

Advancing Responsible Adolescent Development

Richard Jessor

Problem Behavior Theory and Adolescent Health

The Collected Works of Richard Jessor,
Volume 2

 Springer

Advancing Responsible Adolescent Development

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Volume 2

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*For
Kim & Tom
&
In Memory of Lee*

Preface

This second volume in the three-volume series of my Collected Works has brought together selected publications from a corpus of work over the past half century that has deepened understanding of adolescent health and of the various factors that can compromise or enhance it. As the introductory chapter seeks to make clear, the modern concept of *health* encompasses far more than biology alone and is inextricably a psychosocial notion as well. Understanding the health of adolescents and young adults from a psychosocial perspective requires a grasp on their behavior, the social context in which their lives are played out, and the trajectory of the life course that is being pursued. It is these latter psychosocial aspects that have made the application of Problem Behavior Theory germane for research to advance understanding of adolescent health.

The life stage of adolescence happens to be that segment of the larger life course in which nearly all of the behaviors of interest in this volume are first initiated and the stage in which the determinants of those behaviors are established or consolidated. In that respect, it constitutes a developmental demarcation that is of overriding importance, not only in its implications for health during adolescence itself, but for the fact that what constitutes health in adolescence has reverberating consequences for health in young adulthood and across the later life course.

Although a large number of different health-related behaviors are addressed in the various chapters that follow, it is not intended to be an exhaustive list. What constitutes health-compromising or health-enhancing behavior is not simply inherent in the behaviors themselves but depends in many cases on the social or personal meanings they have or the functions they serve at a particular time in history or at a particular stage of the life course. The meaning of marijuana use, for example, has changed markedly in recent years, from an illegal behavior engaging in which was often an expression of opposition to established authority, to a legal behavior recognized for its medicinal benefits in many states and now acceptable even for recreational purposes in several states. As another example, underage alcohol use has a different meaning and function and elicits a different societal response than alcohol use in adulthood. In addition, technological developments can create new health-related behaviors, e.g., excessive engagement with social media and cyber bullying.

It is also the case that particular health-related behaviors can generate prominent public concern at different historical times and elicit strong societal reactions that can intensify the health impact of those behaviors—teenage pregnancy, drunk driving, and opiate use as examples. Rather than exhaustiveness, the selections in this volume exemplify the impact that a particular subset of behaviors can have on variation in adolescent health.

The diversity of the health-related behaviors dealt with in this volume is notable, unprotected sexual intercourse and risky driving as just two examples of difference. What is important to emphasize—and it is the overriding contribution of the volume—is that, despite such diversity, all these behaviors yield to the very same explanatory account, namely, the account provided by the risk and protective factor constructs of Problem Behavior Theory. *The explanatory role of Problem Behavior Theory is what animates all of the studies reported in the chapters in this book.*

In the Preface to Volume I of my Collected Works, *The Origins and Development of Problem Behavior Theory*, I sought to acknowledge those to whom I am indebted for this cumulative body of theory-guided scholarship. Let me repeat here my indebtedness to all of my students, many of whose names are attached to chapters in this and the earlier volume, and many of whom have gone on to their own careers of scholarly inquiry. My indebtedness extends also to my colleagues whose ideas and hard work have been an enormous and enduring contribution, especially Dr. Lee Jessor early on, and Drs. John E. Donovan and Frances M. Costa in the later years, along with Mark Turbin.

I am also indebted to Dr. David Hamburg for encouraging me to engage with the problem of adolescent health in 1978 and for subsequently inviting me to serve on the Carnegie Council on Adolescent Development, a position that broadened my perspective and deepened my understanding of the adolescent life stage. My years involved with the WHO/NIAAA cross-national research project in Zambia, Mexico, and Scotland, and with the W.T. Grant Foundation-funded Denver/Beijing cross-national, comparative study enlarged my awareness of adolescence in the developing world. That awareness was extended by subsequent collaborations with colleagues (now friends) at the African Population and Health Research Center in Nairobi in research on young people in the city's surrounding slums. And my membership on the National Research Council's Panel on Transitions to Adulthood in Developing Countries, under the superb leadership of Cynthia B. Lloyd, provided an extraordinary opportunity to learn more about the changes and challenges facing youth in the nonindustrialized, globalizing world. It has been this fortunate background in cross-national inquiry that helped to reveal the explanatory generality that psychosocial theory—in this case Problem Behavior Theory—can provide about adolescent health across the most diverse of national and societal contexts.

I want also to recognize the exceptional dedication and commitment of Lindy Shultz and Nancy Thorwardson to this publication endeavor. I am deeply grateful for their efforts, and it could not have been successful without them. I am also grateful for the extensive of Elisa Elvove.

Preparing this volume, and the preceding one, has provided me the opportunity to reflect on more than a half century of systematic inquiry about young people across the globe—their experiences, their achievements and setbacks, and the trajectory of their lives. I am indebted to all of them for their participation in my research, indeed, for making my scholarly work possible, and, along the way, for inspiring me with their promise and potential.

Finally, I am indebted to my wife, Jane Menken, whose academic accomplishments have been a model to emulate and whose love has supported my own efforts in that regard.

Boulder, CO

Richard Jessor

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About the Author

Richard Jessor, Ph.D., Sc.D. is Distinguished Professor of Behavioral Science and Professor of Psychology, Emeritus, at the University of Colorado Boulder where he has spent his entire academic career. One of the founders of the university's Institute of Behavioral Science in 1959, he served as its Director from 1980 to 2001. He was Founding Director of the Institute's Research Program on Problem Behavior and, later, its Research Program on Health and Society. From 1987 to 1997, he also directed the Mac Arthur Foundation's Research Network on Successful Adolescent Development among Youth in High Risk Settings. He is the author or editor of ten books and has published over 135 articles and book chapters. In 2003, he was designated a "Highly Cited Researcher" in the Social Science: General category by the Institute for Scientific Information.

Educated at the College of the City of New York and Yale University, where he received his B.A. degree in Psychology in 1946, Jessor received an M.A. from Columbia University in 1947 and a Ph.D. in Clinical Psychology in 1951 from Ohio State University, where he was a student of Julian B. Rotter. He has been a consultant to various federal agencies and private foundations as well as the World Health Organization, Health and Welfare Canada, and UNICEF. He has served on several National Research Council panels and on the Carnegie Council on Adolescent Development. He was an invited Fellow at the Center for Advanced Study in the Behavioral Sciences in 1995–1996, and he received the Outstanding Achievement in Adolescent Medicine Award in 2005 from the Society for Adolescent Medicine. Jessor is, after 65 years, the longest-serving active faculty member at the University of Colorado. In May 2015, he was awarded the degree of Doctor of Science, *honoris causa*, by the Regents of the University of Colorado.

Chapter 1

Introduction to the Volume

Richard Jessor

The first volume in the series of my Collected Works (Jessor, 2016) provided a perspective on the origins and development of Problem Behavior Theory; this second volume provides a panoptical view of the application of that theory in a wide range of studies having implications for adolescent and young adult health. The research selected for inclusion spans an array of behaviors, most of which can compromise healthy development in this critical segment of the life course and some of which can enhance it. The chapters report research that ranges across alcohol use and problem drinking, involvement with marijuana and other illicit drugs, cigarette smoking, early initiation of sexual intercourse experience, delinquent behavior, and risky driving—all of them behaviors that, for adolescents, represent departures from social or legal norms—as well as other behaviors such as unhealthy diet and limited exercise that, while not necessarily transgressing social or legal norms, nevertheless can also impair adolescent health and development. The chapters also include reports of pro-social or health-enhancing behaviors—school involvement, church attendance, and adequate sleep hours—that can have a positive impact on adolescent health and well-being. Overall, then, this volume constitutes a sourcebook for the contribution that Problem Behavior Theory research has made across recent decades to an understanding of adolescent health.

Toward a Broader Concept of Health

Although traditionally the province of medicine with its focus on the body, the concept of *health* has come to be seen as a more problematic notion, one that requires reexamination and extension. Until recently, the concept of health has rested on an

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almost exclusive concern with biological parameters of physical health, and health status itself has largely been considered a residual—simply the absence of disease or disability. The limitations of this “medical model” of health—for example, its inability to account for the increasing prevalence of chronic diseases such as type 2 diabetes, or for the emergence of new epidemics such as HIV/AIDS—have become more evident as understanding of the *causes* of variation in health and illness has begun to require a grasp on the role of the social environment and of the behaviors that people engage in.

The newer paradigm that has emerged in regard to health has entailed a move toward encompassing *behavior*—what people do in their everyday lives—and the *social context* in which their everyday lives are played out, that is, it has been a move beyond a sole focus on biology toward engaging a social and psychological perspective on the meaning of health as well.

There have been various antecedents that have influenced this radical shift in thinking about the concept of health. Among them have been the explorations of the new field of social epidemiology (e.g., Berkman & Kawachi, 2000) with its articulation of the social determinants of health; the burgeoning of concern for health *promotion* (e.g., the Lalonde Report, 1974) to supplement, or provide an alternative to, the traditional preoccupation of medicine with disease prevention; and a very early influence of the challenge presented by the remarkably expansive definition of health adopted by the World Health Organization: “... a state of complete physical, mental, or social well-being and not merely the absence of disease or infirmity” (World Health Organization, 1946).

An additional sign of the shift was remarks made by the renowned epidemiologist, Milton Terris (1983), who chastised his fellow health workers for largely ignoring “... the whole complex of social and other environmental factors ...” that can impact health. And there has been a growing awareness that a large portion of the so-called global burden of illness and disease, both communicable and noncommunicable—from HIV/AIDS to cardiovascular disease, to diabetes, to cancer, etc.—is due to the vicissitudes of human behavior (World Health Organization, 2009). This newer way of thinking about health, in short, emphasizes its embeddedness in the socially organized context of everyday life and the behavioral adaptations that are made to that everyday life. It is of historical interest that such a modern perspective on health was actually anticipated by the great nineteenth-century German physician/scientist, Rudolph Virchow, whose remarkably prescient assertion in his book, *Disease, Life, and Man*, was that: “Medicine is a social science in its very bone marrow” (1958).

It has been this contemporary orientation about health—its engagement with behavior in social context—that has made Problem Behavior Theory apposite for achieving a fuller understanding of adolescent health. From its earliest formulation (Jessor, Graves, Hanson, & Jessor, 1968), Problem Behavior Theory has focused on accounting for problem behaviors, most of which are health-compromising behaviors as well, behaviors that can jeopardize not only physical health (e.g., heavy alcohol use, cigarette smoking, violence), but also social, personal, and developmental health. In this expanded way of thinking about adolescent health, engaging in early sexual intercourse, disengaging from school, or excessive involvement with drugs can all put adolescent health at risk. Such behaviors can compromise health

and development by impeding an adolescent's fulfillment of the developmental tasks that are expected at the adolescent life stage: occupying appropriate social roles, e.g., that of student; acquiring essential academic and social skills; achieving a personal sense of adequacy and competence; and gaining the human capital for successful transition to young adulthood, among others.

The Emergence of the Concept of Behavioral Health

It was in 1977 that Lee Jessor and I published a book reporting the findings from our 4-year longitudinal study of adolescent cohorts starting in middle school and of a cohort of freshmen starting college. The book, *Problem Behavior and Psychosocial Development: A Longitudinal Study of Youth* (Jessor, R. and Jessor, S. L.), received very positive reviews, e.g., "... the study should become a classic, not only for causation-relevant data and results but also as a rare and beautiful illustration of theoretically based, longitudinal-correlational research framed so as to contribute greatly to personality and social development models" (Huba, 1978, p. 631).

When a fortuitous invitation arrived from Dr. David Hamburg, then President of the Institute of Medicine, National Academy of Sciences, to participate in a Conference on Adolescent Behavior and Health in the summer of 1978, I felt primed by the findings in our book to make an initial explanatory foray into the domain of adolescent health. I tried in my presentation at the conference (see Institute of Medicine, Report of Conference, 1978) to distill from those research findings implications that might inform thinking about health from a psychosocial and developmental perspective. The overriding implication that was apparent from our research was that, beyond the traditional medical focus on infectious agents and chronic disease processes, it was the *behaviors* of adolescents—what they were doing—that were determinative in large part of their health and developmental status.

That conclusion reflected and was part of the emergence of the now widely employed notion of *behavioral health* (Matarazzo, et al., 1984), a notion that captures the pervasive role that behavior plays in regard to health—whether it is overeating, or sedentariness, or unsanitary habits, or unprotected sex, or smoking, or violence, on the one hand, or school involvement, civic participation, or church attendance, on the other—and that incorporates consequences not only for the body but also for an adolescent's place on the trajectory of normal or successful or, indeed, healthy development. In Chap. 22 in this volume, this behavioral health perspective is elaborated.

The Meanings or Functions of Health-Compromising Behavior

Several other important implications for adolescent health derive from the problem behavior research in our 1977 book and from our decades of inquiry on health-related behavior that followed. First, all of the problem behaviors we have studied

can also be seen, given the modern broadening of the concept of health, as health-compromising behaviors. For example, early sexual experience or excessive involvement with alcohol, behaviors that were of initial interest to us as violations of social or legal norms for adolescents, were, at the same time, of interest to workers in the health field as risk factors for compromising adolescent health and development. Second, health-compromising behaviors—like all social behavior—are best understood as socially learned and personally functional or goal directed for the adolescent. Despite being normative transgressions, problem behaviors such as illicit drug use or early sexual intercourse are behaviors that have important meanings and serve important functions for the adolescent, and those meanings and functions are essential to grasp if one hopes to understand or influence adolescent health. The behavior of alcohol use, for example, can be a socially learned way for the adolescent to cope with frustration, failure, or fear of failure; the behavior of marijuana use can represent for an adolescent a way of expressing opposition to conventional society; the behavior of cigarette smoking can be a way of demonstrating solidarity and identification with peers; the behavior of early sex can constitute the making of a claim on a more mature status or represent an attempt to transition to young adulthood. All of these possible functions of health-compromising behaviors involve goals, e.g., independence or autonomy and acceptance by peers, that play a key part in *normal* adolescent development. It follows that efforts to prevent their occurrence, or to promote less health-compromising behaviors, can be successful only if they provide alternative ways to achieve those very same goals.

The Covariation of Health-Compromising Behavior

Third, Problem Behavior Theory research has advanced the understanding of behavioral health by showing that health-compromising problem behaviors tend to co-occur or covary in the adolescent's repertoire and to constitute what we termed, in our 1977 book, a *problem behavior syndrome*. Decades of research since then, by other scholars as well as by our own group (see Chaps. 6 and 7 in Jessor, 2016), have not only validated the syndrome notion for problem behaviors but have shown that *pro-social and health-enhancing behaviors also covary* and that, indeed, the latter relate inversely to problem behaviors, as theoretically expected (see Chap. 11 in Jessor, 2016). That body of research called into question the convention among health workers of specializing in individual health-related behaviors—drinking, or smoking, or early sex, or delinquency, or unhealthy diet, or sedentariness, or risky driving—and led to the recognition that there is *organization* or coherence among the diverse behaviors that an adolescent engages in. To capture the covariation initially revealed by the problem behavior syndrome findings, we brought to bear the concept of *lifestyle* (Sobel, 1981), a notion that reflects the organized behavioral diversity of an adolescent's overall way of being in the world. The important implication of the *health lifestyle* notion for behavioral health research, as well as for the design of prevention/intervention programs, is that understanding of an adolescent's health, or attempts to influence it, cannot be accomplished one behavior at a time.

The chapters in this volume, although organized by particular problem or health-compromising behaviors, e.g., drinking and problem drinking, marijuana use, early sexual experience, and risky driving, all report the covariation of that particular behavior with other health-related behaviors, and emphasize the importance of engaging the organization of the behavior *system* as a whole.

Unfortunately, nearly four decades later this emphasis is still not the tradition in the health field as was lamented recently at a conference sponsored by the National Cancer Institute (Klein, Grenen, O’Connell, et al., 2016): “Health behaviors often co-occur and have common determinants ... Nevertheless, research programs often examine single health behaviors without a systematic attempt to integrate knowledge across behaviors.” (p. 1). And, “Integrating knowledge across behavioral domains is a public health imperative” (p. 6).

The Contribution of Psychosocial Theory to Adolescent Health

A fourth contribution of Problem Behavior Theory research to the health field has been the demonstration that *theory* can play an irreplaceable role in efforts to account for variation in adolescent health-related behavior. The exposition in our 1977 book of the three explanatory systems of Problem Behavior Theory—personality, perceived environment, and behavior—and of the significant explanatory contribution that each system made provided an exemplar for health professionals to emulate in their research on adolescent health. Engaging Problem Behavior Theory, a “theory of the middle range” (Merton, 1957), enabled the derivation of construct-valid questionnaire measures and the logical specification of testable hypotheses. Reliance on theory to guide social-psychological measurement and research was not the dominant style of inquiry at that time, and it is unfortunate that theory continues to be only sparsely engaged, even today. Indeed, in an insightful commentary on contemporary research on adolescent development, Michael Lamb laments the fact that “... the majority of studies are effectively atheoretical, with the occasional theoretical gloss added to provide a patina of respectability rather than to articulate an explicit framework in which the research was grounded” (2015, p. 117).

By contrast, Problem Behavior Theory has been essential as the guiding framework for our developmental research for the past half-century. The version of the theory that was described in our 1977 book, with its three explanatory systems of personality, perceived environment, and behavior, can also be found in Volume I of this series (Jessor, R., 2016; Chap. 2, p. 24). That chapter describes the evolution of the theory from its inception in the late 1960s through its various reformulations to the latest version. The current formulation of Problem Behavior Theory is presented in Fig. 1.1.

The theory’s predictor constructs are now expressed in risk factor and protective factor terminology to facilitate communication with workers in the health field who are more familiar with and rely on those terms. The predictor variables that were in the three explanatory systems of the earlier formulations of the theory were con-

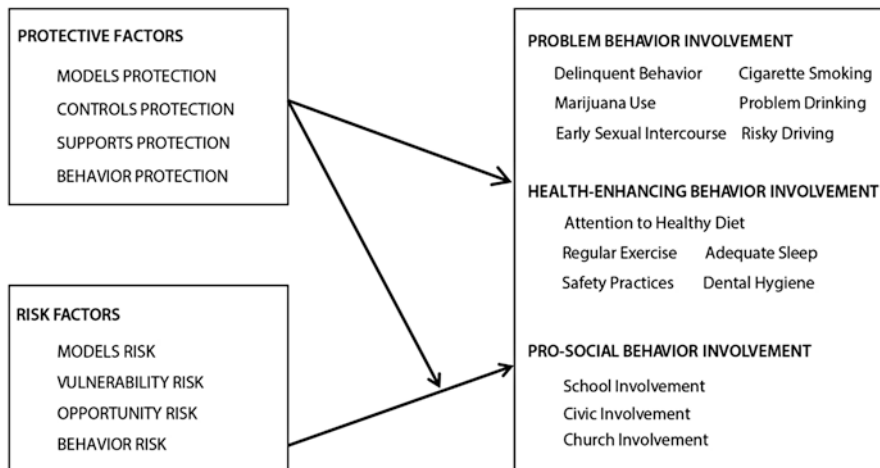


Fig. 1.1 Problem Behavior Theory explanatory model for adolescent risk behavior

served and translated into the protective factor and risk factor constructs that are shown in the two left-hand boxes in Fig. 1.1. The key dialectic between protection and risk, and the moderator effect of protection on risk (see the directional arrows), remains the central dynamics of the theory. For each of the health-compromising behavior topics in this volume, e.g., alcohol use, the studies reported in the earlier chapters on that topic all employed the 1977 formulation of the theory, engaging the variables articulated in the three explanatory systems, whereas the chapters reporting our later studies on that same topic have all employed the protective factor/risk factor version shown here in Fig. 1.1.

The illustrative variables in the right-hand box in Fig. 1.1 are all health-related behaviors, some of them health compromising and some health enhancing, but all of them constituting either protective factors or risk factors for adolescent health and development outcomes. In this current formulation of the theoretical framework, then, it is those behaviors on the right side that are behavioral protective factors or risk factors for adolescent health and development. It is the psychosocial theoretical constructs on the left-hand side that serve as determinants, i.e., as protective factors and risk factors for the behavioral protective factors and risk factors on the right-hand side.

Understanding Behavioral Health Development

Finally, the research presented in our 1977 book introduced a *developmental* approach to the understanding of problem behaviors and provided, thereby, a developmental template for health-related behavior research that was longitudinal or time extended in design. The theoretical constructs in the three explanatory

systems of Problem Behavior Theory were shown in that work to provide a substantial account not only of cross-sectional variation in problem behavior involvement, but also for *developmental variation* over significant intervals of subsequent time. For example, measures of the variables in the three explanatory systems that were collected in Wave I for the middle-school cohorts were predictive of variation in later problem behavior involvement in high school; measures collected in Wave I for the college freshmen were predictive of problem behavior involvement in later college years. As another developmental example, the Wave I theoretical measures for those adolescents who had not yet engaged in a particular problem behavior, i.e., had not had their first drink, had not yet used marijuana, or had not yet had sexual intercourse experience, were shown to predict the *variation in timing* of subsequent onset or initiation of those behaviors over the later years of the longitudinal study.

These latter findings led us to introduce a new *developmental* concept, *transition proneness*, to complement the *cross-sectional* concept in the theory of *problem behavior proneness*. Transition proneness is a construct that represents a theoretically specified, differential adolescent *readiness to initiate new behaviors*, behaviors that can mark a change in developmental status: from abstainer to drinker, from nonuser of marijuana to user, from virgin to nonvirgin. This contribution of a *developmental* perspective on adolescent and young adult behavioral health is evident in several of the studies of the various health-compromising behaviors reported in the chapters in this volume.

Continuity of Health-Related Psychosocial and Behavioral Development

Among our important developmental findings relevant for adolescent health, in addition to the establishment of a psychosocial *readiness* to initiate new health-related behaviors (i.e., transition proneness), two other findings warrant mention. First, the longitudinal design of several of our studies revealed a significant degree of *continuity* in health-related behavior involvement and in its psychosocial determinants, both within the adolescent life stage and between adolescence and young adulthood (Jessor, R. & Jessor, S. L., 1977; Jessor, Donovan, & Costa, 1991). Although considerable developmental change in involvement in these behaviors and in their psychosocial determinants occurs across those life stages, the correlations between the measures collected in early adolescence and the later measures collected in young adulthood are substantial, meaning that, despite considerable developmental change, an adolescent's position relative to the distribution is largely conserved. An adolescent who was drinking more heavily than others may have reduced his or her drinking by young adulthood, but he or she will still be drinking more than others in young adulthood. That same adolescent with perhaps a high value on independence in adolescence may have come to place less importance on

independence by young adulthood, but he or she will still consider it as a more important personal value than others do. This continuity in personality, perceived environment, and behavior across the adolescence/young adulthood portion of the developmental trajectory—this *stability of change* (Jessor, 1983)—has implications for what to focus on and when to do so in efforts to prevent health-compromising behavior or to moderate involvement in it. Such continuity speaks again to the role played by the relative stability of a lifestyle—an adolescent’s organized way of being in the world—and the importance, in designing intervention programs, of dealing with the adolescent as a whole rather than behavior by behavior.

The Direction of Psychosocial and Behavioral Development: From Unconventionality Within Adolescence Toward Conventionality in Young Adulthood

The other important developmental research finding that warrants mention is that the *direction of psychosocial and behavioral development* from early to later adolescence was shown to be *toward greater unconventionality*, that is, toward greater involvement in problem or health-compromising behavior and in their psychosocial determinants. By contrast, the direction of development from early to later young adulthood was shown to be the opposite, that is, *toward greater conventionality*, lesser involvement in problem or health-compromising behavior, and lesser commitment to its psychosocial determinants (see Chaps. 24 and 25). As an example, there was a general increase in alcohol use from early to later adolescence as well as a theoretically consonant increase in value on independence in the personality system, an increase in models for drinking in the perceived environment system, an increase in cigarette smoking, and a decrease in church attendance in the behavior system. This theoretically coherent pattern across adolescence is then reversed across young adulthood, with a general decrease in alcohol use, a decrease in value on independence, a decrease in models for drinking, a decrease in cigarette smoking, and an increase in church attendance and other conventional behaviors.

There is a parallel in these important health-related developmental findings to what has become known in the criminal justice field as the “maturing out” of involvement with delinquency and crime, that is, desistance from it, with entry into young adulthood and with having to assume the adult roles of work, family, and child-rearing (Laub and Sampson, 1993). As a general direction of normal development from adolescence into young adulthood, a moving away from health-compromising problem behavior involvement, this is a salutary finding in its own right, and it also suggests caution about radical, early interventions for what are, for the most part, merely behavioral explorations. Such interventions may not only be unwise, but also be unwarranted.

Some Final Comments

The chapters in this volume constitute a sampling of our studies applying Problem Behavior Theory to account for variation in aspects of adolescent health. The original concern of the theory with adolescent behaviors that represented departures from social or legal norms was enlarged when it became apparent that those same behaviors were also health related and could compromise adolescent health and development. Enlargement of the scope of application of the theory contributed to the emergence of the concept of *behavioral health*, a concept that refers to the substantial role that behavior-in-social context plays in health and illness. It also was accompanied by an awareness that the notion of health could not be exhausted by recourse to biological parameters alone, but that it implicated a wider social-psychological perspective, one that includes the sense of well-being, feelings of adequacy and competence, acquisition of human capital appropriate to the adolescent life stage, and occupying a position of being developmentally “on track,” rather than having dropped out of school, gotten pregnant, or been involved with the criminal justice system.

What has been most salient across our decades of health-related inquiry is the indispensable role that *theory* has played in what has been accomplished. Problem Behavior Theory has been able to illuminate the contribution made by all three of the explanatory systems it engages—personality, perceived environment, and behavior—and has made evident the insufficiency of any less comprehensive approach. It has also revealed that adolescent behaviors represent an organized *system* rather than a congeries of separate behaviors, and that led us to the concept of a *problem behavior syndrome* and, in turn, to that of a *health lifestyle*. The theory has also shown that the very same pattern of theoretical explanatory variables, a pattern summarized as *problem behavior proneness*, can account for variation in the diverse array of topographically different problem behaviors that it has addressed. That common theoretical etiology across such diverse behaviors is what underlies, at least in part, the covariation observed among them.

Finally, the theory was shown to account for *development and change* in health-related behaviors from adolescence into young adulthood, development that, within adolescence, is toward an *increase in unconventionality* and, within young adulthood, becomes the reverse, an *increase in conventionality*. In the language of the current formulation of Problem Behavior Theory shown in Fig. 1.1, developmental change toward greater conventionality entails, among the protective factors: an increase in models for pro-social behavior; an increase in personal and social controls; an increase in social support for pro-social behavior; and an increase in pro-social behavior involvement. Among the risk factors, developmental change toward greater conventionality in young adulthood entails: a decrease in models for problem or risk behavior; a decrease in personal vulnerability; a decrease in opportunity for engaging in problem or risk behaviors; and a decrease in problem or risk behavior involvement.

Overall, as a social-psychological framework engaging the fundamental processes of behavior acquisition and change, i.e., models, controls, and supports in its most recent formulation, Problem Behavior Theory has been shown to have explanatory generality across such widely divergent societies as The Peoples' Republic of China and the USA (see Chaps. 28 and 29; also Jessor, R. 2008). It has brought illumination to an important social problem, *adolescent health*, for both developed and developing societies across the globe. Much more remains to be learned, of course, but reliance on the theory appears already to have substantially advanced psychosocial understanding of adolescent health. That advanced understanding is evident in the chapters that follow.

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Part I
Health-Related Problem Behaviors:
Drinking and Problem Drinking

Chapter 2

Predicting the Initiation of Alcohol Use

Richard Jessor, Mary I. Collins, and Shirley L. Jessor

The course of psychosocial development is often marked by the appearance, for the first time, of certain new behaviors, behaviors not previously part of the individual's repertoire. During adolescence, especially, engaging in certain behaviors for the first time serves to define or lay claim to important changes in status that cumulate in the transition between childhood and adulthood. Among behaviors having this function are those that are institutionally recognized as permitted or prescribed components of a more mature status while being discouraged or proscribed for the incumbents of a less mature status. Examples, such as "looking for a job" or "having sexual intercourse," would include also, for many adolescents in American society, "beginning to drink."

Although conceptualizing the appearance of such behaviors as part of an adolescent transition suggests some of the probable goals involved, it does not offer a sufficient explanation of why some adolescents engage in the behavior and others do not. More important, it does not explain why the behavior appears early in adolescence for some and occurs much later for others. Additional explanatory concepts are obviously required to account for the variation in occurrence and time of occurrence of behaviors, such as drinking, that may mark a status transition during adolescence.

As long as an adolescent occupies a status (or an age) in which certain behaviors are discouraged or proscribed, it is useful to consider his engaging in them as departures from regulatory norms. An understanding of behavior that departs from norms may be derived from a social psychology of deviant behavior (see, for example, Jessor, Graves, Hanson, & Jessor, 1968). Such variables as personal values and expectations that can serve as instigators to transgression, individual attitudes and orientations that can serve as personal controls against transgression, and social

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supports and controls that characterize the context in which such behavior occurs—all should have some relation to variation in occurrence and in age of onset of behaviors that are normatively proscribed during adolescence.

Since the proscriptions against many of the behaviors that mark adolescent transitions are actually age- or status-related rather than absolute (the proscriptions tend to be withdrawn or to become inoperative when a certain age is reached, e.g., for drinking, or when a certain status is achieved, e.g., marriage, for sexual intercourse), the most important issue to account for in such cases is not the occurrence-nonoccurrence of the behavior but rather the differential time of its occurrence or age of its onset. It is this fundamental issue of variation in the age of onset of temporarily proscribed behaviors that encourages a coalescence of the social psychologies of deviant behavior and of adolescent development.

As it turns out, several of the aspects cited as characteristics of adolescent development in general in contemporary American society would also be relevant to an account, for individual adolescents, of the factors in transgressions linked to status changes: the importance of independence from adults, the decreasing involvement with the values of the conventional society, the growing tolerance for departures from conventional norms, the attenuated impact of institutionalized social controls, and the increasing centrality of peer support in influencing behavior choice. The relation of social-psychological factors such as these to the process of “becoming a drinker” was the specific focus of the present study of adolescent development.

A relatively unique opportunity to carry out such an investigation was provided by the longitudinal nature of our larger study of the socialization of problem behavior in youth. The larger study is designed to follow adolescents through a four-year period of time, with comprehensive personality, social, and behavioral measures being collected on each subject on an annual basis. By the end of the second year of the study, it was possible to identify two key groups of adolescents: those who were abstainers at year I and remained so at year II of the study, and those who had been abstainers at year I but who had begun to drink by year II. A comparison of the personality and social characteristics of these two groups at year I, when they were *both* comprised of abstainers, would enable us to see whether the expected social-psychological differences already obtained—differences that were to be predictive of the fact that one group would undergo a status transition within the subsequent year, that is, would change from abstinence to drinking, while the other group would continue to remain abstinent.

Two general hypotheses guided the study. Hypothesis one was that there are significant *initial* (year I) differences in social and personality attributes between abstainers who will remain abstainers a year later and abstainers who will have begun to drink by a year later. The social and personality attributes on which initial differences were expected to obtain follow from those mentioned earlier; in general, those who will engage in the transition-marking behavior of drinking should place greater importance on independence, less importance on such conventional goals as academic achievement, have more tolerant attitudes toward transgression, and perceive more social support for drinking than those who will remain abstainers. The full set of hypothesized initial differences between the two groups will be specified below, once the various measures have been presented. Hypothesis two was that, beyond such initial differences between the two groups, those abstainers who have

become drinkers by a year later will have undergone greater drinker-prone *change* on the set of social and personality measures than those abstainers who have remained abstainers. These two hypotheses, one about initial differences and one about differential amount of change, are independent approaches to the prediction of variation in the onset of drinking behavior among adolescents.

Method

Subjects

The subjects of the study are part of a larger cohort of junior-senior high school students who are being followed over a four-year period of time. A random sample of students, stratified by sex and grade level, was originally selected from the enrollment at three junior and three senior high schools in a single school district in a small city in one of the Rocky Mountain states. The entire sample was individually contacted by letter and asked to participate in a study of the personality and social development of youth. Parents of the subjects were also contacted directly by letter and asked for signed permission for their child's participation in the research. Of the designated sample of 2,220 students, 949 (42%) participated in the first year of data collection in April, 1969, and became the basic, starting cohort for the longitudinal study. A year later, in April, 1970, a total of 692 of these students participated again in the second year of data collection.¹ This number is 81% of all those who had not graduated in the interim and were still available (the cohort retention rate was 87% at the junior high level and 69% at the senior high level).

Procedure

Data were collected by means of an elaborate questionnaire (48 pages in length in year I and 54 pages in year II) that consisted of a large number of carefully developed psychometric measures or indexes of a variety of personality, social,

¹Although persistent follow-up efforts were made to gain the cooperation of the 2220 subjects initially designated, the fact that parental permission was a necessity and the fact that participation required remaining after school for an hour and a half or so on a Spring afternoon both contributed to the lower than desirable initial percentage of participation. Retention between years I and II was, however, at a very acceptable level; the overall retention rate of 81% is satisfactory and probably reflects the commitment of the starting cohort to the study, as well as the fact that participants in year II were paid the sum of \$2.00 as compensation for the time involved. Students who moved away from the community were contacted and sent the questionnaire to be filled out and returned by mail. The fact that only 42% of the originally designated random sample of students ultimately participated in the research means that findings on the starting cohort cannot be generalized back with confidence as descriptive of the school population. While this limitation is unfortunate, it does not in any way preclude the testing of hypotheses nor does it diminish the significance of developmental analyses of the starting cohort itself.

behavioral, and demographic attributes. Many of the measures had been devised and validated for previous research (Jessor, Carman, & Grossman, 1968; Jessor, Graves, Hanson, & Jessor, 1968; Jessor, Young, Young, & Tesi, 1970). The questionnaire was pretested with samples from three local schools not included in the final study, and revisions were made on the basis of the pretest findings.

Group administration of the questionnaire took place immediately after school hours at each of the schools. Since many of the questions dealt with personal or intimate material, confidentiality was guaranteed each subject. Questionnaires were dealt with by code number only; the name sheets associated with the code number were removed from the booklets upon completion and stored in a safe deposit box in a bank vault where they could be consulted when necessary. Students' written reactions to the questionnaire were solicited upon completion, and their comments indicate that they found it an interesting and personally worthwhile experience on the whole.

Establishment of Drinker-Status Groups

One section of the questionnaire consists of a detailed inquiry about various aspects of drinking behavior, including frequency of drinking occasions, average intake per occasion, reasons for drinking, and negative consequences of drinking. This section was introduced, in year II, by two questions used to determine drinker status:

1. Have you ever had a drink of beer, wine, or liquor—not just a sip or a taste? (A sip or a taste is just a small amount or a part of someone else's drink, or a swallow or two; a drink would be more than that.)
2. Have you had a drink of beer, wine, or liquor *more than two or three times in your life?*

All subjects who answered "Yes" to *both* questions were classified as drinkers; all others were classified as abstainers.² It was possible to classify 666 of the 692 subjects who took the questionnaire both years as to their drinker status at *both* year I and year II (because of a change in wording from year I to year II, 26 subjects could not be classified with confidence and were dropped from further analyses). The drinker status breakdown that emerged is as follows:

	Group	<i>N</i>	Year I Status	Year II Status
A.	Ab. I–Ab. II	221	Abstainer	Abstainer
B.	Ab. I–Dr. II	77	Abstainer	Drinker
C.	Dr. I–Dr. II	368	Drinker	Drinker

²The concept of "abstainer" as used here applies to those who have never used alcohol, rather than to those who may have used it previously and no longer do. The present definition is consistent with our interest in "beginning to drink" as a status-transition behavior. Abstainers, in this study, may be considered as *those who have not yet begun to drink*; the aim of the research is to predict which of them will begin drinking in the subsequent year.

The breakdown indicates that of the 298 abstainers in year I, 221 remained abstainers in year II, while 77 had become drinkers by year II. It is the comparison of these two groups, group A, which did not undergo a change of status during the year, and group B, which did, that is the central concern of this paper. The 368 students who were drinkers in both years, group C, will serve as a reference point in the comparison of groups A and B and in the interpretation of the differences between them.³

Since it was important to rule out the possibility that age itself would account for the differential change from abstainer to drinker, groups A and B were analyzed for age differences. While mean age in months is slightly higher for group B members, the majority of grade level differences are one month or less, and the age ranges of group A and group B subjects at each grade level fully overlap each other. There is no basis, therefore, for recourse to age differences to account for drinker status change.

Another factor of interpretive concern was differential parental compliance with drinking. With respect to parental *attitude* about adolescent drinking, there is no significant difference between the groups—94% of group A and 88% of group B report their parents as disapproving of teenage drinking. With respect to actual parental *behavior*, 70% of the group A parents are reported to drink, while the figure is 84% for the parents of group B. Although this difference is small, it reaches significance in a chi-square test. Consequently, differential parental modeling of drinking had to be examined as a possible factor influencing change in drinker status among the adolescents. Analyses of variance of the year I data (see Table 2.1) yielded no interaction between parental modeling and drinker status in relation to any of the psychological or social predictors. It was possible, therefore, to rule out parental compliance, both in terms of attitude and of modeling behavior, as influencing the change in drinker status.

Measures

The specific measures employed in the present study are derived from the larger questionnaire, which is designed to assess a variety of variables having to do with instigation to nonconformity, deviance, or problem behavior, with personal and social controls against such behavior and with sources of learning and reinforcement or support for such behavior. A brief description of each of the measures in the year I form of the questionnaire is presented in Jessor (1969).

³The sex and school-level composition of each drinker-status group is as follows: group A (male junior high, $N = 84$; female junior high, $N = 100$; male senior high, $N = 12$; female senior high, $N = 25$); group B (male junior high, $N = 19$; female junior high, $N = 41$; male senior high, $N = 4$; female senior high, $N = 13$); group C (male junior high, $N = 120$; female junior high, $N = 126$; male senior high, $N = 40$; female senior high, $N = 82$). The data to be presented are by the drinker-status groups, A, B, and C, as a whole. Analyses were also carried out by sex and school levels; they indicate highly consistent findings for all sex-by school-level subgroups, which provided justification for combining them as indicated.

Table 2.1 Mean Scores on Personality, Social, and Behavioral Measures Obtained in Year I for Three Drinker-Status Groups

Group Mean Scores on Year I Measures				
Measure	Group A	Group B	Group C	Significance Group A vs Group B
	Ab. I–Ab. II (<i>N</i> = 221)	Ab. I–Dr. II (<i>N</i> = 77)	Dr. I–Dr. II (<i>N</i> = 368)	
Personality				
PV-ACR	74.9	68.6	67.3	**
PV-Ind	68.5	70.0	72.9	NS
E-ACR	59.9	54.0	53.4	*
I-E	42.5	42.1	41.0	NS
ATD	188.6	180.9	162.0	*
Religios.	14.8	14.5	12.6	NS
Perceived Social Environment				
Fam. Contr.	6.8	6.6	6.7	NS
Soc. Supp. Dr.	17.7	19.9	24.1	**
Neg. Funct. Dr.	41.3	38.5	32.5	**
Behavioral				
GPA	3.1	2.9	2.8	**
Chu. Attend.	53.0	51.4	34.3	NS
DVB	32.9	35.2	40.5	**

Key: *Mean difference significant at $p < 0.05$, two-tailed t -test; **Mean difference significant at $p < 0.01$, two-tailed t -test; NS: Not significant at $p = 0.05$

In relation to the present focus on the abstainer-to-drinker change during adolescence, the measures listed below follow from and enable a test of the formulation sketched earlier in this paper. More specifically, those most likely to shift to drinking should be those with greater personal instigation to nonconventional behavior (e.g., greater value on independence, lower value on and expectation for such conventional goals as academic achievement), with lesser personal controls against transgression (e.g., greater tolerance of deviance, lower involvement with religion), with lesser social controls against deviance from either parents or institutions such as the church, and, finally, with greater social support for drinking behavior itself. All of the measures have been examined for adequacy of internal psychometric properties and, with one or two exceptions, are characterized by satisfactory homogeneity ratios and Cronbach alphas.

Personality Measures

1. *PV-ACR*: a 10-item rating scale measure of the personal value placed on academic recognition or achievement. A high score suggests commitment to the conventional goal of school success.

2. *PV-Ind*: a 10-item rating scale measure of the personal value placed on independence. A high score indicates an emphasis on autonomous decision and self-determination of life style.
3. *E-ACR*: a 10-item rating scale measure of the degree to which the subject expects to attain academic recognition. A high score indicates high expectation of achievement goals.
4. *I-E*: a 15-item Likert-type scale measuring the generalized belief in internal versus external control. A high score indicates a high internal control orientation.
5. *ATD*: a 30-item scale measuring degree of attitudinal tolerance of transgression. A high score indicates intolerance of deviance. *ATD* is considered to be a personal control measure.
6. *Religios.*: a five-item Likert-type scale of religiosity, the degree of involvement with religion, and the personal importance of religious practices. *Religios.* is also interpreted as a personal control measure.

Perceived Social Environment Measures

7. *Fam. Contr.*: a two-item measure of the subject's perception of family control, i.e., the regulation and sanctions likely to be forthcoming from his parents were he to transgress. *Fam. Contr.* is considered to be a social control measure.
8. *Soc. Supp. Dr.*: a nine-item scale of social support for drinking—a measure of opportunity to learn and be reinforced for drinking, especially by peers.
9. *Neg. Func. Dr.*: a ten-item Likert scale of perceived negative aspects or functions of drinking. This measure is considered to reflect a cognitive control against drinking through its anticipated negative outcomes.

Behavior Measures

10. *GPA*: grade-point average, a measure of actual success in school performance. Considered an indirect indicator of conformity to conventional behavior standards.
11. *Chu. Attend.*: frequency of church attendance in the past year, a behavioral measure of involvement in the adult social control system and of exposure to conventional norms.
12. *DVB*: a 30-item measure of frequency of self-reported deviant behavior, an indicator of actual nonconformity (other than drinking) to conventional norms having to do with stealing, fighting, etc.

These 12 measures operationalize the variables to be considered in accounting for the onset of drinking behavior, and all 12 will be examined in relation to both of the hypotheses at issue. Other measures of nonconforming behavior, such as use of

marijuana, social activism, and petting experience were also collected in year II; they will be introduced later, where they can help to illuminate the meaning of the abstainer-to-drinker status change.

Summary of Method and Hypotheses

Three groups of junior-senior high school students were established on the basis of their drinker status measured at two points in time, one year apart. Group A consists of 221 students who were abstainers in year I and remained abstainers in year II (Ab. I–Ab. II); group B consists of 77 students who were abstainers in year I but who changed to drinkers by year II (Ab. I–Dr. II); and group C consists of 368 students who were drinkers in both year I and year II (Dr. I–Dr. II). Questionnaire data collected on all subjects on the two occasions will be used to compare the groups. The main hypotheses guiding the comparison can now be stated more specifically. Hypothesis one is that those abstainers who change their status to drinkers during the subsequent year will show the following *initial* (i.e., year I) differences from those abstainers who remain abstainers: They will have lower value on academic recognition, higher value on independence, lower expectations for academic recognition, lower internal control, greater tolerance of deviance, lower religiosity, lower family control, greater social support for drinking, fewer negative functions of drinking, lower grade-point average, lower church attendance, and higher self-reported deviant behavior. Hypothesis two is that those abstainers who change their status to drinkers during the subsequent year will, compared with those who remain abstainers, show greater *change* on these same measures in the direction represented by the hypothesized initial differences.

Results

Testing Hypothesis One

The first concern of the data presentation is to enable an appraisal of whether change in drinker status a year later can be predicted from personality, social, and behavioral variables measured the year before. The question at issue is whether there are at year I already evident differences between abstainers who will become drinkers by year II (Ab. I–Dr. II) and abstainers who will remain abstainers by year II (Ab. I–Ab. II). Such initial differences could be interpreted as forecasting or representing the preconditions for an impending change, or as incipient indicators of a change process already underway and likely to become more manifest with the passage of time. The relevant data, mean scores on the various measures at year I, are presented in Table 2.1. Means are presented for all three drinker-status groups so that

comparison of the two initially-abstaining groups, groups A and B, can be made against the group that was already drinking at year I, group C.

The findings at year I are of interest for several reasons. Most salient is the fact that on every measure but one (Fam. Contr.), group B mean scores *lie between* those of group A and group C. In other words, the group that we know will change from abstainer to drinker by the following year is consistently closer to the group that already drinks than is the group that will remain abstinent. Even at the outset, then, a year in advance of the measurement of change in drinker status, differences are already evident between the two abstainer groups, A and B. Such differences, viewed in relation to the characteristics of group C, are taken as indicative of group B's *proneness to shift* from abstainer to drinker status.

More than half of the differences between group A and B reach statistical significance and are in the direction expected from the earlier theoretical discussion. Group A, the group that will continue to abstain during the subsequent year, places significantly higher value on academic recognition and has a significantly higher expectation of attaining such goals than does group B. Group A also has a significantly higher grade-point average, indicating greater actual success in school. With respect to transgression or deviance, group A is significantly ($p \sim 0.05$) more *intolerant* of deviance (ATD) and reports significantly less actual deviance (DVB) than group B. With specific reference to drinking, group A perceives significantly less social support for drinking and perceives significantly more negative functions of drinking than group B. All of these year I findings are consistent with the difference in prospective likelihood of drinking by year II. Group A is clearly more tied in with the conventional achievement orientation of the school system, with attitudes toward transgression in general that serve to inhibit its occurrence, and with less positive and more negative expected reinforcement for the specific behavior of drinking. Group A also values independence less than does group B; while this difference is not of a significant magnitude, its direction is consonant with the larger pattern. This pattern is fully consistent with the continuing abstinence of group A as compared with the subsequent shift to drinking that will take place in group B.

Groups A and B do not differ significantly on certain measures of controls shown in Table 2.1; there is no significant difference between them on religiosity, church attendance, or perceived family controls. These measures on which no difference is apparent in year I will be of particular interest to examine in the year II data, when effects of what may be an ongoing process may have become more apparent.

While the single-variable differences noted above provide support for hypothesis one, a multivariable appraisal enables an examination of the joint predictive power of the year I variables in accounting for the shift from abstainer to drinker. Stepwise, multiple regression analyses were run against the dichotomous criterion of abstainer-to-drinker change versus no change using the year I data for all 298 year I abstainers. Three non-drinking-related personality predictors (PV-ACR, PV-Ind, and ATD) and two drinking-related predictors (Soc. Supp. Dr. and Neg. Funct.) were used. Intercorrelations among these five predictors ranged from 0.04 to 0.35, indicating adequate independence among them; the highest single-variable correlation with the criterion is that for Soc. Supp. Dr., $r = 0.25$. The overall multiple R reached 0.30

($F = 9.74$, which is significant at $p < 0.001$), with the Social Support for Drinking measure, as expected, entering the equation first and accounting for the largest portion of the variance. When only the three nondrinking-related personality predictors are used, the multiple R reaches 0.23 ($F = 8.09$, $p < 0.001$), with PV-ACR first to enter. While the overall multiple R of 0.30 is highly significant and provides unequivocal support for hypothesis one—that there are initial attribute differences that can predict the abstainer-to-drinker change in status measured a year later—the size of the correlation is not large, and only about 10% of the variance in the criterion is accounted for.

Another approach to multivariable analysis was undertaken that makes clearer the degree to which accurate *individual* classification can be accomplished on the basis of an individual's profile of scores on a set of variables taken together. Using year I scores on four of the preceding five variables (Neg. Funct. was dropped because of a missing-data problem), a stepwise, multiple discriminant analysis was carried out. The discriminant function showed highly significant discriminatory power ($F = 9.71$, $p < 0.001$), and the classification matrix derived from it is the following:

			Classified Status	
			By Discriminant Function	
			A. Ab. I–Ab. II	B. Ab. I–Dr. II
Actual	A.	Ab. I–Ab. II	157(151)	64(70)
Status	B.	Ab. I–Dr. II	29(37)	48(40)

This outcome, like the stepwise multiple regression results, strongly supports hypothesis one. However, it is apparent that the number of misclassified subjects in the derived matrix is sizable. Of the 221 subjects whose actual status is group A, the discriminant function classified 64 of them as belonging in group B; likewise, 29 of the 77 subjects whose actual status is group B were classified in group A. The variable to enter the discriminant function first is, again, Soc. Supp. Dr.; it is followed by PV-ACR, which is the only one of the personality variables to enter significantly. If Soc. Supp. Dr. is not used in the profile of scores, a stepwise discriminant analysis based only on the three personality variables (PV-ACR, PV-Ind, ATD) is still significant ($F = 5.56$, $p < 0.001$), but weaker. The classification of subjects derived from this latter discriminant function is what is shown by the figures in parentheses in the preceding matrix; clearly, the number of misclassifications has increased for both groups A and B.

Considering these two approaches to multivariable prediction from year I data to drinker status change by year II, it can be said, in summary, that they provide strong support for hypothesis one while making evident that much of the variance still remains unaccounted for.

One way of making the implications of the year I findings more compelling is to argue that the differences they indicate at year I will become more pronounced or obvious with ongoing development or with the passage of time. That argument can be evaluated by examining the year II data on the same variables that were already examined at year I. The year II mean scores of our three groups are presented in Table 2.2.

Table 2.2 Mean Scores on Personality, Social and Behavioral Measures Obtained in Year II for Three Drinker-Status Groups

Group Mean Scores on Year II Measures				
Measure	Group A	Group B	Group C	Significance Group A vs Group B
	Ab. I–Ab. II (<i>N</i> = 221)	Ab. I–Dr. II (<i>N</i> = 77)	Dr. I–Dr. II (<i>N</i> = 368)	
Personality				
PV-ACR	72.8	64.5	62.1	**
PV-Ind	70.1	75.2	76.3	**
E-ACR	58.6	51.8	53.0	**
I-E	56.5	54.6	54.7	NS
ATD	180.9	166.4	158.0	**
Religios.	13.7	12.3	11.8	*
Perceived Social Environment				
Fam. Contr.	7.4	7.1	7.0	NS
Soc. Supp. Dr.	16.8	21.4	22.1	**
Neg. Funct. Dr.	29.2	26.3	26.0	**
Behavioral				
GPA	3.0	2.7	2.7	**
Chu. Attend.	52.2	30.5	24.9	**
DVB	33.5	38.3	40.7	**

Key: *Mean difference significant at $p < 0.05$, two-tailed t -test; **Mean difference significant at $p < 0.01$, two-tailed t -test; NS: Not significant at $p = 0.05$

The findings in Table 2.2 are striking. At year II, nearly all of the measures show larger mean score differences between groups A and B than obtained at year I, and on nearly all the measures the differences between means are highly significant. Several of the measures that were not statistically able to differentiate the two groups at year I (e.g., PV-Ind, Religios, Chu. Attend.) now yield significant differences. In year I, for example, the behavior measure of frequency of church attendance in the past year was almost identical for group A and group B (means of 53.0 and 51.4, respectively); by year II, group A's mean remained essentially the same, 52.2, but group B's mean had dropped to 30.5, very close to the mean of group C. As a further example, ATD, the measure of attitudinal tolerance of deviance, yielded a year I mean difference between group A and B of 7.7, which was barely significant; by year II the mean difference is 14.5, significant at $p < 0.001$. In short, the passage of a year's time eventuates in a clearer separation of the two initially abstaining groups on the variables theoretically expected to distinguish them, and the *direction* of change is exactly as expected, with group B becoming less like group A and more like group C across most of the variables.

A stepwise, multiple regression analysis of the year II data against the abstainer-to-drinker change versus no change criterion yields, as would be expected, a much

higher multiple R than it did for the year I data. The same five predictor variables mentioned above were used; their intercorrelations in year II ranged from 0.05 to 0.46, with Soc. Supp. Dr. still having the highest correlation with the criterion, $r = 0.46$. The overall multiple R is now 0.51 ($F = 34.14$, $p < 0.001$). Again, Social Support for Drinking is, as expected, the first variable to enter the equation; while it still accounts for most of the variance, both PV-ACR and PV-Ind, two personality measures, add significantly to the multiple R . When only the three non-drinking-related personality measures are used, the multiple R reaches 0.33 ($F = 11.89$, $p < 0.001$), and again PV-ACR enters first.

That drinker status established on the basis of year II data about drinking should be better accounted for by variables also measured at year II than by variables measured a year earlier is, of course, not surprising. The point of the data in Table 2.2 goes beyond that demonstration. What it is intended to suggest is that the year I differences shown in Table 2.1 are not arbitrary or ephemeral but instead are indicative of more pronounced differences that are in process of development and that can be seen most clearly in the year II data in Table 2.2. The smaller year I differences can, in light of the year II data, be taken as compellingly associated with the abstainer-to-drinker change in status among our adolescent subjects.

Testing Hypothesis Two

With the preceding data we have shown that there are certain personality, social, and behavioral variables that are associated with the change in status from abstainer to drinker. Those data indicated that *differences in initial level* on certain theoretical variables were predictive of the subsequent drinker status change. The present hypothesis differs from the preceding one in the following way: instead of examining variation in initial level as the determinant of change in drinker status, it invokes another parameter, namely *variation in the amount of change* that occurs on a “predictor” variable between year I and year II. The interest here is in the change itself.

An examination of Tables 2.1 and 2.2 indicates that, on ten out of the 12 measures, group B changed more in raw scores than group A between year I and year II. But raw change scores do not control for differences in initial level. An independent test of the hypothesis about magnitude of directional change requires that differences in initial level on the predictor variables be controlled or partialled out. An appropriate score for this purpose is the Δ gain score, which is the discrepancy between a subject's *actual* year II score and the score that would be predicted for him from the regression of year II scores on year I scores. The use of the overall regression line for the 298 subjects comprising groups A and B in computing subjects' gain scores does control for initial level differences; the procedure generates a change score that has a zero correlation with year I scores and which is interpretable as that part of the year II score that is independent of the year I score.

The analysis of Δ gain scores was pursued by computing the mean Δ gain on each of our 12 measures for groups A and B. The data are presented in Table 2.3; the

Table 2.3 Mean Δ Gain Scores between Year I and Year II on Personality, Social and Behavioral Measures for Two Drinker Status Groups

Group Mean Δ Gain Scores Year I–Year II			
Measure	Group A	Group B	Significance of Difference
	Ab. I–Ab. II (<i>N</i> = 221)	Ab. I–Dr. II (<i>N</i> = 77)	
Personality			
PV-ACR	1.07	–3.14	*
PV-Ind	–1.14	3.29	**
E-ACR	0.70	–2.01	NS
I-E	0.40	–1.14	NS
ATD	2.19	–6.21	*
Religios.	0.29	–0.87	*
Perceived Social Environment			
Fam. Contr.	0.03	–0.17	NS
Soc. Supp. Dr.	–0.78	2.18	**
Neg. Funct. Dr.	0.59	–1.43	*
Behavioral			
GPA	0.05	–0.08	NS
Chu. Attend.	7.11	–12.07	**
DVB	–0.80	2.27	**

Key: *Mean difference significant at $p < 0.05$, two-tailed t -test; **Mean difference significant at $p < 0.01$, two-tailed t -test; NS: Not significant at $p = 0.05$

plus or minus signs indicate the direction of gain for a given group relative to the direction of overall gain for the combined groups A and B.

The hypothesis that *magnitude of change* on variables theoretically linked with drinker status is associated with actual change from abstainer to drinker status is clearly supported by the data in Table 2.3. In every case, the direction of change of group B relative to group A is as expected, and, in eight of the 12 comparisons, the differences in mean Δ gains are statistically significant (a ninth comparison, I-E, reaches the $0.10 > p > 0.05$ level). Thus, it can be seen that the Δ gain on PV-ACR between year I and year II is –3.14 for group B and 1.07 for group A. Relative to the overall change for the combined groups, group B *decreased* in the value it placed on achievement while group A *increased* over the time interval; the Δ gain score difference is significant at $p < 0.05$. With respect to PV-Ind, the direction of change by the two groups is, as expected, reversed; over the year's interval, group B *increases* in value on independence while group A *decreases* relative to the overall change. Again, this difference in Δ gain scores is highly significant, $p < 0.01$.⁴ An examination of the

⁴It is of interest to note that, in terms of *raw* mean gains over the year, *both* groups decreased in value on achievement, and *both* groups increased in value on independence; the raw gains are not, therefore, as revealing of change *differences* between the two groups as are the Δ gains.

scores for the other variables in Table 2.3 makes clear that the differential changes are in all cases as predicted, and in some cases, e.g., Chu. Attend., of impressive magnitude.

Multivariable analyses of the Δ gain scores on the four variables previously employed were carried out by means of stepwise, multiple discriminant analysis. For all four variables taken together (PV-ACR, PV-Ind, ATD, and Soc. Supp. Dr.), the discriminatory power was highly significant ($F = 16.93, p < 0.001$). This outcome provides further support for hypothesis two. The Soc. Supp. Dr. variable entered first, followed by PV-Ind and then PV-ACR, all adding significantly to the variance accounted for; ATD did not add anything significant. The classification matrix derived was the following:

			Classified Status	
			By Discriminant Function	
			A. Ab. I–Ab. II	B. Ab. I–Dr. II
Actual	A.	Ab. I–Ab. II	159(138)	62(83)
Status	B.	Ab. I–Dr. II	29(28)	48(49)

Although the multivariable analysis provides strong support for hypothesis two, it is clear from the matrix that a sizable number of subjects are being misclassified, 29 of group B and 62 of group A. The figures in parentheses in the matrix represent the classification derived when only the three personality measures are used and Soc. Supp. Dr. is eliminated. While the discriminatory power of this latter cluster is still highly significant ($F = 7.97, p < 0.001$), the marked loss of accuracy in the derived classification matrix over that yielded when Soc. Supp. Dr. is included is noteworthy. Interestingly, the loss is almost entirely for group A, where the misclassifications rise from 62 to 83.

Discussion and Conclusions

Perhaps the most important outcome of the present study is that it has identified a pattern of attributes that seems, for adolescents, to signal a forthcoming shift from abstainer to drinker status. The pattern includes instigation aspects (lower value on academic recognition and a tendency toward a higher value on independence), personal control differences (greater tolerance of transgression), social environment differences (greater perceived support for drinking from others, especially peers, and few negative functions of drinking), and actual behavioral differences (poorer school performance and more frequent engagement in transgressions). These aspects of the overall pattern significantly differentiate abstainers who will have changed to drinkers by the following year, from abstainers who will remain abstainers over the same time period. Further, those who will change to drinker status have characteristics more like those who already drink than do those who will not change. The pattern becomes more sharply etched with the passage of time, the observed

differences becoming larger and new differences emerging on other attributes (e.g., religiosity and church attendance) that are clearly related to the original set. What gives the original pattern added weight is that the data were collected prior to the occurrence of the abstainer-to-drinker change; this is the unique contribution of the longitudinal research design. Given the theoretical implications of the data for the onset of drinking, and given their temporal precedence to that onset, one can make a stronger (though still inferential) *causal* claim than would be possible were the temporal dimension not in the research design.

Next in importance, the study has demonstrated that *change* on these attributes is itself an important correlate of the onset of drinking. Since the measurement of change involves the year II data, it is not possible to claim temporal precedence for the Δ gain scores in relation to the drinker-status change. This situation is further complicated by the fact that, while the change in drinker status was *measured* a year after the initial data were collected, the *actual* change could have occurred at any time during the year's interval. Thus, it is conceivable that the gain score on a personality attribute, e.g., the lowering of PV-ACR, is an *outcome* of beginning to drink rather than vice versa. This is the reason for using the term "correlate" with regard to the change scores; the only data in this study that literally precede the drinker status change in time and which can accurately be termed antecedents are the year I data.

In addition to the general support the data provide for both hypothesis one and hypothesis two, they also enable an ordering of importance of the different classes of attributes involved. The perceived environmental variable, Social Support for Drinking, emerges consistently as most important in relation to becoming a drinker. Not only does it have the highest bivariate correlation with the change criterion ($r = 0.25$ in year I and 0.46 in year II), but it also enters first in all the multivariate analyses and accounts for more of the variance than any of the other variables used. Second in importance, and generally adding significantly, were the instigator variables—value for academic recognition and value for independence—in that order. The person-control variables—tolerance of deviance and negative functions of drinking—while each being significantly related to the criterion in both years, added nothing to the multivariate analyses after the preceding variables had entered. It should be emphasized that, while social support was the single most powerful predictor, when it was excluded from the multivariate analyses the personality variables—PV-ACR and PV-Ind—generated significant multiple R s or discriminant functions. Thus, the account of becoming a drinker cannot rest exclusively on environmental variables alone. This outcome is entirely consonant with our earlier research on deviance employing similar social-psychological concepts (Jessor, Graves, Hanson, & Jessor, 1968).

While the analyses of the results have been organized in relation to the two major hypotheses, there was a third interest that we were able to follow in a preliminary way with these data. The interest was in the extent to which the year I data could predict not simply the change from abstainer to drinker status but also *which of those who began to drink would have problems associated with their drinking*. Information was available on 76 of the 77 subjects who began drinking between year I and year II as to the frequency of drunkenness and the number of negative

consequences due to drinking (trouble with family, friends, school, police, etc.) they had experienced during the year. Of the 76 subjects, 48 had no negative consequences and no times drunk; 20 had *either* at least one time drunk *or* at least one negative consequence; and eight had *at least* one time drunk *and* one negative consequence. Admittedly this approach relies on a rather mild definition of problem drinking, but for teenagers who have just begun drinking the ordering of these three groups is meaningful.

It is of interest to note that seven of the eight subjects with at least two drinking “problems” come from religious groups traditionally opposed to alcohol use—Mormon, Methodist, Baptist, Lutheran, and United Pentecostal. In relation to the theoretical attributes employed earlier to predict the transition from abstainer to drinker, two of them significantly separate the eight subjects who have at least two problems from the 48 with no problems (and show the 20 subjects with one problem to fall in between). The eight two-problem drinkers have significantly higher value on independence (PV-Ind) and significantly lower expectations of academic recognition (E-ACR). In addition, they are significantly higher on another measure relevant to the concern with problem drinking, a 13-item, Likert-type measure of alienation. Thus, there is some preliminary suggestion that coming from a background that proscribes drinking, having strong independence values, and experiencing some personality maladjustment all may conduce, *once one begins to drink*, to problems associated with the drinking. Although the data tend to support these interpretations, their tenuousness due to the small *Ns* and the extremely mild definition of problem drinking must be reemphasized.

According to our earlier discussion, the factors investigated as predictive of or associated with the transition from abstainer to drinker should not be specific to drinking alone but should be general enough to apply to a variety of transition-marking behaviors. To our knowledge, this particular issue has not been examined empirically before by those concerned with the adolescent abstainer-to-drinker shift (e.g., Campbell, 1964; Maddox, 1970). Since our year II data included questions on marijuana use, activist behavior, and experience with petting, it was possible to compare group A (Ab. I–Ab. II) with group B (Ab. I–Dr. II) on these various other behaviors. In all three of these other behavior domains, group B reported a significantly greater amount of the behavior than group A. In terms of percentages, 29% of group B had some experience with marijuana, whereas only 4% of group A reported any (for group C the figure is 33%); 53% of group B reported experience with petting, as against only 19% for group A (for group C the figure is 70%); and 82% of group B reported some social activism participation as against 59% for group A (for group C the figure is 80%). It seems clear from these findings that there is some degree of generality across behavior domains where status transitions during adolescence are concerned. While our focus in this paper has been on the particular shift from abstainer to drinker, the data suggest that various behaviors that can signify a change in status may occur at the same time or, possibly, occur as a syndrome. It is also likely that, if these various behaviors have in common the function of marking a change in status, then the personality and social factors associated with the onset of any one of them are likely to be associated with the onset of all of them.

Despite the significant support gained by both of our hypotheses, the amount of variance actually accounted for by the multiple R s and the accuracy of the discriminant analysis classifications left much to be desired. It is, of course, possible that the time interval predicted—a year—is too short; that is, it is possible that those abstainers who have the theoretical attributes indicative of change to drinker status but who have not become drinkers, have simply not *yet* begun to drink. What this suggests is that the predictive model should be applied again to the same subjects a year later (i.e., year III). This not only would provide further general validation for the model but would enable an examination of the subjects previously misclassified to see whether their behavior finally conforms to the prediction. Such an effort is entirely feasible, given the longitudinal nature of the research.

It is possible, too, that a better mapping of peer-network variables might have explained more of the variance in drinker status. A tentative exploration of this possibility was carried out using a group of subjects incorrectly predicted to become drinkers and a group that was correctly predicted from the same four variables (PV-ACR, PV-Ind, ATD, Soc. Supp. Dr.). Those who were correctly predicted report significantly more friends who are models for transgressions, significantly more approval from friends for engaging in such behaviors, and significantly less parental influence on their attitudes than those who were incorrectly predicted. It may be, then, that variables having to do with exposure to and involvement in the peer culture, beyond simply social support for drinking, would contribute to a measurable improvement in the overall prediction of the abstainer-to-drinker change. Such involvement and exposure could also help to explain the greater amount of change experienced by group B between year I and year II on the theoretical attributes.

This emphasis upon the importance of social factors in the transitions of adolescence is compatible with the general pattern of our findings—the prime role played by the social support variable in the prediction of the abstainer-to-drinker shift. Our research has also made it clear, however, that personality attributes are significantly operative. The overall conclusion we would urge is that adolescent development, including the onset of such transition-marking behaviors as becoming a drinker, is best treated as a joint function of both personal and social variation.

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Chapter 3

Alcohol Use and Adolescent Development

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In a society in which the use of alcohol is symbolically associated with adult status and in which youthful access to alcohol is both legally and normatively regulated, the onset of drinking should constitute a significant event that both reflects and patterns the course of adolescent development. Research in this area, however, has been extremely limited, and knowledge about factors related to the transition from abstinence to drinking among youth is sparse. In an effort to expand such knowledge, in the present investigation the initiation of drinking was studied as part of adolescent development as a whole, that is, as an integral aspect of personality, social and behavioral change during adolescence.

Ideally, the study of development, transition or change, including the development of drinking behavior, requires that the same individuals be followed through time and that a longitudinal or panel design be employed. The difficulties involved in such studies probably account for why so few have been carried out and why those that have (e.g., Campbell, 1964; Bruun, 1965; Maddox, 1970) have had to be limited in various ways: in the scope of variables investigated, in the length of time encompassed, or in the number of repeated measurements made. Our own preliminary effort in this direction (Jessor, Collins, & Jessor, 1972) was also limited; only a 1-year interval was involved, and there was no opportunity to study variation in time of onset since the design yielded only onset or no-onset groups over the single year.

In the present study it has been possible to follow, on an annual basis, a sample of 218 students in junior high school, none of whom drank in 1969 and 129 (59%) of whom had begun drinking by 1972 when all had reached senior high school. Because of the significant length of the time interval, because of the 4 annual measurements made, and because of the wide variety of personality, social and behavioral variables

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assessed on each occasion, we now have longitudinal data that are more adequate for understanding the abstainer-to-drinker transition. These data enable us to examine 4 crucial questions: (1) Whether there is a pattern of personality, social and behavioral attributes among youthful abstainers which can be considered to constitute a prior "proneness" to drinking, that is, a sociopsychological "readiness" to make the transition from abstainer to drinker status; (2) Whether such a pattern signals not only onset but variation in time of onset as well, so that, for example, some abstainers can be considered more likely to begin drinking sooner than some others, or later than still others; (3) Whether variation in time of onset of drinking is systematically related to variation in the developmental trajectories of the associated personality, social and behavioral attributes; and (4) Whether variation in the time of onset of drinking is related to variation in the prevalence of other possible transition-marking behaviors such as sexual intercourse or use of marijuana. Insofar as these questions can be addressed empirically, we should be able to see in some detail the relationship of the onset of drinking to adolescent development as a whole.

The theoretical framework of the present study derives from the larger longitudinal research project on the socialization of problem behavior in youth of which it was a part. The framework, initially presented in the report of the earlier Tri-Ethnic Project (Jessor, Graves, Hanson, & Jessor, 1968), and since then revised and adapted for dealing with youthful development in contemporary society, has been described in several recent papers (Jessor, Collins, & Jessor, 1972; Jessor & Jessor, 1973a; Jessor & Jessor, 1973b; Jessor, Jessor, & Finney, 1973; Jessor & Jessor, 1974; Rohrbaugh & Jessor, 1975; Weigel & Jessor, 1973). For present purposes, only a brief description will be necessary.

The term "problem behavior" or "deviance," as we use it, refers to a category or class of socially defined actions which depart sufficiently from relevant and regulatory norms to result in or evoke or imply some sort of social-control response, even minimal social censure. The regulatory norms we have been concerned with are not those of the actor nor, necessarily, of his immediate peer group, but rather those of the larger society. This approach enables the identification of a variety of behaviors considered to be "problems," departures from conventional behavior, deviant or nonconforming in relation to the dominant and relatively pervasive norms of adult society. Some examples would include smoking marijuana, premarital sexual experience, frequent drunkenness or militant social protest. Although it is not possible here to deal with all the complexities of defining deviant behavior, about which an entire chapter is devoted in the Tri-Ethnic book (Jessor, Graves, Hanson, & Jessor, 1968), four points should be emphasized: First, behavior is not intrinsically deviant or conforming but depends always on social definition and relevant norms; second, a behavior may be considered deviant in relation to regulatory norms even though a majority of people engage in it, that is, the definition is not a statistical one; third, neither ethical nor moral considerations are involved in any way in defining conformity or deviance; and fourth, the norms relevant to defining behavior as deviant or conforming are often variable and relative to specific characteristics of the actor or his situation, e.g., his age, sex or marital status. The latter point will be seen to be of critical importance to the developmental formulation employed in the present study.

In our attempt to account for the occurrence or nonoccurrence of problem behavior (and, therefore, also of conformity), we have employed a fairly comprehensive social psychology comprising three major explanatory systems—personality, the perceived social environment, and behavior. Within each system, variables are specified that have logical implications for the likelihood of occurrence of problem behavior or of conformity. In the personality system, values and expectations for achievement and independence, beliefs such as social criticism, internal-external control, alienation and self-esteem, and personal controls such as attitudinal tolerance of deviance and religiosity, are some of the major variables assessed. In the perceived social environment system, the main variables are sociopsychological rather than demographic and include value compatibility between parents and friends, relative influence of parents versus friends, parental supports and controls, parental attitudes toward deviance and friends' approval and models of deviance. The behavior system is comprised of various problem behaviors (marijuana use, problem drinking, premarital sexual intercourse, and general deviant behavior such as aggression, lying and stealing) and various conventional behaviors (church attendance and school achievement). Problem behavior, in this sociopsychological framework, is conceptualized as the outcome of the interaction of variables which instigate or conduce toward departure from norms and of variables which control against such transgression; the pattern of variables constitutes, in the terms of the theory, a deviance-proneness or a proneness to engage in problem behavior.

The application of such a social psychology of problem behavior to an adolescent developmental process involving the onset of drinking has two main justifications. First, the framework, while focused on problem behavior, is nevertheless comprehensive enough to include a number of variables likely to be relevant to adolescence in general and to the changes that characterize it, variables such as value on independence, self-esteem and parent-friends compatibility. Thus, some illumination is likely. But the second justification is a systematic one and therefore of key importance—it is based on the interpretation of beginning to drink as a status transition involving, especially for younger adolescents, a departure from the regulatory norms defining appropriate behavior for that age or stage in life.

Much, though clearly not all, of what is considered problem behavior in youth is relative to age-graded norms, that is, the same behavior may be permitted or even proscribed for those who are older while being proscribed for those who are younger. Thus, nonmarital sexual intercourse at age 25 may be normatively permitted, while at age 15 it is likely to be considered a normative departure implicating social controls. Such behaviors come to be seen as characterizing the occupancy of a more mature status; hence, engaging in them for the first time can serve to mark a transition in status, one that goes from "less mature" to "more mature," from "younger" to "older," or from "adolescent" to "adult." A large variety of behaviors can, obviously, serve as transition-marking, but our point is that when such behaviors are normatively age-graded, that is, permitted at a later but not at an earlier age, their occurrence at a younger age can be seen as a normative departure, that is, as problem behavior. Insofar as this is the case, our social psychology of problem behavior should have systematic relevance to accounting for variation in the age of onset.

Youth who, in theoretical terms, are more problem-behavior-prone are more likely to engage in such age-graded transition behavior earlier than youth who are theoretically less problem-prone. This formulation, by mapping the developmental concept of transition-proneness onto the sociopsychological concept of problem-proneness, provides for the systematic application of a theory of problem behavior to processes of adolescent development, especially those involving transitions toward a more mature status.

To link this general discussion with the specific interest in the onset of drinking, it needs to be emphasized that, for the most part, “children and young adolescents live in an abstaining sub-culture” (Stacey & Davies, 1970, p. 210). As Maddox and McCall note, “abstinence is strongly preferred for children in our society ... both parental and public law typically support abstinence for the adolescent in principle. Teen-age drinking is deviant behavior in the sense that it is not preferred or encouraged” (Maddox & McCall, 1964, pp. 61–62). At the same time, drinking is a normatively accepted aspect of adult status. Thus, for many adolescents, beginning to drink can be conceptualized as a transition-marking behavior, or as “a symbolic means of dissolving the adolescent status and identifying the user with the life style of adults...” (Maddox & McCall, 1964, 3, pp. 69–70). Beginning to drink therefore appears to qualify as an age-graded, normatively regulated, transition-marking behavior, and to that extent the present theoretical framework should be relevant to accounting for variation in whether and when it occurs.

This paper, then, is a study of the onset of drinking. It reports on a group of youthful abstainers followed for 3 subsequent years. It employs a theoretical network of variables to try to account for which of the youth begin to drink and which do not; and, among those who do, it tries to account for which begin earlier and which later. It also tries to demonstrate that the onset of drinking is associated in an orderly and systematic way with other changes taking place concurrently in the network of attributes that make up the theory. The general hypothesis underlying the research is that the likelihood of onset of drinking is directly related to the degree to which the individual is, in the terms of the theory, “problem-prone” or, in developmental terms, “transition-prone” on the measures in the conceptual framework.

Method

Subjects

The subjects for this study were drawn from three junior high schools (grades 7, 8 and 9) in a small city in the Rocky Mountain region in the spring of 1969. A random sample of 1126 students, stratified by sex and grade level, was designated, and each student and his parents were contacted by letter. The students were asked to participate over the next 4 years in a study of personality, social and behavioral development. Parents were asked, after a detailed explanation of the research, for signed permission for their son or daughter to participate. Of the designated random sample of 1126, permissions were received for 668 students and, of these, 589 (52% of

the random sample; 88% of those with permission) were tested in April 1969 and became the Year 1 cohort of the study. In 1969 their ages ranged from 12 to 15. By the end of the Year 4 testing, 483 students were still in the study, representing an 82% retention of the initial cohort over the subsequent 3 years. Of the 483 students, there were 432 (188 boys and 244 girls) for whom there was no missing year of data, that is, each of the 432 students was tested in each of the 4 years, 1969 through 1972. The latter group is considered our core sample for developmental analyses, a sample with only modest attrition from the initial cohort considering the length of time and number of testings involved. It is on this core sample of 432 students that the data for the present paper are based.¹

Demographically, the core sample is relatively homogeneous. Almost entirely Anglo-American in ethnic background, it represents middle-class socioeconomic status. The average educational level of fathers was “some years of college” and their average occupational level was above the category of skilled labor. In short, the sample does not include wide socioeconomic variation and is essentially middle-class.

Procedure

Data were collected in April of each year by means of an elaborate questionnaire, approximately 50 pages in length, requiring about 1½ hours to complete. The questionnaire consisted largely of psychometrically developed scales or indices assessing a variety of personality, social, behavioral and demographic variables. Most of the scales were kept constant over the 4 years, but modifications were made in some, and a number of new scales were introduced at different times. While many of the measures derive from and were validated in our previous research (Jessor, Graves, Hanson, & Jessor, 1968), the entire questionnaire was pretested and scales were revised to increase their appropriateness for the present student sample.

¹The Ns in this paper differ from those in our early reports. In those, the random sampling drawn from three senior high schools was also included, since the analyses were either cross-sectional or only 1-year longitudinal. In this paper and all others relying on our 4-year core developmental sample, the Ns are based only on the original junior-high students, the only ones who could participate all 4 years in the study before graduating from high school.

The initial loss of 48% of the designated random sample, despite persistent follow-up efforts, was due largely to the requirement of parental permission and to the fact that participation the first year involved staying after school for 1½ hours on a spring afternoon. The bias introduced by such loss is not possible to specify since data could not be obtained on nonparticipants. What can be said, at least, is that there remained a wide range of variation among those who did participate on all the sociopsychological measures.

The subsequent attrition of 18% of the initial cohort over the 3-year interval resulted in a further departure of the core sample from randomness. An examination of Year 1 scores on 26 separate measures, comparing those who stayed with those who did not, shows only a few stable differences: the “leavers” were significantly lower in grade-point average than the “stayers” of both sexes, and the same was true for expectations of achievement. The overwhelming impression from this attrition analysis, however, was of the sociopsychological similarity of “stayers” and “leavers.” Given the initial loss and the subsequent attrition, it is clearly not possible to generalize our findings to the junior-high-school population as a whole.

The administration of questionnaires took place in small group sessions outside of class hours, and students received \$2 as token payment for their assistance after the initial year. Frankness and honesty were urged in the questionnaire instructions and a guarantee was made that all responses would be held in strict confidence. The guarantee was offered since all participants signed their names to their questionnaires to enable annual follow-up. Name sheets were removed at completion and kept stored in a safe deposit box in the vault of a bank; the questionnaire analysis was carried out by code number only. Over the period of the research, no breach of confidentiality ever occurred. Written reactions to the questionnaire were collected annually from each student; most reported that they found the experience interesting and personally valuable, and the low attrition rate indicates their degree of ongoing interest in and commitment to the study.

The Abstainer-Drinker Transition Groups

The essential requirement for our analytic purposes was the identification of groups of abstainers in 1969 (Year 1) who would make the transition to drinker status at differing times over the subsequent 3 years. Such a requirement could only be fully met retroactively, that is, at the end of the study period when measurements from all 4 years had been completed and were in hand. From the perspective, then, of the completion of the 1972 testing (Year 4), it was possible to classify each student as to his abstainer or drinker status for each of the 4 years of testing.² Such a classification shows that in 1969 there were 218 abstainers (92 boys and 126 girls) and 190 drinkers (89 boys and 101 girls). The abstinence rate was 53%. By 1972, 89 of the original 218 students were still abstainers (39 boys and 50 girls), and the number of those who drank had grown to 319 (142 boys and 177 girls). The abstinence rate was 22% (in 1970 and 1971, the rates were 42% and 31%). But since our main interest is in variation in time of onset of drinking rather than in whether onset occurs by 1972, the classifications for the intervening years, 1970 and 1971, are critical. Considering all 4 years simultaneously, it is possible to generate groups that reflect the temporal sequence of abstainer or drinker status and which yield the desired variation in time of onset.³ Table 3.1 shows the transition groups that will be employed in the analyses.

²In the section of the questionnaire dealing with drinking, two questions were asked first: "1. Have you ever had a drink of beer, wine or liquor—not just a sip or a taste? (A sip or a taste is just a small amount or a part of someone else's drink, or a swallow or two; a drink would be more than that.)" "2. Have you had a drink of beer, wine, or liquor *more than two or three times in your life?*" All students who answered "Yes" to both questions were classified as drinkers; all others were classified as abstainers. The abstainer classification does not include those who may have used alcohol previously and no longer do; it refers, instead, to those who have never used alcohol or who have not yet begun to drink.

³Among the students classified in Year 1 (1969) as abstainers and who subsequently began to drink, 1 boy and 3 girls later reported having stopped drinking. Among the students classified in Year 1 as

Table 3.1 Abstainer (A) or Drinker (D) Status Over the Four Years

Group	1969	1970	1971	1972	Number of Students		
					Boys	Girls	Total
I	A	A	A	A	39	50	89
II	A	A	A	D	17	21	38
III	A	A	D	D	21	25	46
IV	A	D	D	D	15	30	45
V	D	D	D	D	89	101	190

It is important to note that groups I–IV were all abstainers in 1969 and that they also represent ordered variation in time of onset of drinking. Group I has no onset, that is, it remains an abstainer group through the end of our study; group II does make the transition, but only in the last year; group III had begun drinking a year earlier than group II; and group IV, among the four initially abstaining groups, started to drink earliest, that is, within the first subsequent year. Group V, consisting of students who were already drinkers when the study began, provides a baseline against which the other groups can be compared. Two further comments should be made about group I: first, it should be seen as representing a fairly strong rather than ephemeral commitment to abstinence since it has “held out” against drinking over a 3-year period in which the over-all abstinence rate has dropped from 53% to 22%; and second, it should not be assumed that these students will never make the transition to drinking, given further time, since many of them probably will.⁴

In terms of our basic interest in transition-proneness, an examination of these five groups on the antecedent 1969 theoretical measures should reveal whether there is an ordering on those measures that is congruent with, and therefore predictive of, the order of onset of their drinking.

Measurement of the Variables in the Theoretical Framework

The measures reported here have been described in our previous publications (Jessor, Graves, Hanson & Jessor, 1968; Jessor, Collins, & Jessor, 1972; Jessor & Jessor, 1973a; Jessor & Jessor, 1973b; Jessor, Jessor, & Finney, 1973; Jessor & Jessor, 1974;

drinkers, 6 boys and 14 girls reported later discontinuation of drinking. These 24 students have been omitted from the transition groups that were established for the analyses in this paper; thus, all students classified as drinkers are current drinkers and not discontinued former drinkers. The phenomenon of “discontinuation” is of interest in itself and, as can be seen, appears to be more frequent in girl drinkers than in boy drinkers; nevertheless, it was not possible to pursue the issue in the present analysis.

⁴It is of interest in this regard that, in a college freshman cohort being studied as a part of the larger project, the rate of abstinence at the end of the freshman year was 4% in boys and 12% in girls. Although this is certainly not a comparable sample, it does suggest that the abstainer rate may continue to decline with continuing development in later adolescence.

Rohrbaugh & Jessor, 1975; Weigel & Jessor, 1973). Details about item content and scoring of most of the scales have been prepared.⁵ For the most part, the scales have at least adequate psychometric properties as shown by Scott's Homogeneity Ratio and by Cronbach's alpha index of reliability. There is substantial measurement stability over time, as indicated by interyear correlations, and various kinds of validity, including construct validity, have already been demonstrated. For present purposes we will deal with only a subset of our measures in order to avoid redundancy. Each of these, presented in terms of its location in the theoretical network, is characterized as to its transition-prone direction.

Personality system measures. The motivational instigation structure: lower value on achievement, higher value on independence, higher value on independence relative to value on achievement and lower expectations of achievement would be conceptualized as transition-prone in this structure. The personal belief structure: higher social criticism and higher alienation would be considered transition-prone. The personal control structure: lower attitudinal intolerance of deviance, lower religiosity and fewer negative functions against drinking would be transition-prone.

Perceived social environment system measures. The distal structure contains variables only indirectly linked to problem behavior: lower compatibility between views of friends and parents (i.e., higher anomie), greater influence of friends rather than of parents, lesser parental support and lesser parental controls would be transition-prone. The proximal structure contains variables directly implicating problem behavior: the greater the friends' approval of drinking and of other problem behaviors, the greater the friends' models for drinking and for other behaviors, and the lesser the parental disapproval of drinking and of other behaviors, the greater the transition-proneness.

Behavior system measures. The greater the general deviance (lying, stealing, cheating, aggression), and the lesser the church attendance and academic achievement, the more likely the transition to drinking.

This brief listing of measures and of their expected directions assumes that the adequacy of the measures, their specific item content and their theoretical relations have been dealt with sufficiently elsewhere and need no further elaboration here. Not all of these measures were collected in 1969, and several additional measures, to be dealt with later, were collected only in later years. With the transition groups established and the nature of the measures of the variables described, it is possible to turn to the analyses of the longitudinal data.

Results

Evaluation of the data will be organized around the major questions mentioned in the introduction. First, data will be presented to enable an assessment of the degree to which onset and variation in onset of drinking can be predicted from variation in

⁵Jessor, R. General description of junior-senior high school questionnaire and its component measures. Project report. July 1969. Mimeographed. pp. 1-28.

transition-prone attributes among abstainers. Both univariate and multivariate procedures will be employed. Second, Figures graphing the 4-year developmental trajectories of several of these attributes will be presented to enable an assessment of the degree to which variation in onset of drinking is associated with variation in other, conceptually related aspects of development. Third, data on the prevalence of other possible transition-marking behaviors will enable an assessment of the degree to which such prevalence is associated with variation in the onset of drinking.

Prediction of the Onset of Drinking

The first approach to predicting onset of drinking from antecedent measures was to examine the mean scores on the various theoretical attributes in 1969 when groups I–IV were all abstainers and group V was composed of drinkers. The means and the associated F ratios from 1-way analyses of variance are presented in Table 3.2.

The data in Table 3.2 provide support for the notion that the onset of drinking is related to a transition-prone pattern of personality, perceived environment and behavioral attributes existing prior to onset. For example, on the measure of value on achievement, group I has the highest score which, in our theoretical framework, indicates an orientation toward conventionality; this is the group of abstainers who do not make the transition to drinking during the study years. Group V, the group already drinking, has the lowest score on value on achievement, and the scores of groups II–IV lie between the means of groups I and V. These relationships provide the basis for describing groups II–IV as more transition-prone than group I, all four groups being abstainers at Year 1, and for considering the measure of value on achievement as predictive of the onset of drinking. With respect to the prediction of variation in time of onset of drinking, the mean scores of groups II–IV reveal that the three groups are perfectly ordered on value on achievement in relation to their order of onset of drinking; group II which has the latest onset is closest in mean score to group I, group IV which has the earliest onset is closest in mean score to group V, and group III which has the intermediate onset has the intermediate mean score. Since the over-all F ratio is highly significant, these data provide a paradigm of the relationship of a theoretically transition-prone attribute to both onset and variation in time of onset of drinking during adolescence.

Table 3.2 also shows that group I has the least instigation to problem behavior (highest value on achievement, lowest independence-achievement value disjunction, highest expectations of achievement), the strongest personal controls against transgression (highest intolerance of deviance, highest religiosity, highest negative functions or reasons against drinking), a perceived environment that provides the least approval and opportunity for drinking (lowest friends' approval, parents' approval and friends' models for drinking), and is a group that engages in the least amount of general deviance while evidencing the highest academic performance at school. This theoretically coherent pattern gains additional significance from the fact that, in almost all of the aspects listed, the group that provides the most extreme

Table 3.2 Year 1 (1969) Mean Scores on Transition-Prone Attributes in Each Transition Group (Boys and Girls Combined)

	Transition Groups					<i>F</i>
	I (<i>N</i> = 89)	II (38)	III (46)	IV (45)	V (190)	
Personality						
<i>Motivational Instigation Structure</i>						
Value on achievement	77.7	75.5	73.6	70.0	68.0	7.92 [‡]
Value on independence	68.6	67.3	68.5	68.8	71.0	
Independence-achievement disjunction	80.9	81.8	84.9	88.8	93.1	10.25 [‡]
Expectations of achievement	62.8	57.4	58.4	55.3	54.1	3.44 [‡]
<i>Personal Belief Structure</i>						
Alienation	35.7	35.9	37.2	37.3	37.1	
<i>Personal Control Structure</i>						
Attitude toward deviance	197.7	189.8	179.1	185.6	159.2	18.86 [‡]
Religiosity	15.3	14.8	14.5	14.7	13.1	6.20 [‡]
Negative functions of drinking	42.0	39.4	37.8	37.7	32.4	25.39 [‡]
Perceived Environment						
<i>Distal Structure</i>						
Parents-Friends compatibility	3.2	3.2	3.2	3.0	3.1	
Parental support	8.1	8.3	7.3	7.6	7.4	3.79 [†]
Parental controls	6.9	6.4	7.2	6.8	6.8	
<i>Proximal Structure</i>						
Friends' approval of drinking	1.2	1.6	1.3	1.6	1.9	10.72 [‡]
Parental approval of drinking	1.3	1.6	1.5	1.7	2.0	16.63 [‡]
Friends' models for drinking	3.2	3.6	3.6	3.6	4.8	27.44 [‡]
Behavior						
General deviant behavior, past year	31.9	32.4	34.8	35.2	40.8	30.93 [‡]
Church attendance, past year	53.0	58.2	40.0	58.2	41.7	
Grade point average, past year	3.2	3.0	3.0	2.9	2.9	4.53 [‡]

†*P* < 0.01‡*P* < 0.001

contrast to the group I pattern is the one that already drinks. Further, the groups that are going to begin drinking are generally intermediate and are, on several of the variables, appropriately ordered with regard to the order in time of their transition. Not all of the variables were discriminating in 1969, however; the measures of value on independence, alienation, parents-friends compatibility, parental controls and church attendance failed to show systematic initial-year differences between the groups. Whether this indicates that they are unrelated to drinking or are simply unrelated to onset will be shown below.⁶

⁶The results have been presented for boys and girls combined since separate analyses by sex yielded almost entirely parallel outcomes. One exception among the girls was on intolerance of deviance, and one among the boys was on grade-point average. In both of these cases, the significant *F* ratio

The second approach to predicting onset was one that enables an appraisal of the over-all strength of the account provided by the initial differences between the abstainer groups with respect to their transition proneness. A set of multiple regression analyses was carried out using the 1969 measures as predictors and the continuum of membership in groups I–IV as the criterion score.⁷ Group V, the group already drinking, is not included; the criterion score represents, instead, a measure of variation in time of onset of drinking among students who were all abstainers in 1969. The multiple *R*s for the total set of predictors were .37 for girls, .47 for boys and .33 for the sexes combined. All of these are significant at $p < .001$, thus providing further support for the theory as capable of predicting the onset of drinking. This result gains in importance when it is kept in mind that the predictor data preceded the establishment of the criterion measure by 3 years. Nevertheless, it is obvious that the amount of variance accounted for in the criterion remains small from any practical standpoint—from 10% when the sexes are combined to 22% for the boys alone.

The data presented thus far have been oriented toward prediction of onset from data collected at the beginning of the study in 1969. A different way of examining the relation of the theoretical variables to variation in onset is to compare the groups on the same measures at the end of the study, in 1972. Mean scores in 1972 should reflect variation in length of involvement with alcohol, that is, in length of time since beginning to drink. Insofar as this is the case, it would strengthen the evidence in support of the relevance of the theoretical variables to the onset of drinking—variables that were previously shown to constitute a proneness to begin drinking would now be shown to reflect the occurrence of the transition itself. The data relevant to this issue are presented in Table 3.3.

The 1972 measures in Table 3.3 clearly reflect the variation in time since transition or in length of involvement with alcohol represented by the five transition groups. These data are considerably stronger than those in Table 3.2, an outcome to be expected since they are no longer antecedent predictors but cross-sectional correlates. The difference between group I and the other three initially abstaining groups has grown larger on several measures, and measures such as value on independence, alienation and church attendance, previously nondiscriminating, now reach significant *F* ratios.

shown for the sexes combined is absent, and there is no trend within groups I to IV; in both cases, however, group V is, as expected, lowest in mean score.

With regard to other factors that might affect the interpretation of the over-all findings, one-way analyses of variance were calculated across the five transition groups for several background or social origin measures. The transition groups do not differ on father's occupation, father's education, mother's education, or on the fundamentalism of either parent's religious affiliation. Thus, in our sample differences in sociodemographic characteristics cannot account for onset or for variation in time of onset of drinking. With regard to age, there is no difference among the five groups of boys; among the girls, groups III and V are older by 4 and 6 months than the other three groups. In view of the unsystematic nature of these differences, and their absence in the boys, age was not considered a factor of significance to the interpretation of the results.

⁷The set of predictor measures actually used in the multiple regression analyses is somewhat different from the set shown in Table 3.2. While the set is conceptually similar and equally comprehensive, the particular measures used are part of a uniform set applied routinely in the larger project to analyses of each of the problem behaviors of concern.

Table 3.3 Year 4 (1972) Mean Scores on Transition-Prone Attributes in Each Transition Group (Boys and Girls Combined)^a

	Transition Groups					F
	I (N = 89)	II (38)	III (46)	IV (45)	V (190)	
Personality						
<i>Motivational Instigation Structure</i>						
Value on achievement	73.5	67.5	61.9	60.9	58.7	10.05 [‡]
Value on independence	73.0	74.6	72.8	77.4	76.9	2.45 [*]
Independence-achievement disjunction	89.5	97.1	100.8	106.5	108.2	14.28 [‡]
Expectations of achievement	62.8	56.2	54.6	54.1	56.1	2.59 [*]
<i>Personal Belief Structure</i>						
Alienation	33.7	35.5	35.3	37.5	35.7	3.10 [*]
<i>Personal Control Structure</i>						
Attitude toward deviance	183.6	161.4	150.8	160.2	150.7	14.88 [‡]
Religiosity	18.6	15.0	14.9	13.3	13.3	9.32 [‡]
Negative functions of drinking	29.7	24.8	24.2	24.6	24.3	12.89 [‡]
Perceived Environment						
<i>Distal Structure</i>						
Parents-Friends compatibility	9.4	8.8	8.1	7.1	7.8	9.23 [‡]
Parental support	8.1	8.2	7.2	6.9	7.1	6.88 [‡]
Parental controls	6.0	6.3	6.3	6.0	5.7	
<i>Proximal Structure</i>						
Friends' approval of drinking	2.6	3.2	3.1	3.3	3.2	22.82 [‡]
Parental approval of drinking	1.6	2.0	2.0	2.3	2.3	11.82 [‡]
Friends' models for drinking	4.5	5.8	5.7	6.2	6.1	21.75 [‡]
Behavior						
General deviant behavior, past year	33.1	39.3	40.1	40.8	41.0	18.80 [‡]
Church attendance, past year	38.0	25.6	27.2	23.5	14.9	10.81 [‡]
Grade point average, past year	3.2	2.8	2.9	2.7	2.8	5.57 [‡]

^aSince the score range on some of the measures, e.g., religiosity, was changed between 1969 and 1972, developmental comparisons between Tables 3.2 and 3.3 mean scores will be misleading in those cases.

^{*}P < 0.05

[‡]P < 0.001

When multivariate regression analyses of the 1972 predictors were calculated against the criterion measure of membership in one of the four initially abstaining groups (I–IV), the multiple *R*s are .68 for girls, .74 for boys and .62 for the sexes combined. The range of variance accounted for is 35% to 55%, much higher than in the predictive analyses, and indicates a strong relationship between variation in length of time since the onset of drinking and variation in attributes theoretically linked to problem behavior.⁸

⁸When only the personality and perceived environment system predictors were employed, rather than the full set, the multiple *R* for the sexes combined reached .58. The four predictors that

Onset of Drinking and Development during Adolescence

The demonstration of a sociopsychological readiness to begin drinking that is, in fact, predictive of its onset, and the demonstration that time of onset is related to subsequent sociopsychological outcome, suggest that the course of sociopsychological development during adolescence should vary depending on whether and on when drinking begins. It is to this issue that the present section is addressed. The approach taken has been to plot the actual course of development in each of the five transition groups on a variety of measures of the theoretical variables. For most of the variables there are scores from each of the 4 years, enabling a significant segment of the adolescent period to be covered. That segment involves, incidentally, the move of the students from all being in junior high school to all being in senior high school. Since it is not possible here to present graphs for the measures of every variable, certain ones have been selected which illustrate the main character of the developmental data as well as representing the various theoretical structures of the conceptual framework.

The initial Figure has been selected as an ideal case or a paradigm example for purposes of discussion; the subsequent Figures, as will be seen, do not have all of the properties shown in Fig. 3.1 even though they support the major developmental trends. Fig. 3.1 presents the “growth curves” of the girls’ general deviant behavior score over the 4 years of testing in each of the five transition groups.

Fig. 3.1 shows that group I, which did not begin drinking, is low in general deviant behavior in 1969 and remains low over the years of testing (a matched-sample t test between its score in 1969 and its score in 1972 is nonsignificant). Group V, the group already drinking in 1969, is high in 1969 (significantly higher than each of the other groups) and remains high throughout, showing no significant change either. The three groups that do make the transition are all low in 1969 but are already ordered as to when the transition will take place. All three of these groups change significantly in general deviant behavior score over the 1969–1972 interval, and the steepest slope of increase in deviant behavior occurs in the year in which the onset of drinking occurs. Thus, the sharpest increase for group IV is in the 1969–70 interval; for group III, in the 1970–71 interval; and for group II, in the 1971–72 interval. Further, it can be seen that groups II, III and IV, while close to group I in 1969 when all were abstainers, have converged on group V by 1972, when all are drinkers. Thus, despite their initial differences and their different courses or rates of development, the three onset groups become similar to each other and to the previously drinking group V. (In 1972, groups II–V are all significantly

entered the regression significantly, and their partial correlations, were as follows: Friends’ models for deviance (.54), Independence-achievement value disjunction (.16), Attitude toward deviance (—).13), and Parent-friends compatibility (—).10). Several things are worth noting: first, a strong account of the criterion is provided by personality and perceived environment measures alone; second, the role played by peer models is a prepotent one; and finally, the personality measures do contribute significantly to the variance accounted for, despite the strength of the perceived environment measures.

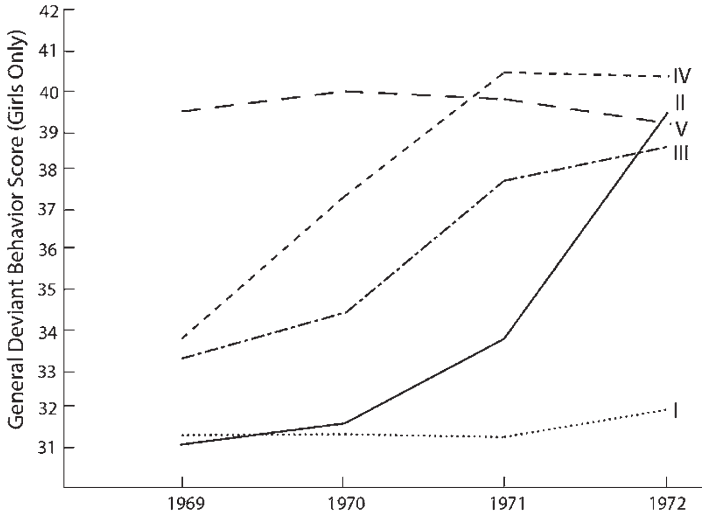


Fig. 3.1 Development of General Deviant Behavior and the Onset of Drinking among the Girls. Group I (AAAA), $N = 50$; II (AAAD), $N = 21$; III (AADD), $N = 25$; IV (ADDD), $N = 30$; V (DDDD), $N = 101$

different from group I in general deviant behavior score, while not being significantly different from each other.) Being a drinker, it would appear, has “homogenized” the three previously abstaining groups and the already-drinking group by 1972, at least with regard to self-reported general deviance. The curves in Fig. 3.1, then, show a clear relationship between the onset of drinking and systematic change in a conceptually related attribute from the behavior system: the development of drinking is positively associated with an increase in general deviant behavior, and the rate of increase reflects the time of onset.

The other Figures deal with attributes from the personality and perceived environment systems of the framework and are an attempt to convey the coherent nature of the various developmental changes associated with the onset of drinking. Fig. 3.2 shows that the groups all decline in value on achievement over the subsequent 3 years, the transition-prone ordering in 1969 being maintained in 1972. But group I, while declining significantly, shows the smallest amount of mean change, and the three groups that do begin drinking show again a trend toward convergence on group V. (In 1972, group I is significantly different in mean score from all the other four groups.) It should be noted, also, that while group I does decline, its 1972 value on achievement score is not much lower than the highest score of the other groups 3 years earlier in 1969. Fig. 3.3, the development of the alienation measure from the personal belief structure, provides an example of a variable that does not show clear and consistent developmental differences as did the preceding Figures. The importance of presenting it is to give a balanced view of our over-all findings. While groups I and V both show a significant decline in alienation, the three change groups

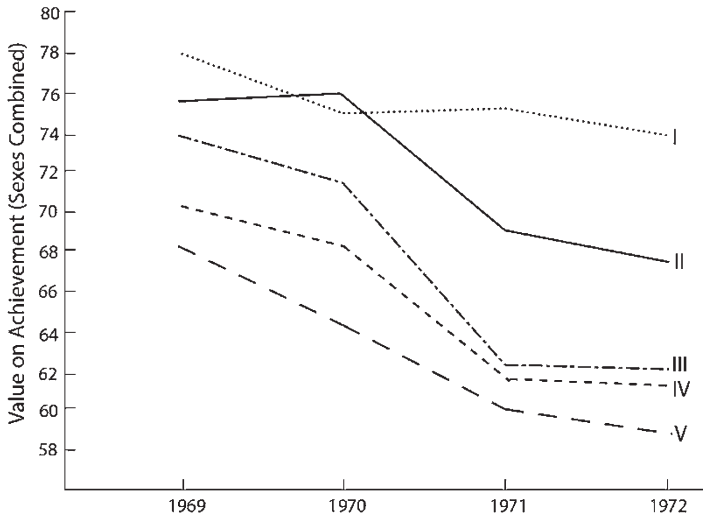


Fig. 3.2 Development of Value on Achievement and the Onset of Drinking among Boys and Girls Combined. Group I (AAAA), $N = 89$; II (AAAD), $N = 38$; III (AADD), $N = 46$; IV (ADDD), $N = 45$; V (DDDD), $N = 190$

do not decline significantly, and they do not converge on group V. Change in alienation is not, evidently, a developmental covariate of the onset of drinking (nor was it a transition-prone predictor of onset, as we saw earlier in Table 3.2).

Fig. 3.4 shows again the marked convergence over the years of the three change groups on the previously drinking group V. While all groups evidence a significant decline in attitudinal intolerance of deviance with development, the magnitude of decline in each of the onset groups is about twice that of the group that continues to abstain. Group I declines in intolerance only to about where the most intolerant of the three change groups was in 1969. With regard, then, to this attribute of the personal control structure of the personality system, its development varies clearly with onset of drinking and less clearly with time of onset.

Fig. 3.5 deals with an aspect of the perceived environment that is directly proximal to drinking behavior, the perceived prevalence of friends' models for drinking. The Figure shows that developmental properties of the perceived environment are also related to the onset of drinking. At the beginning of the study, in 1969, group I had the fewest drinking models among its friends, group V had the most, and the three onset groups were intermediate, but closer to group I. With time and development, all groups show a significant increase in friends' drinking models, but the increase of the three onset groups is about twice that of group I, and by 1972 they have all moved away from group I and converged on the previously drinking group V. The importance of time of onset is also evident in the slopes of groups II and IV, at least.

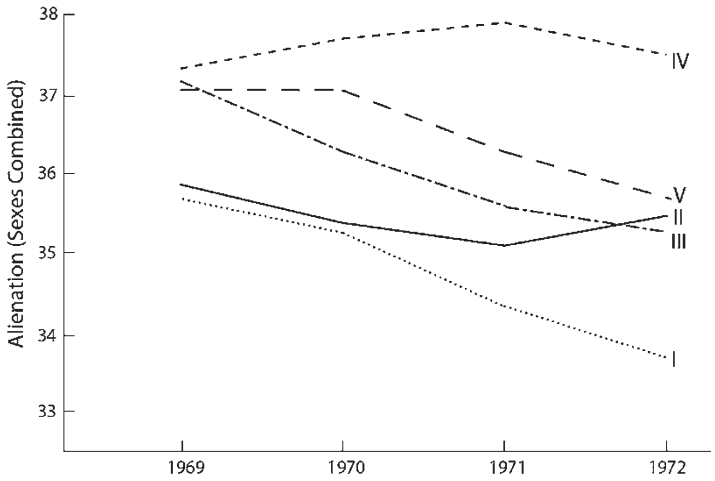


Fig. 3.3 Development of Alienation and the Onset of Drinking among Boys and Girls Combined. Group I (AAAA), *N* = 89; II (AAAD), *N* = 38; III (AADD), *N* = 46; IV (ADDD), *N* = 45; V (DDDD), *N* = 190

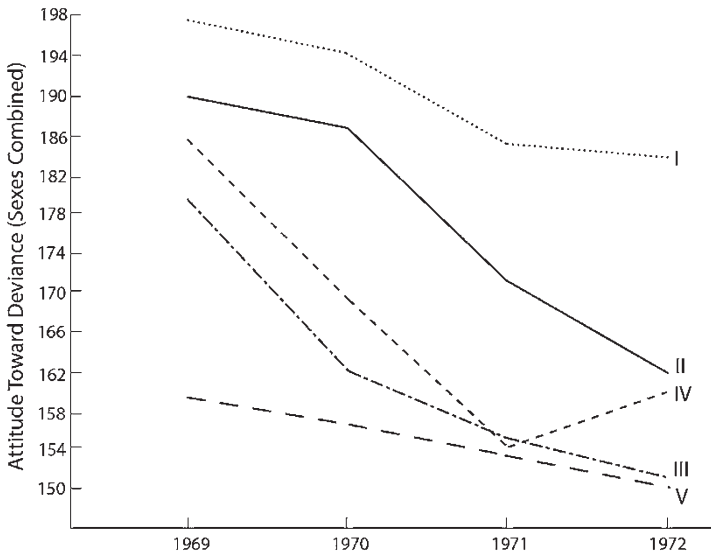


Fig. 3.4 Development of Attitude toward Deviance and the Onset of Drinking among Boys and Girls Combined. Group I (AAAA), *N* = 89; II (AAAD), *N* = 38; III (AADD), *N* = 46; IV (ADDD), *N* = 45; V (DDDD), *N* = 190

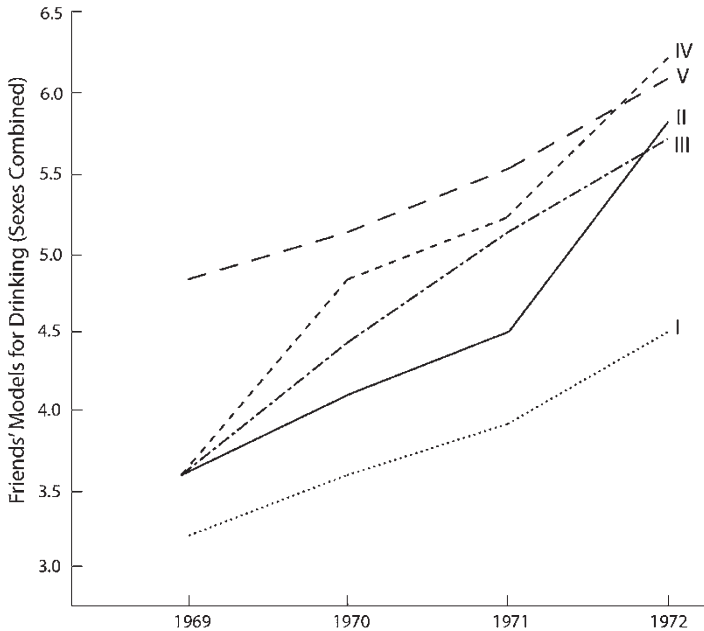


Fig. 3.5 Development of Friends' Models for Drinking and Onset of Drinking among Boys and Girls Combined. Group I (AAAA), $N = 89$; II (AAAD), $N = 38$; III (AADD), $N = 46$; IV (ADDD), $N = 45$; V (DDDD), $N = 190$

The Figures make a strong case for a developmental relationship between onset of drinking and other sociopsychological attributes. While not all of the attributes in the framework vary with onset in the same coherent way (for example, in addition to the alienation variable presented above, expectations for achievement show no developmental change at all in any group, and value on independence increases significantly with time, but about equally in all groups), many do, including others not presented here. The personal belief structure variable of social criticism (measured only in 1970, 1971 and 1972) is an example of the latter. In addition, it has been possible to show such developmental covariation on at least one variable in each of the structures of each of the systems within the over-all conceptual framework. The data in the Figures represent, in this regard, an important outcome of the longitudinal research design.

Onset of Drinking and the Prevalence of Other Behaviors

The last part of the results bears on the relation of the onset of drinking to the prevalence of other possible transition behaviors. Such behaviors may be related to beginning to drink in several ways. First, the sociopsychological transition-proneness

Table 3.4 Percentage of Groups I–IV Reporting Possible Transition Behaviors, Year 4 (1972)

Group	Use of Marijuana			Sexual Intercourse			Activist Protest Participation			Problem Drinking		
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
I	0	2	1	5	4	4	3	12	8	0	0	0
II	6	24	16	18	19	18	6	15	11	24	29	26
III	57	24	39	14	32	24	30	16	22	48	32	39
IV	50	57	55	40	50	47	7	21	16	60	50	53

demonstrated above is obviously not specific to drinking but conceptually implicates a variety of other behaviors, e.g., sexual intercourse, which, like the onset of drinking, can also mark a shift in status. Second, the beginning of drinking itself may lead to entry into new contexts or to the development of new attributes which may be conducive to engaging in other transition-marking or problem behaviors, e.g., smoking marijuana. And finally, the reverse may be the case, that is, a transition initially occurring in another behavioral area, e.g., engaging in activist protest, may itself be conducive to beginning drinking. Whatever the specific mediation, however, all suggest that onset of drinking and time of onset should be associated with the prevalence of other possible transition-marking behaviors during adolescence. The data relevant to this issue are presented in Table 3.4. Each of the four initially abstaining groups is presented, by sex and combined, along with the proportion of each group that has, by 1972, used marijuana more than once, had sexual intercourse, participated in a militant activist or peaceful demonstration and, finally, met a modest problem-drinking criterion (five or more times drunk in the past year or two or more negative social consequences of drinking, such as a problem with friends or with the police). These four behaviors are presented separately because of their intrinsic interest and because each could conceivably function as a transition-marking behavior; none of these behaviors is included in the measure of general deviant behavior presented in Table 3.3, and hence there is no overlap with it.

The data in Table 3.4 provide strong support for the relation of drinking onset to other possible transition or problem behaviors. The relations are highly significant for marijuana use, sexual intercourse, and problem drinking in boys and girls separately and combined ($p < 0.001$ in all but one case). The percentage involvement in these behaviors by group I, the abstainers, is minimal (and, of course, zero for problem drinking), and all the onset groups show higher percentages than group I. But perhaps of even greater interest, the percentage of involvement of the three onset groups is quite directly related to length of time since onset of drinking, with an increasing trend across groups II, III and IV in the prevalence rates of the various behaviors. The main exception to this generalization is activist protest participation for which there is no significant trend within the onset groups. The data, on the whole, provide emphasis for the view that the onset of drinking is not an isolated behavioral change but is related to involvement with other possible transition-marking behaviors, as it theoretically should be. Further, they reveal again the

developmental regularity that can emerge when time of onset is used as a variable for organizing the data—prevalence rates of other behaviors vary in an orderly way with time of onset, and the percentage difference between later onset (group II) and earlier onset (group IV) can be of considerable social import, e.g., marijuana use rates of 16% versus 55%, respectively.

Discussion

Becoming a drinker, according to our findings, is an integral aspect of the process of adolescent development as a whole. In this regard, our earlier findings (Jessor, Collins, & Jessor, 1972) have been replicated and extended. There are orderly relations between the onset of drinking and a set of sociopsychological attributes which antedate its occurrence; those attributes, constituting a patterned readiness to begin drinking, are also related in a significant way to the time of onset—the greater the readiness the earlier the onset; further, variation in time of onset is related to developmental change in those attributes; and, finally, the onset of drinking, in turn, seems to influence those attributes (and other behaviors) in a way that brings them, ultimately, into greater coherence with the new status of drinker. This network of findings makes the onset of drinking a visible thread in the web of adolescent development.

In terms of our conceptual framework, abstainers have been shown to differ from youth who drink in a number of characteristics reflecting what may be termed a pattern of conventionality—a greater value on achievement or successful performance in the school setting, less value on independence relative to achievement, greater intolerance of deviant behavior, greater religiosity, greater involvement with parents and with friends whose outlook is similar to that of the parents, fewer friends who drink and friends who approve less of drinking, and greater involvement with church and grades while less involved in general transgression. This portrait can, of course, be overdrawn or made to appear more clear-cut and salient than it really is. Two points should be made, however, that give warrant to such a listing: first, it conveys an interrelated pattern that lies across the various conceptual structures of the theoretical network rather than consisting of only a few arbitrary, isolated or specific differences; and second, it is a pattern—conventionality—that the over-all course of adolescent development tends to erode—that is, for all of the youth in the study, irrespective of drinker status, drug-use, etc., the over-all developmental trend is away from conventionality, toward lower value on achievement, higher value on independence, greater social criticism, greater tolerance of transgression, lower religiosity, greater peer than parent orientation, greater models and approval of problem behavior, and, of course, greater involvement in such behavior. The abstainers, then, represent a pattern that, for most of our youths, is unraveled by the passage of time and by what may be the ordinary psychological processes of growth.

The coherent character of the conventionality pattern and the fact that it has been sustained among the abstainers despite its erosion among the changers, both help to

explain why the abstainers, embedded by 1972 in a context in which 78% of their peers drink, nevertheless have not themselves begun to use alcohol. With regard to those who did change, and the order of their transition, the predominant trend was to approach the pattern of those who were already drinking, a pattern strongly contrasting with that of the abstainers. In terms again of the over-all trend of the developmental data, the drinkers' pattern represents a later developmental level. Our findings, in this regard, are consonant with the conclusion of the review by Stacey and Davies, "Consumption of alcohol at a very early age ... may ... indicate mere precocity in development..." (Stacey & Davies, 1970, p. 210).

It was because much of what is termed by the larger society as problem behavior among adolescents is often a claim upon and a definition of the occupancy of a more mature status that the present social psychology of problem behavior was felt to be of potential use as a psychology of adolescent development. The findings have borne out the utility of the approach. The developmental notion of transition-proneness was readily mapped onto the sociopsychological concept of problem-proneness, and it was then possible to consider variation in motivational instigation, in personal beliefs and controls, in environmental supports and models, and in allied behaviors as measurable components of the readiness or disposition to begin to drink.

Since the present research has shown the onset of drinking to be part of adolescent development in general, and to be related to other possible transition-marking behaviors such as sexual intercourse and marijuana use, emphasis needs to be placed on drinking as a social and psychological phenomenon with associated cultural meanings rather than a pharmacologically alcohol-specific phenomenon. An adolescent's drinking, as Maddox and McCall in 1964 have noted, "is associated with growing up in an environment in which an important status to which he legitimately aspires, that of becoming an adult, is perceived typically as involving alcohol use" (p. 106). The implication seems clear that in a different culture or society in which the use of alcohol was not associated with the achievement of adult status, e.g., in Italian society (Jessor, Young, Young, & Tesi, 1970), the pattern of sociopsychological correlates of drinking onset might well be very different from the one reported here. As for efforts to prevent alcohol misuse, it would follow that such efforts might well be directed at ways to untie drinking from its meaning as an indicator of adult status. The relation in our data between time since onset of drinking and prevalence of problem drinking is worth noting in this context; it also accords with the findings of others (e.g., Globetti, 1972; Zucker & DeVoe, 1975).

The limitations of this study should be noted. The sample is not a random sample of junior-high-school youth, not even of those in the community from which they were drawn. Those who stayed with the study over the 4 years, while a high percentage, are nevertheless a subsample of those who started. Not all the variables that were expected to be predictive actually were (e.g., value on independence and alienation) and the reason why is unclear. The criterion variable of transition groups set up at the end of the study and then "predicted" from the earlier-collected 1969 data is a somewhat different type of prediction approach from one starting in 1969 and predicting onset for each student in advance. Further, the study enables no claim of causality despite the reliance on transition-prone predictive data collected before

the criterion; while temporal priority does add an increment of conviction about causal influence, it does not enable us to go beyond the assertion of covariation. And, finally, the data presented for the sexes combined may have blurred what might be, for other purposes, meaningful distinctions on some of the variables between boys and girls, especially in their psychosocial development.

Despite these limitations, the research seems to have contributed both to the study of adolescent development and to knowledge about youthful drinking. By using an approach in which development is dealt with in terms of explanatory variables rather than relying on the conceptually empty notion of age, and by mapping those variables onto the abstainer-drinker transition, we have been able to give a developmental account of the onset of drinking. At the same time, it has been possible to show that onset, in turn, is consequential for development. It goes without saying that without a longitudinal research design neither objective would have been attainable.

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Chapter 4

Adolescent and Young Adult Problem Drinking

John E. Donovan, Richard Jessor, and Lee Jessor

Despite increasing concern about alcohol use among youth, little is actually known about the continuity of problem drinking between adolescence and young adulthood. Whether most adolescent problem drinkers “mature out” of this pattern of behavior as they grow, or whether they continue to misuse alcohol as young adults, is an unresolved question the answer to which has important implications for public health policy. Only rarely has the “natural history” of problem drinking from adolescence through the third decade of life been studied. Nor have factors been identified among adolescent problem drinkers that may signal who is more likely to “mature out” of such behavior and who is likely to continue to have problems from the use of alcohol in young adulthood. Such knowledge would be useful for prevention programs targeted on those adolescents most at risk for drinking problems later on in young adulthood. This paper is a report of a longitudinal study that bears on these issues. We examine involvement in problem drinking at two time periods in young persons’ lives—first, in adolescence or at college-age, and second, in young adulthood—and we seek to identify those psychosocial and behavioral factors in adolescence that may be predictive of the later pattern of drinking during the middle and late twenties.

Recent reviews of the literature provide evidence of the burgeoning research into the prevalence, antecedents, correlates, and consequences of drinking and problem drinking among teenagers (Blane & Hewitt, 1977; Braucht, 1980; Braucht, 1982; Kandel, 1980; Radosevich et al., 1980; Smart, 1980),¹ but they have little to say

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¹Also, Barnes, G. E. A current perspective on teen-age drinking. [Unpublished manuscript, University of Manitoba, 1979.]

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regarding our primary interest here, namely, the relation between problem drinking in adolescence and problem drinking in young adulthood. Although there have been many longitudinal studies of problem drinking (Fillmore, 1974; Fillmore, 1975; Fillmore, Bacon, & Hyman, 1979; Hoffmann, Loper, & Kammeier, 1974; Jones, 1968; Jones, 1971; Kammeier, Hoffmann, & Loper, 1973; Loper, Kammeier, & Hoffmann, 1973; McCord, 1972; McCord, 1981; McCord & McCord, 1960; McCord & McCord, 1962; Ricks & Berry, 1970; Robins, 1966; Robins, 1978; Robins, Bates, & O'Neal, 1962; Robins & Ratcliff, 1979; Vaillant, 1980), most of these studies either had no data or only incomplete data on the adolescent drinking and problem drinking of the participants, or else they followed up the adolescents only when they were well beyond their middle-to-late twenties (usually when the participants were in their late thirties or older). Similarly, although several longitudinal studies have examined the stability-instability of particular drinking problems over time (Cahalan, 1970; Clark, 1976; Clark & Cahalan, 1976; Roizen, Cahalan, & Shanks, 1978),² in all of them the initial drinking data were collected after adolescence, i.e., when the participants were aged 21 or older. None of these studies, then, has dealt directly with the question of the stability-instability of problem drinking between adolescence and young adulthood.

The present paper is based on two parallel prospective longitudinal studies, one initiated in 1969 in cohorts of 7th-, 8th-, and 9th-grade adolescents, and one initiated in 1970 in a sample of college freshmen. Adolescent data on these youth, both young men and women, were collected on an annual basis for 4 successive years (1969–1972 in the high-school sample, 1970–1973 in the college sample). The data included numerous psychosocial and behavioral measures designed to provide a test of a social-psychological theory of adolescent problem behavior. In this theory—referred to as “Problem Behavior Theory” (Jessor & Jessor, 1977)—problem behavior is treated as the result of the interaction of 3 systems of variables: the personality system, the perceived-environment system, and the behavior system. Measures of each of these 3 systems of explanatory variables were included in each of the 4 annual questionnaires. The research yielded considerable empirical support for Problem Behavior Theory as an explanation of drinking, problem drinking, marijuana use, general delinquent-type behavior, and premarital sexual intercourse in adolescence and youth (Jessor & Jessor, 1977).

In 1979, after a 7-year hiatus for the high-school sample and a 6-year hiatus for the college sample, a further follow-up of the participants was initiated. This involved the location and testing of the former participants in the high-school sample, now aged 23 through 25, and the former participants in the college sample, now aged around 28, who had taken part in all 4 years of the earlier study of adolescent psychosocial development. Those data constitute the first follow-up wave of what has now become a longitudinal study of psychosocial development within young adulthood. The follow-up questionnaire assessed most of the same variables that had been assessed earlier, including drinking and problem drinking, and it also

²Also, Cahalan, D. and Roizen, R. Changes in drinking problems in a national sample of men. Presented at the North American Congress on Alcohol and Drug Problems, San Francisco, December 1974.

included assessments of several life-areas important in young adulthood—friendships, family, work and leisure.

Thus these follow-up data constitute a unique resource for examining the link between adolescent problem drinking and young-adult problem drinking in the same young people followed over time; that is the primary focus of this paper. The second focus is on the relation of personality and social factors assessed in adolescence or youth to problem drinking in young adulthood.

Method

Overall Design of the Study

In the spring of 1969 a 4-year longitudinal study of adolescent psychosocial development was initiated in the high-school sample by drawing a random sample of students stratified by sex and grade from 3 junior high schools in the same Rocky Mountain school district. Of the 1126 selected students in grades 7 through 9, 589 (53%) agreed to participate in the study for 4 annual testings (1969 through 1972) and, with parental permission, completed the first-year questionnaire. In 1972, the fourth year of testing, 483 students (82% of the original group) took part in the testing. Of those 483, 432 (188 men) had completed the annual questionnaire on all 4 occasions between 1969 and 1972.

Another part of the overall study focused on college youth. In spring 1970 a random sample was drawn of freshman students in the College of Arts and Sciences of a large university in the same city. These students were contacted and asked to participate in the research over the next 4 years (1970 through 1973). Of the 462 students contacted, 276 (60%) completed questionnaires in the spring of 1970, and 226 of them completed questionnaires in the spring of 1973. A total of 205 students (92 men) participated in the study in all 4 years.

The second phase of the research, hereafter referred to as the Young-Adult Follow-Up Study, began in fall 1978 with the process of locating the 637 high-school- and college-sample participants who had taken part in all 4 years of the earlier phase of the research. Three participants had died in the interim (2 from the high-school sample, 1 from the college sample), and 1 former participant could not be located.

In spring 1979 each of the 633 former participants was contacted and asked to resume participation in the study. A 65-page questionnaire and a token payment of \$10 were mailed to each subject who agreed to participate. The participants were informed that the confidentiality of their responses was guaranteed by confidentiality certificates from the U.S. Department of Justice and from the U.S. Department of Health, Education and Welfare.

A total of 595 of the young adults returned completed questionnaires, for a retention rate of 94%. Of the 595 young adults participating, 403 (172 men) are former participants from the high-school sample and 193 (88 men) are former participants from the college sample. The present analyses are based on 595 questionnaires with usable data.

Description of the Participants

For the most part, both the high-school and college samples come from middle-class or upper-middle-class Anglo-American families. Only 7% of the sample are non-Anglo (Spanish American or American Indian, for the most part). Study participants had the following characteristics as young adults: 45% of the high-school sample and 47% of the college sample were married, with somewhat more of the women than the men being married; about 25% of those who were single were living with someone of the opposite sex; and about 20% of the participants had children. About 80% of the men and 60% of the women in both samples were employed full-time, and 14% of the women were full-time homemakers. Almost 45% of the high-school sample and 86% of the college sample had completed college or schooling beyond that. With regard to their young-adult occupations, 68% of the college sample had managerial or professional-executive positions, in contrast to 30% of the high-school sample; only 5% of the college sample, compared with 20% of the high-school sample, were employed in semiskilled or unskilled jobs. As to religious affiliation, 49% belonged to Protestant denominations, 13% were Catholics, and 27% reported that they were not affiliated with any religion.

Measurement of Variables in Problem Behavior Theory

The annual questionnaires administered between 1969 and 1972 to the high-school sample and between 1970 and 1973 to the college sample were approximately 50 pages in length and consisted of a set of psychometric instruments developed to represent the variables of Problem Behavior Theory. Most of the personality, perceived-environment, and behavior-system variables were assessed by the same scales in all 4 years, and many of the scales were the same for both the high-school and college samples. For the present set of analyses the measures assessed in the fourth year of testing on both samples were used as adolescent predictors of problem drinking in young adulthood (these are the Year IV-1972 measures for the high-school sample, and the Year IV-1973 measures for the college sample). The specific personality-system, perceived-environment-system, and behavior-system variables that were examined are all listed in Table 4.3. All of the measures of these variables are described in detail elsewhere (Jessor & Jessor, 1977), and the great majority of these measures are multiple-item summative scales with satisfactory psychometric properties (Jessor & Jessor, 1977, pp. 56–57) as indicated by Cronbach's *alpha* estimates of reliability (Cronbach, 1951) and by Scott's homogeneity ratios (Scott, 1960; Scott, 1968).

Establishment of Drinking Status

Both the earlier 1972/1973 Year IV questionnaires and the later 1979 questionnaire devoted considerable attention to the assessment of alcohol use and drinking problems. As in our previous research, problem drinking was operationally defined in

terms of both frequency of drunkenness and frequency of negative personal and interpersonal consequences due to drinking (Jessor & Jessor, 1977; Donovan & Jessor, 1978; Jessor & Jessor, 1973).

In the 1972/73 data, problem drinkers were drinkers who had been drunk six or more times in the past year, or who had experienced negative consequences due to their drinking at two or more times in the past year in each of three or more out of six different life-areas: trouble with teachers, difficulties with friends, trouble with parents, criticism from dates, trouble with the police, and driving while under the influence of alcohol. Although this operational definition is, of course, somewhat arbitrary, it yields numbers of subjects classified as problem drinkers that are sufficient for research purposes, and its use results in findings with regard to the psychosocial correlates of problem drinking that differ little from findings based on two alternative definitions (Donovan & Jessor, 1978).

The upper portion of Table 4.1 presents the resulting 1972/73 classifications of the 4 sex-by-sample groups on the index of drinking status. Problem-drinking rates in the adolescent (1972) or youth (1973) data are the following: high-school-sample men, 27%; high-school-sample women, 16%; college-sample men, 30%; and college-sample women, 10%. It is of interest that a substantial proportion of these problem drinkers had also been coded as problem drinkers in the preceding year as well: in the high-school subsamples, 45 and 43% of the 1972 male and female problem drinkers, respectively, also qualified as problem drinkers a year earlier in 1971; in the college subsamples, 73% of the 1973 male problem drinkers and 40% of the 1973 female problem drinkers had also been coded as problem drinkers in 1972.

The operational definition of problem drinking used in coding the young adult data (1979) used somewhat higher cutting points because of the higher level of involvement with alcohol in the subsamples at this older age.³ Accordingly, young adult problem drinkers were defined as drinkers who, in 1979, had been drunk 6 or more times in the past 6 months, or who had experienced 3 or more of 9 negative consequences due to drinking in the past 6 months. Negative consequences assessed in 1979 were the following: interpersonal problems (criticism from friends, family concerned about the respondent's drinking), job-related problems (missing work or calling in sick due to drinking, being told your drinking was creating problems on the job), trouble with the police, financial problems, accidents at home or at work due to drinking, problems with spouse or person living with, and driving while under the influence of alcohol.

The percentages classified as problem drinkers in 1979 are presented in the lower portion of Table 4.1. These young adult percentages turn out to be very similar to the problem-drinker rates obtained earlier, in 1972/73: for former high-school-sample men, 31%; for former high-school-sample women, 14%; for former college-sample men, 29%; and for former college-sample women, 9%. This similarity in rates is

³ Paired sample *t*-tests comparing the 1972/73 and the 1979 drinking behavior of participants who were drinkers at both times show that the average daily intake of alcohol increased significantly in all four subsamples, frequency of drunkenness increased in the high-school subsamples but not in the college subsamples, and drinkers in all four subsamples experienced significantly more negative consequences as a result of their drinking in 1979 than they had in 1972/73. These *t*-tests were all based on measures that were maximally comparable across the two time periods.

Table 4.1 Drinker Statuses in 1972/73 and 1979 by Sex and Sample—Young-Adult Follow-Up Study^a

	High-School Sample (1972)				College Sample (1973)			
	Men		Women		Men		Women	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
<i>1972/73 Status^b</i>								
Abstainers	35	(20)	49	(21)	2	(2)	3	(3)
Discontinuers	7	(4)	15	(7)	0	(0)	3	(3)
Minimal drinkers	4	(2)	3	(1)	0	(0)	1	(1)
Nonproblem drinkers	79	(46)	127	(55)	59	(68)	88	(84)
Problem drinkers	47	(27)	37	(16)	26	(30)	10	(10)
Total	172	(99)	231	(100)	87	(100)	105	(101)
<i>1979 Status^b</i>								
Abstainers	5	(3)	5	(2)	0	(0)	1	(1)
Discontinuers	10	(6)	20	(9)	2	(2)	3	(3)
Minimal drinkers	3	(2)	9	(4)	1	(1)	0	(0)
Nonproblem drinkers	100	(58)	164	(71)	58	(67)	91	(88)
Problem drinkers	54	(31)	33	(14)	25	(29)	9	(9)
Total	172	(100)	231	(100)	86	(99)	104	(101)

^aColumn percentage totals may not sum to exactly 100% because of rounding. Two 1979 respondents, one man and one woman from the college sample, failed to fill in the drinking questions and were excluded from the 1979 percentages

^bAbstainers have not had a drink more than 2 or 3 times in their lives. Discontinuers have stopped drinking or have not had a drink in at least 6 months. Minimal drinkers usually drink less than a can of beer, a glass of wine, or a drink of spirits at a single occasion, and were considered unlikely to develop problems because of their low levels of alcohol intake. Nonproblem drinkers were current, more-than-minimal drinkers who had been drunk less than 6 times in the last year (1972/73) or last 6 months (1979), and who had experienced negative consequences because of their drinking in no more than 2 areas in the past year (6 months in 1979). Problem drinkers are defined in the text

fortuitous, however, an outcome of the different cutting points specified on the drunkenness measure and the negative-consequences measure in 1972/73 and in 1979.⁴

The construct validity of these classifications was supported by analyses comparing the mean scores of the problem and the nonproblem drinkers on a variety of

⁴Despite this similarity in the problem drinker rates at both times, problem drinkers in the two years differed in how they qualified. In 1972/73, the great majority of those coded as problem drinkers in the four subsamples (between 76 and 100%) “passed” only the drunkenness criterion cut-off, and only one 1972/73 problem drinker “passed” the negative-consequences criterion cut-off without also passing the drunkenness criterion. In 1979, however, negative consequences due to drinking figured much more prominently in the classification of problem drinkers (60% of the high-school sample and 100% of the college-sample women qualified by this criterion alone or in combination with drunkenness). For 1972/73 the two component measures, times drunk in the past year and total negative consequences, correlated 0.48 in the high-school sample and 0.59 in the college sample; the respective correlations were 0.51 and 0.33 in the 1979 data.

drinking-related measures in 1972/73 and also in 1979. Participants classified as problem drinkers reported drinking 2 to 3 times as much alcohol on a daily basis as those classified as nonproblem drinkers. They also reported being drunk much more often on the average than those classified as nonproblem drinkers: the average times drunk for participants classified as problem drinkers in 1972/73 ranged between 15 and 23 times in the past year for the 4 subsamples, and for the 1979 problem drinkers the average times drunk ranged from 14 to 35 times in the past year; in contrast, the average number of times drunk for the nonproblem drinkers ranged between only 1.5 and 3 times in the past year. Participants classified as problem drinkers also reported more experience with hangovers and symptomatic drinking (drinking first thing in the morning, impairment of memory of drinking episodes, frequency of being high on alcohol, and number of binges or continued drinking over several days), and more negative consequences as a result of their drinking than did the nonproblem drinkers. Problem drinkers defined according to our criteria, then, did indeed report a more problem-prone pattern of drinking behavior than that found among the nonproblem drinkers.

Results

Findings related to the following four topics will be presented. First, we examine the continuity-noncontinuity of problem-drinking status between adolescence and young adulthood. Second, the earlier data, consisting of the 1972/73 personality, perceived-environment, and behavior-system measures, are employed to determine whether psychosocial attributes assessed in adolescence or youth can predict later problem drinking in young adulthood. Third, the same 1972/73 measures are used to determine if there are antecedent differences in adolescence that signal the continuation or noncontinuation of problem drinking from adolescence into young adulthood. Fourth, these 1972/73 psychosocial measures are used to determine if there are antecedent differences in adolescence that foreshadow the shift from earlier, nonproblem drinking to problem drinking in young adulthood.

Continuity of Problem Drinking Between Adolescence and Young Adulthood

Continuity of problem drinking depends on the stability over time of two different patterns of drinking behavior: nonproblem drinking and problem drinking. Noncontinuity implies that a sizable percentage of adolescent problem drinkers gave up this pattern of drinking by young adulthood, and that a fair number of adolescent nonproblem drinkers initiated a pattern of problem drinking by young adulthood. Table 4.2 presents frequency distributions on the 1979 drinking-status

Table 4.2 Turnover in Drinking Status between Adolescence and Young Adulthood by Sex and Sample—Young-Adult Follow-Up Study

	<i>N</i> (%) in Each Drinking Status in 1979				
	Discontinuers	Minimal Drinkers	Nonproblem Drinkers	Problem Drinkers	Total
High-School Sample, 1972 Drinking Status					
<i>Men</i>					
Nonproblem drinkers	2(3)	0(0)	47(59)	30(38)	79(100)
Problem drinkers	2(4)	0(0)	25(53)	20(43)	47(100)
<i>Women</i>					
Nonproblem drinkers	9(7)	3(2)	96(76)	19(15)	127(100)
Problem drinkers	1(3)	0(0)	26(70)	10(27)	37(100)
College Sample, 1973 Drinking Status					
<i>Men</i>					
Nonproblem drinkers ^a	0(0)	1(2)	45(78)	12(21)	58(101)
Problem drinkers	0(0)	0(0)	13(50)	13(50)	26(100)
<i>Women</i>					
Nonproblem drinkers ^a	2(2)	0(0)	78(90)	7(8)	87(100)
Problem drinkers	0(0)	0(0)	8(80)	2(20)	10(100)

^aOne nonproblem drinker among the college-sample men and one among the college-sample women skipped the drinking section of the questionnaire in 1979 and could not be coded in that year. Row *N*s should have been 59 and 88, respectively

measure separately for the adolescent nonproblem drinkers and for the adolescent problem drinkers in each subsample.

The Continuity of Problem Drinking. With regard to the stability of adolescent problem drinking over time, the modal tendency is in the direction of noncontinuity. In all four subsamples, a majority of the 1972/73 problem drinkers are classified as nonproblem drinkers in 1979 as young adults. Of the adolescent problem drinkers, 53% of the high-school-sample men and 70% of the high-school-sample women were nonproblem drinkers in 1979. Results for the college sample were similar: 50% of the male former problem drinkers and 80% of the female former problem drinkers were nonproblem drinkers in 1979. Analyses by sex and grade within the high-school sample generally show the same result.

There is, however, a clear gender difference in the degree of noncontinuity of problem drinking. Almost three-quarters of the women who were problem drinkers in 1972/73 were nonproblem drinkers as young adults; this tendency to shift from problem to nonproblem drinking is even more pronounced for the college-sample women than for the high-school-sample women (80 vs 70%). In contrast, among the

men, youthful problem drinkers were only slightly more likely to discontinue a pattern of problem drinking than to continue it.

The Continuity of Nonproblem Drinking. In contrast to these findings for the adolescent problem drinkers are the findings for the adolescent nonproblem drinkers. Nonproblem drinking was by far a more stable behavior pattern than problem drinking between adolescence and young adulthood. In all four subsamples, the majority of the 1972/73 nonproblem drinkers were still nonproblem drinkers as young adults in 1979: 59% of the high-school-sample men, 76% of the high-school-sample women, 78% of the college-sample men, and 90% of the college-sample women who were adolescent nonproblem drinkers exhibited a similar drinking pattern in 1979. This stability of nonproblem drinking also holds for five of the six sex-by-grade cohorts within the high-school sample.

There are both gender and sample differences in the stability of nonproblem drinking over time. In the high-school sample, 38% of the male nonproblem drinkers, in contrast to 15% of the female nonproblem drinkers, had become problem drinkers by young adulthood; in the college sample, 21% of the male nonproblem drinkers and 8% of the female nonproblem drinkers had become problem drinkers by 1979. The men in our samples were thus 2.5 times more likely than the women to have shifted from a nonproblem drinking status in 1972/73 to a problem-prone style of drinking in 1979. This gender difference was replicated at the cohort level in the high-school sample as well. As is also clear from the percentages just cited, high-school-sample nonproblem drinkers were more likely than college-sample nonproblem drinkers to be problem drinkers in 1979.⁵

One further point should be made with regard to the findings in Table 4.2. In all 4 subsamples, those who were problem drinkers as adolescents had a higher likelihood of being problem drinkers in young adulthood than did participants who had been nonproblem drinkers as adolescents. In 3 of the 4 subsamples (i.e., for all but the high-school male sample), problem-drinking adolescents were about twice as likely as nonproblem-drinking adolescents to be problem drinkers in young adulthood. This finding holds for 5 of the 6 sex-by-grade cohorts in the high-school sample as well (all except the 7th-grade male cohort).

⁵When a much more stringent definition of young-adult problem drinking is used (drunk 12 or more times in the past 6 months, or negative consequences twice in the past 6 months in 3 or more areas), most of the gender and sample differences are still evident, although they are considerably reduced in size. Under this definition, in the high-school sample, 66% of the male and 81% of the female adolescent problem drinkers were nonproblem drinkers in 1979; in the college sample, 73% of the male and 80% of the female 1973 problem drinkers were nonproblem drinkers in 1979. The high-school-college difference that was evident for the women in Table 4.2 is no longer apparent with this more stringent definition, but the sex difference in both samples remains clear.

In the high-school sample, 78% of the male and 82% of the female adolescent nonproblem drinkers were still nonproblem drinkers in 1979; in the college sample, 88% of the male and 93% of the female 1973 nonproblem drinkers were still nonproblem drinkers in 1979. Among the 1972/73 nonproblem drinkers, 19% of the high-school-sample men, 9% of the high-school-sample women, 10% of the college-sample men, and 5% of the college-sample women were classified as problem drinkers in young adulthood.

Finally, problem drinking in adolescence, according to the data in Table 4.2, appears to be much more chronic for the men than it is for the women in the sense of its continuity or enduring nature. Among the women, there is a much greater chance that it will not be evident in adulthood than that it will, whereas among adolescent male problem drinkers the chances are just about equal.

Adolescent Psychosocial Antecedents of Problem Drinking in Young Adulthood

Given the availability of extensive adolescent psychosocial data on these young adults, it was possible to explore whether problem drinking in young adulthood is systematically related to variation on the personality-system, perceived-environment-system, and behavior-system measures assessed earlier in 1972 or in 1973. For this purpose, biserial correlations were computed between each of the 1972/73 measures and a dichotomous index of problem-drinking status in 1979 (problem drinker = 1, not a problem drinker = 0). The data are presented in Table 4.3. (Biserial correlations may be interpreted as estimates of the product-moment correlations that would have been obtained had the criterion measure been a normally distributed, continuous measure.) A positive biserial correlation means that the 1972/73 mean for the 1979 problem drinkers is larger than the comparable mean for those participants who are not problem drinkers in 1979. For comparison purposes, this table also includes in parentheses the comparable cross-sectional correlations between the 1972/73 psychosocial measures and 1972/73 problem-drinker status. Tetrachoric correlations between the 1972/73 and the 1979 dichotomous problem-drinking-status measures (problem drinker vs not a problem drinker) are .25, .32, .48, and .31 for the high-school-sample men and women, and the college-sample men and women, respectively.

With respect to the 1972 personality-system measures in the high-school sample, there are a number of statistically significant correlations with young-adult problem-drinking status for both men and women. These correlations, although modest, are consistent across the multiple measures. They indicate that adolescents who were problem drinkers as young adults had scores on the 1972 personality measures reflecting higher personal instigations for involvement in problem behavior (lower value on academic achievement, higher value on independence relative to achievement, and lower expectations for academic recognition) than adolescents who were not problem drinkers as young adults. Their 1972 scores also indicate lower personal controls against involvement in problem behavior (less intolerance of socially disapproved behavior, less religiosity, fewer reasons against drinking, and more positive than negative reasons for marijuana use and for sexual intercourse). Measures of the personal-belief structure in adolescence, however, showed little relationship to problem-drinker status in young adulthood. Of the 1972 drinking-function measures, only the importance of positive social (or social-convivial) functions relates to the

Table 4.3 Biserial Correlations between the 1972/73 Psychosocial Measures and 1979 Status as a Problem Drinker or Not a Problem Drinker^a

	High-School Sample				College Sample			
	Men		Women		Men		Women	
	(N = 172)	(231)	(86)	(104)				
Personality System								
<i>Motivational-Instigation Structure</i>								
Value on achievement	-.30 [†]	(-.13) ^b	-.23 [*]	(-.35) [‡]	-.22	(-.10)	.35 [*]	(.23)
Value on independence	.09	(.10)	-.02	(.07)	-.08	(-.15)	-.13	(.15)
Independence-achievement value discrepancy	.22 [*]	(.19) [*]	.21 [*]	(.37) [‡]	.18	(.01)	-.40 [*]	(-.14)
Expectations for academic achievement	-.20 [*]	(-.08)	-.23 [*]	(-.28) [†]	-.14	(.05)	.02	(-.01)
Expectations for affection	-.03	(.07)	-.06	(.10)	-.12	(-.08)	.06	(-.02)
<i>Personal Belief Structure</i>								
Social criticism	.06	(.04)	.03	(.09)	.11	(.12)	.13	(.24)
Alienation	.16	(-.02)	.11	(-.07)	.18	(-.06)	-.06	(.15)
Self-esteem	.02	(.01)	-.07	(.02)	-.33 [*]	(.08)	.31 [*]	(-.03)
<i>Personal Control Structure</i>								
Tolerance of deviance	-.28 [†]	(-.42) [‡]	-.39 [‡]	(-.39) [‡]	-.24 [*]	(-.21)	-.14	(-.09)
Religiosity	-.24 [†]	(-.06)	-.15	(-.13)	-.30 [*]	(-.15)	-.09	(-.24)
Drinking functions disjunction	.13	(.40) [‡]	.21 [*]	(.28) [‡]	.18	(.36) [†]	.26	(.43) [†]
Negative functions	-.23 [*]	(-.36) [‡]	-.22 [*]	(-.32) [‡]	-.15	(-.41) [†]	.17	(-.44) [†]
Positive functions	-.01	(.16)	.11	(.15)	.10	(.10)	.46 [†]	(.13)
Personal effects functions	-.03	(.13)	.09	(.15)	.17	(.11)	.36 [*]	(.23)
Positive social functions	.22 [*]	(.49) [‡]	.15	(.37) [‡]	.24	(.25) [*]	.06	(.24)
Conforming social functions	-.05	(.01)	.09	(.07)	-.00	(-.09)	.54 [†]	(-.00)
Status transformation functions	-.15	(-.12)	.01	(-.11)	-.07	(.05)	.40 [*]	(-.13)
Drug functions disjunction	.40 [‡]	(.40) [‡]	.23 [*]	(.47) [‡]	.18	(.16)	.29	(.26) [†]
Sex functions disjunction	.33 [‡]	(.26) [†]	.26 [†]	(.27) [†]	.16	(.09)	.16	(.43) [†]

(continued)

Table 4.3 (continued)

	High-School Sample				College Sample			
	Men		Women		Men		Women	
	(N = 172)		(231)		(86)		(104)	
Perceived-Environment System								
<i>Distal Structure</i>								
Parental support	-.12	(-.38) [‡]	.07	(-.10)	.02	(.01)	.00	(-.21)
Parental controls	-.06	(.00)	-.22 [*]	(-.07)	-.04	(.15)	-.07	(.02)
Friends' support	-.10	(-.04)	.03	(.24) [†]	.09	(.36) [†]	-.04	(-.21)
Parent-friends compatibility	-.23 [†]	(-.27) [†]	-.05	(-.21) [*]	-.33 [*]	(-.28) [*]	-.04	(-.34) [*]
Parent-friends influence	.16	(.18) [*]	.14	(.12)	.08	(.16)	-.07	(.23)
<i>Proximal Structure</i>								
Parental approval for problem behavior	.11	(.33) [‡]	.08	(.00)	-.03	(.25) [*]	.17	(.15)
Friends' approval for problem behavior	.35 [‡]	(.51) [‡]	.25 [†]	(.42) [‡]	.13	(.54) [‡]	.30 [*]	(.40) [‡]
Friends models for problem behavior	.29 [†]	(.65) [‡]	.19 [*]	(.55) [‡]	.29 [*]	(.54) [‡]	.19	(.45) [†]
Parental approval of drinking	.05	(.22) [*]	.04	(-.03)	.11	(.29) [*]	-.01	(-.10)
Friends' approval of drinking	.16 [*]	(.35) [‡]	.06	(.28) [‡]	-.03	(.49) [‡]	.44 [†]	(.02)
Friends models for drinking	.11	(.54) [‡]	.03	(.50) [‡]	.20	(.46) [‡]	.22	(.31) [*]
Behavior System								
<i>Problem Behavior Structure</i>								
Multiple problem behavior index	.24 [†]	(.64) [‡]	.32 [†]	(.51) [‡]	.21	(.36) [†]	.39 [‡]	(.46) [†]
General deviant behavior	.27 [†]	(.50) [‡]	.41 [†]	(.41) [‡]	.32 [*]	(.37) [†]	.29	(.24)
Involvement with marijuana	.38 [‡]	(.72) [‡]	.33 [‡]	(.57) [‡]	.36 [†]	(.43) [‡]	.14	(.26)
Frequency of marijuana use, past 6 months	.29 [†]	(.52) [‡]	.24	(.28) [*]	.29 [*]	(.45) [†]	.05	(-.03)
Illicit drinking behavior	.06	(.29) [†]	.14	(.24) [*]				
Solitary drinking behavior	.22 [*]	(.34) [†]	-.03	(.20) [*]	.37 [*]	(.16)	.61 [*]	(.20)
Average intake of beer per occasion	.21 [*]	(.59) [‡]	.17	(.52) [‡]	.39 [†]	(.56) [‡]	.30	(.36) [*]
Average daily intake of beer (in oz of absolute alcohol)	.08	(.69) [‡]	.12	(.55) [‡]	.19	(.66) [‡]	.33 [*]	(-.00)

(continued)

Table 4.3 (continued)

	High-School Sample				College Sample			
	Men		Women		Men		Women	
	(N = 172)		(231)		(86)		(104)	
Average daily intake of spirits (in oz of absolute alcohol)	.11	(.47) [‡]	-.13	(.41) [†]	.19	(.55) [†]	.16	(.43)
Average daily intake of alcohol (in oz of absolute alcohol)	.08	(.58) [‡]	.04	(.68) [‡]	.25*	(.73) [‡]	.14	(.39)*
Times drunk in past year	.16	(.91) [‡]	.18	(.83) [‡]	.40 [†]	(.83) [‡]	.04	(1.00)*
Total negative consequences of drinking	.07	(.68) [‡]	.05	(.65) [‡]	.46 [†]	(.72) [‡]	.37*	(.44) [†]
Number of areas of negative consequences	.14	(.75) [‡]	.04	(.67) [‡]	.40 [†]	(.77) [‡]	.45 [†]	(.60)*
Study year of onset of problem drinking (1–4)	-.04		-.11		-.21		-.03	
Number of years as a problem drinker(0 to 4)	.09		.23*		.47 [‡]		.26	
<i>Conventional Behavior Structure</i>								
Church attendance frequency (past year)	-.20 [†]	(-.14)	-.21 [†]	(-.19) [†]	-.17	(-.14)	-.14*	(-.19) [†]
School performance	-.28 [†]	(-.25)*	-.14	(-.18)*	.09	(.16)	-.20	(-.09)
<i>Sociodemographic Measures</i>								
Father's occupational group	.17	(.02)	.09	(.04)	-.01	(.11)	.06	(.05)
Father's education	.08	(.03)	-.01	(.00)	.02	(.07)	-.02	(-.28)*
Mother's education	.10	(-.04)	-.07	(-.20)*	-.33*	(.04)	.24	(-.29)*
Father's Hollingshead Index (SES) ^c	.13	(.02)	.04	(.02)	-.00	(.10)	.02	(-.11)

^aThese biserial correlations were calculated from point-biserial correlations using a formula given by Cohen and Cohen (1975, 35, p. 61). These biserial correlations are all larger than their respective point-biserial correlations, and may be anywhere from 25% to 66% larger, depending on the departure of the dichotomy from a 50–50 split. The significance of the biserial was determined by *t*-tests on the 1972 or 1973 group means based on either the pooled or separate variance estimates of *t*, as appropriate

^bThe biserial correlations in parentheses are between the 1972/73 psychosocial measures and 1972/73 status as a problem drinker or not a problem drinker

^cHollingshead, A. B. Two factor index of social position. New Haven, Conn.; 1957. [Mimeographed]

**P* < .05

[†]*P* < .01

[‡]*P* < .001

likelihood of being classified a problem drinker in young adulthood. The significant biserial correlations between the 1972 personality measures and problem drinking in young adulthood are generally similar for both the male and female subsamples.

With regard to the 1972 measures of the perceived-environment system, there were fewer significant correlations with young-adult problem-drinking status. In the distal structure of that system, young-adult problem-drinking status was associated for the men with less perceived compatibility of interests between parents and friends and, for the women, with lower perceived parental controls in adolescence. In reference to the measures of the proximal structure of the perceived environment, adolescents who are problem drinkers as young adults tended to perceive greater approval for involvement in problem behavior, and more models for such behavior among their friends, than did adolescents who are not problem drinkers in young adulthood. Perceived social support specifically for drinking in adolescence, however, bears little relationship to involvement in problem drinking in young adulthood.

With respect to the 1972 behavior-system measures, adolescents who are problem drinkers as young adults differed very little in terms of their actual adolescent drinking behavior from those who are not problem drinkers as adults; however, they did tend, as adolescents, to have greater involvement in “other” problem behavior, such as general deviant behavior and involvement with marijuana, and less involvement with the conventional institutions of the church and the schools.

None of the (parental) sociodemographic variables measured in adolescence was significantly correlated with problem-drinking status in young adulthood for either sex in the high-school sample.

All of the significant correlations linking 1972 adolescent personality and social-environment variables to young-adult problem-drinker status are theoretically consistent in their implications. Participants whose scores as adolescents reflected greater theoretical proneness for involvement in problem behavior are indeed more likely to be problem drinkers as young adults than are adolescents with less psychosocial proneness for problem behavior. In the terms of Problem Behavior Theory, the likelihood of involvement in problem drinking in young adulthood was higher for those adolescents with greater personal instigations toward, attenuated personal controls against, greater social support for, and greater actual involvement in problem behavior, and, at the same time, less involvement in conventional behavior such as church attendance.

The results for the college sample are also presented in Table 4.3. In general, the correlations between the 1973 personality-system, perceived-environment-system, and behavior-system measures and 1979 problem-drinker status are neither of the same magnitude nor as consistent across measures or between sexes as they were for the high-school sample.

For the college-sample men, the correlations with young-adult problem-drinker status are generally similar to those seen in both high-school subsamples. The major differences are that the motivational measures and the drug- and sex-function disjunction measures correlate less strongly with later problem drinker status for the college-sample men, whereas the measures of youthful drinking correlate much

more strongly than in the other subsamples. For the college-sample women, several of the correlations of personality measures with young-adult problem-drinker status are actually in the opposite direction of those for the men (e.g., value on achievement, the independence-achievement-value discrepancy, and self-esteem). In addition, unlike the other three subsamples, young-adult problem drinking does not correlate with the positive social functions of drinking for the college women, but does correlate with the other three classes of positive drinking functions. Given the small number of young-adult problem drinkers within the sample of college women ($N = 9$), however, it is not clear that these psychosocial relationships are in fact reliable.

Comparison of the biserial correlations between the 1972/73 psychosocial measures and problem-drinking status in 1979 and the biserials between these 1972/73 predictors and 1972/73 problem-drinking status (also presented in Table 4.3, in parentheses) reveals that, for the most part, the strongest psychosocial predictors of young-adult problem drinking were among the strongest correlates of adolescent or youthful problem-drinking status as well. The highest correlates of 1972/73 problem-drinking status were measures of the personal control structure in the personality system, measures of peer social support for involvement in problem behavior in the proximal structure of the perceived-environment system, and measures of involvement in both drinking-related and nondrinking problem behavior in the behavior system.

In order to gauge the combined predictive power of the 1972/73 measures for 1979 status as a problem drinker or nonproblem drinker, a stepwise multiple regression was performed for each of the subsamples using a set of 11 predictor measures selected on the basis of their theoretical importance in Problem Behavior Theory.⁶ The resulting multiple regressions account for statistically significant percentages of the variance on the dichotomous criterion measure. Multiple correlations (R s) of .53 and .45 were obtained for the high-school-sample men and women, accounting for 29 and 21%, respectively, of the variance in young-adult problem-drinker status. For the college-sample men and women, R s of .53 and .64 were obtained, accounting for 28 and 41% of the variance, respectively. All of these R s are statistically significant at the .001 level or beyond. Thus, variation in psychosocial proneness for problem behavior in adolescence or youth was modestly associated with the likelihood of being classified as a problem drinker in young adulthood.

⁶The adolescent predictor measures preselected to represent the framework of Problem Behavior Theory are exactly the same set of measures used by Jessor and Jessor (1977), with the exception of the parental demographic variables. The total set of 11 predictors includes the following 1972/73 measures: independence-achievement-value discrepancy, expectations for academic recognition, social criticism, attitudinal tolerance of deviance, parent-friends compatibility, friends as models for problem behavior, drug functions-disjunction, sex functions-disjunction, church attendance frequency, school performance, and the multiple problem-behavior index (excluding problem drinking). Predictor variables had to have an F -to-enter of 1.0 in order to be selected as components in the regression equation predicting problem drinking status in 1979. The resulting multiple correlations are based on the estimated biserial correlations with problem drinking.

Predicting Young-Adult Problem Drinking Among Adolescent Problem Drinkers

What the foregoing analyses have not done, however, is to control for the adolescent problem-drinking status of these youth. When this is done, it then becomes possible to address the two final topics of this section: the link between adolescent psychosocial variables and problem drinking in young adulthood among adolescent problem drinkers, and the link between adolescent psychosocial variables and problem drinking in young adulthood among former adolescent nonproblem drinkers.

The focus of this section is on exploring psychosocial antecedents that may distinguish those adolescent problem drinkers who would still be problem drinkers as young adults (the PD-PD group) from those who would be nonproblem drinkers as young adults (the PD-NPD group). Because of the small number of 1973 problem drinkers in the college subsamples, the analyses will be limited to the high-school subsamples only. The left half of Table 4.4 presents the 1972 means on the personality, perceived-environment, and behavior-system measures for the PD-PD and the PD-NPD groups of adolescents who were 1972/73 problem drinkers.

In general, the results of the mean comparisons are highly similar to those found in the preceding correlational analyses. Where there are significant differences between the two groups, those adolescent problem drinkers who will again be classified as problem drinkers in young adulthood have adolescent scores that are consistently more problem-behavior-prone. Adolescent problem drinkers who will be classified as nonproblem drinkers in 1979 are consistently more conventional and less problem-behavior-prone as adolescents.⁷

Multiple-regression analyses were carried out against the PD-PD vs PD-NPD criterion using the same set of 11 preselected predictor measures of adolescent personality, perceived-environment, and behavior-system variables as used above. They account for 49% of the variance ($R = .70, p < .01$) in young-adult problem-drinking status for the high-school-sample men and for 22% of the variance ($R = .47, p < .05$) for the high-school-sample women.

⁷Since the PD-PD group in the combined-sexes analysis in Table 4.4 is two-thirds men and only one-third women, separate analyses by sex were also performed. The adolescent psychosocial differences between the PD-NPD (discontinuers) and PD-PD (continuers) groups are similar for the high-school-sample men and women on the following measures: value on achievement, independence-achievement value discrepancy, expectations for academic achievement, tolerance of deviance, sex functions disjunction, parental controls, general deviant behavior, involvement with marijuana, average intake of beer per occasion, times drunk in the past year, school performance, and father's occupational group. For the most part, the mean differences (and *ts*) were larger for the men than for the women. There were also significant differences in the expected directions for the high-school male subsample, but no difference for the female subsample, on the following 1972 measures: social criticism, religiosity, drug functions disjunction, positive social functions of drinking, parent-friends influence, and friends' approval for problem behavior.

Table 4.4 Mean Scores on the 1972 Psychosocial Measures for Groups of Adolescent Problem Drinkers and Nonproblem Drinkers Differing in Subsequent Young-Adult Problem-Drinking Status, High-School Sample, Sexes Combined

	PD-PD ^a (N = 30)	PD-NPD ^b (51)	<i>t</i>	NPD-PD ^c (49)	NPD-NPD ^d (143)	<i>t</i>
Personality System						
<i>Motivational-Instigation Structure</i>						
Value on achievement	48.6	61.4	-2.7 [†]	60.5	62.3	-.6
Value on independence	73.9	77.1	-1.1	74.3	75.6	-.6
Independence-achievement value discrepancy	115.3	105.7	2.0 [*]	103.8	103.7	.0
Expectations for academic achievement	46.6	57.2	-2.1 [*]	55.5	56.6	-.3
Expectations for affection	57.1	61.7	-1.4	57.9	57.6	.1
<i>Personal Belief Structure</i>						
Social criticism	31.3	29.8	1.2	29.6	30.8	-1.4
Alienation	35.3	34.6	.5	37.4	35.4	1.9 [*]
Self-esteem	30.4	30.0	.5	29.5	30.2	-1.1
<i>Personal Control Structure</i>						
Tolerance of deviance	129.3	144.9	-1.9 [*]	146.6	161.3	-2.6 [†]
Religiosity	12.1	14.3	-1.4	12.3	14.3	-1.7 [*]
Drinking functions disjunction	36.9	35.4	.7	32.2	29.9	1.4
Negative functions	21.7	22.9	-.7	24.0	25.6	-1.7 [*]
Positive functions	34.5	33.7	.5	32.0	31.3	.5
Personal effects functions	7.8	8.0	-.4	7.5	7.3	.6
Positive social functions	12.3	11.8	1.3	10.7	10.6	.5
Conforming social functions	8.3	7.8	.9	7.5	7.4	.2
Status transformation functions	6.1	6.1	-.1	6.2	6.1	.3
Drug functions disjunction	29.1	25.7	1.5	23.1	10.0	1.8 [*]
Sex functions disjunction	22.6	17.8	3.8 [‡]	18.9	16.7	2.3 [*]
Perceived-Environment System						
<i>Distal Structure</i>						
Parental support	6.6	6.9	-.7	7.7	7.2	1.4
Parental controls	5.4	6.1	-1.6	5.8	6.0	-.6
Friends' support	7.3	7.5	-.6	7.0	7.5	-1.8 [*]
Parent-friends compatibility	6.9	7.5	-1.2	7.9	8.1	-.5
Parent-friends influence	4.0	3.6	1.5	3.6	3.7	-.5
<i>Proximal Structure</i>						
Parental approval for problem behavior	11.8	11.5	.5	11.3	11.2	.3
Friends' approval for problem behavior	13.3	12.4	2.1 [*]	11.7	11.1	1.5
Friends models for problem behavior	13.1	12.6	1.3	10.9	11.0	-.3
Parental approval of drinking	2.2	2.2	-.2	2.2	2.2	.0

(continued)

Table 4.4 (continued)

	PD-PD ^a (N = 30)	PD-NPD ^b (51)	<i>t</i>	NPD-PD ^c (49)	NPD-NPD ^d (143)	<i>t</i>
Friends' approval of drinking	3.3	3.5	-1.3	3.2	3.2	.5
Friends models for drinking	6.7	6.8	-.5	5.4	5.8	-1.6
Behavior System						
<i>Problem Behavior Structure</i>						
Multiple problem behavior index	2.3	2.0	1.3	1.3	1.1	1.0
General deviant behavior	46.8	42.1	2.9 [†]	41.1	38.4	2.1*
Involvement with marijuana	5.6	4.2	2.1*	2.6	1.6	2.3*
Frequency of marijuana use, past 6 months	29.3	18.3	1.4	11.1	5.0	1.5
Illicit drinking behavior	6.6	6.4	.5	5.9	5.9	.3
Solitary drinking behavior	1.5	1.5	.1	1.4	1.2	1.8*
Average intake of beer per occasion	7.3	6.7	1.4	5.3	4.6	1.6
Average daily intake of beer (in oz of absolute alcohol)	.4	.3	.6	.1	.1	.8
Average daily intake of spirits (in oz of absolute alcohol)	.2	.2	.1	.0	.1	-.9
Average daily intake of alcohol (in oz of absolute alcohol)	1.0	.9	.3	.3	.3	.3
Times drunk in past year	25.0	17.9	1.4	1.9	1.7	.7
Total negative consequences of drinking	3.7	3.5	.4	1.1	1.1	.3
Number of areas of negative consequences	1.1	1.1	.2	.2	.2	-.4
Study year of onset of problem drinking (1-4)	3.1	3.2	-.4	2.0	2.2	-.6
Number of years as a problem drinker (0-4)	1.8	1.7	.2	.2	.2	.7
<i>Conventional Behavior Structure</i>						
Church attendance frequency (past year)	15.0	15.8	-.2	11.8	23.0	-3.0 [†]
School performance	2.7	3.1	-2.4 [†]	3.0	3.1	-1.6
Sociodemographic Measures						
Father's occupational group	6.0	5.6	1.6	5.8	5.5	1.0
Father's education	5.4	5.5	-.3	5.5	5.3	.8
Mother's education	5.1	4.8	.9	5.2	5.2	.1
Father's Hollingshead Index (SES) ^e	63.4	61.1	.8	62.4	60.2	.9

^a1972 problem drinkers who were still problem drinkers in 1979 (20 men, 10 women)

^b1972 problem drinkers who were nonproblem drinkers in 1979 (25 men, 26 women)

^c1972 nonproblem drinkers who were problem drinkers in 1979 (30 men, 19 women)

^d1972 nonproblem drinkers who were still nonproblem drinkers in 1979 (47 men, 96 women)

^eHollingshead, A. B. Two factor index of social position. New Haven, Conn.; 1957. [Mimeographed]

One-tailed test

* $P < .05$

[†] $P < .01$

[‡] $P < .001$

Predicting Young-Adult Problem Drinking Among Adolescent Nonproblem Drinkers

Because of the smaller number of problem drinkers in the college subsamples in 1979, these analyses will also be restricted to the high-school subsamples. The right half of Table 4.4 presents the 1972 mean scores for the group of adolescent nonproblem drinkers who are problem drinkers as young adults (the NPD-PD group) and for the group of adolescent nonproblem drinkers who are still nonproblem drinkers in young adulthood (the NPD-NPD group).

As was true in the preceding analyses, adolescent nonproblem drinkers who have become problem drinkers by young adulthood generally had more problem-behavior-prone personality, social and behavioral attributes in adolescence than did the adolescent nonproblem drinkers who are still nonproblem drinkers as young adults.

Multiple correlations using the set of 11 preselected predictor measures against the NPD-PD vs NPD-NPD criterion account for 22% of the variance for the men ($R = .47, p < .01$), but for only 3% of the variance for the women ($R = .17, p < .10$). This gender difference may be partly due to the low rate (hence, low variance) of young-adult problem drinking among the female adolescent nonproblem drinkers, as well as to the theoretical predesignation of the predictors for the multiple regression (when a larger predesignated set of 26 predictors is used, R s of .54 and .37 are obtained for the men and women, respectively).

The concept of problem-behavior proneness in adolescence thus provides a somewhat weaker account of young-adult problem drinking among adolescent nonproblem drinkers than it does of the continuation of problem drinking among adolescent problem drinkers. Measures that predict both the continuation of problem drinking into young adulthood and the later onset of problem drinking among previous nonproblem drinkers include tolerance of deviance; religiosity; drug and sex functions disjunctions; perceived friends' approval for problem behavior; measures of involvement in other, nondrinking problem behavior; and school performance.⁸

Discussion

The primary concern of the analyses in this paper was descriptive, having to do with the issue of whether there is continuity or noncontinuity of involvement in problem drinking between two critical portions of life, adolescence and young

⁸ Because of the differing gender ratios in the npd-npd group (67% women) and in the npd-pd group (61% men), separate analyses were also performed for each gender. In 12 of the 18 cases where the combined-sex differences indicate at least a trend ($p < 0.10$, one-tailed test) in the data, analyses of the data by sex indicate that the two groups show much the same mean differences for each sex (albeit somewhat smaller differences for the women). This was not the case with regard to six of the measures. Onset of problem drinking related to social criticism, friends' support, school performance, and solitary drinking for the men but not for the women; drinking functions disjunction and parental support were related to problem-drinking onset for the women but not for the men.

adulthood. A secondary concern was to explore the link between measures of personality, the social environment, and behavior assessed in adolescence and subsequent involvement in problem drinking in young adulthood.

With respect to the continuity-noncontinuity of problem drinking between adolescence or youth on one hand, and young adulthood on the other, this pattern of drinking does not continue into young adulthood for the majority of the adolescent problem drinkers in our samples. The modal trend, in both the high-school and college samples, is for participants classified as problem drinkers in 1972/73 to be nonproblem drinkers as young adults in 1979. Most of the high-school adolescents and the college youth in our samples, then, appear to have “matured out” of earlier involvement in problem drinking by their middle or late twenties.

The data suggest, however, that there is an important gender difference in the continuity of problem drinking. Problem drinking in adolescence appears to constitute a greater risk for later problem drinking in the young men than it does in the young women. It may be that growth into adulthood involves the assumption of roles, statuses, and life situations by young women that place greater constraints on their continuing heavy use of alcohol than do the roles taken on by young men of the same age. Concern about alcohol’s effects on fetal development may also constrain women’s use of alcohol during these childbearing years. Alternatively, it may be that the young women were more likely to discontinue problem drinking by young adulthood because, as adolescents, they had never gotten as deeply involved in problem drinking as the young men had.

The findings on the continuity of nonproblem drinking from adolescence or youth to young adulthood demonstrate a similar gender difference. Although the great majority of adolescent nonproblem drinkers in our samples remained nonproblem drinkers as young adults, the male nonproblem drinkers were somewhat more likely than the women to have become problem drinkers by young adulthood. The men in our samples were therefore not only at greater risk than the women of continuing adolescent problem drinking into young adulthood, but also at greater risk of beginning problem drinking by young adulthood.

There are sample differences as well in the continuity of problem and nonproblem drinking between adolescence/youth and young adulthood. For both men and women, nonproblem drinkers in the younger high-school sample were more likely to be problem drinkers as young adults than were nonproblem drinkers in the older college sample. A similar result was found for the women with regard to discontinuation of adolescent problem drinking: the women problem drinkers in the younger high-school sample were somewhat less likely to shift to nonproblem drinking by young adulthood than were the women problem drinkers in the older college sample. This difference between the younger high-school and older college samples may be a developmental one. In 1979 the high-school cohorts, aged 23–25, were still in the midst of a high-risk period for drinking-related problems (Cahalan, 1970; Cahalan & Room, 1972; National Institute on Alcohol Abuse and Alcoholism, 1975), whereas the college sample by 1979 had already developed beyond that high-risk period to the age of 28 at which “maturing out” may already have taken place.

The second main concern of this report—the link between adolescent personality, social-environment, and behavior variables and young-adult problem drinking—was explored through a variety of analyses. The results of these analyses show that variation on measures of Problem Behavior Theory (Jessor & Jessor, 1977) variables obtained in adolescence and youth is modestly associated with later involvement in problem drinking in young adulthood. Adolescents or youth whose personality, perceived-environment, and behavior scores indicate greater theoretical proneness for problem behavior were significantly more likely as young adults to be involved in problem drinking.

Problem-drinker status in young adulthood relates to a coherent psychosocial profile of adolescent personality, social-environment, and behavior attributes assessed 6 or 7 years previously. The profile includes greater personal instigations for involvement in problem behavior, lower personal controls against involvement in problem behavior, more models and approval for problem behavior, deeper personal involvement in problem behavior other than drinking, and less involvement with the conventional institutions of church and the schools. These relationships, over this 6–7-year interval of time, argue for a significant degree of continuity in psychosocial proneness for problem behavior between adolescence/youth and young adulthood. It is fairly clear also that the strongest psychosocial predictors of young-adult problem drinking over time were also the strongest cross-sectional correlates of problem drinking during adolescence (see Table 4.3). It is of interest to note that much the same profile of psychosocial variables distinguishes nonproblem drinkers from problem drinkers in young adulthood as well: The psychosocial measures assessed in young adulthood, which include measures of satisfactions and stresses in a number of life areas as well as many of the same measures examined in adolescence, account for around 50% of the variance in problem drinking in young adulthood.

It is possible to view the adolescent measures of psychosocial proneness for problem behavior as a network of risk factors for young-adult problem drinking. Adolescents with scores indicating greater levels of psychosocial proneness for problem behavior in adolescence were at greater risk of later, young-adult problem drinking than were adolescents with scores indicating less psychosocial proneness for problem behavior. Although this association is a statistically significant one and, thereby, of theoretical importance, its actual predictive power is considerably less than would be required in order to identify specific adolescents for targeted prevention efforts. What these findings do suggest is sufficient encouragement to warrant developing this approach further.

The results further underline the importance for prevention efforts of broadening the concern beyond adolescents' use of alcohol to their involvement in other problem behavior as well. It was found, for example, that adolescent problem drinkers who continue this pattern of drinking later on and adolescent problem drinkers who shift to nonproblem drinking did not actually differ on the measures of drinking behavior assessed in adolescence. They did differ, however, on measures of involvement in other problem behavior, such as delinquent-type behavior and the use of illicit drugs such as marijuana. What distinguishes adolescents who will be problem

drinkers as young adults from those who will shift to a pattern of nonproblem drinking appears not to be specific predisposition toward problems with alcohol, but rather a generalized proneness toward problem behavior in adolescence. It might be more effective, therefore, to focus prevention or intervention efforts on changing the total adolescent—his or her personality, social environment, and behavioral involvement—rather than on influencing specific aspects of alcohol use (Jessor, 1982).

That the psychosocial variables assessed in adolescence or youth do not provide a stronger account of problem drinking in young adulthood may be due to the myriad changes in life situation experienced by the participants over the period between 1972/73 and 1979, their differential life courses during that period, and their varied involvement in adult roles and careers. Such transitions as getting married and having children do appear to have some influence on both the discontinuation of adolescent problem drinking and the continuation of nonproblem drinking. For example, among the high-school-sample men who were problem drinkers in both adolescence and as young adults, only 20% got married in the interim period; in contrast, 56% of the adolescent problem drinkers who became nonproblem drinkers as young adults got married in the interim. Among the college-sample men who were problem drinkers in 1973, 39% of those who were still problem drinkers as young adults had gotten married between 1973 and 1979, in contrast to 62% of those who became nonproblem drinkers as young adults.

The assessment of problem drinking at only two points in time, in 1972/73 and 1979, is an important limitation of the present study. Given the instability of problem drinking across time, and the “spontaneous remission” of drinking problems noted by other researchers (Clark, 1976; Clark & Cahalan, 1976; Roizen, Cahalan, & Shanks, 1978) (footnote 2), it is quite possible that many of the participants in our samples became involved in problem drinking and discontinued this pattern of drinking several times during the interim period. The assessments of problem drinking in 1979 could have “caught” some of the respondents in a pattern of drinking behavior that was not at all characteristic of their usual pattern of drinking as young adults; this would have affected not only the classification of their problem-drinker status in 1979, but also their classifications as problem-drinker “onsetters” or as “continuers.” That differences could still be discerned in adolescence between adolescent problem drinkers who were classified as problem drinkers in young adulthood and adolescent problem drinkers who were coded as nonproblem drinkers in young adulthood, and that the findings are interpretable and relatively consistent across multiple measures argues for the robustness of these classifications.

There are several additional limitations of the present work that need to be mentioned. The relatively homogeneous, middle-class background of the high-school and college samples constrains the generalizability of these findings to other samples of youth. The low response rates to the initial sampling in 1969 and 1970 also constrain us from generalizing to the larger student population from which the samples were drawn; this does not, however, limit our ability to test theoretical relationships or to describe trends over time in the longitudinal data. Another limitation stems from the specific operational definition of problem drinking that was used in these analyses. This index was developed for the purpose of locating individuals in

our samples whose drinking behavior was more problem-prone than that of other participants, thus permitting the comparison of such groups of adolescents or young adults on other measures. That any such definition is always somewhat arbitrary is clear. Nevertheless, analyses of a national sample of adolescents which used the same operational definition as that used here, as well as two alternative definitions of problem drinking, resulted in much the same pattern of psychosocial correlates no matter which index was examined (Donovan & Jessor, 1978). Finally, the small number of women in the college sample who could be classified as problem drinkers precluded a detailed assessment of that subsample. It also precluded replicating all of the analyses in all four of the subsamples.

The present data provide some illumination on the stability of problem drinking across a hitherto unexplored portion of the life course, that between adolescence and young adulthood. They have shown that there is a great deal of noncontinuity between these two stages, more for women than men and more for the older than for the younger samples. They have shown, further, that changes in problem-drinking status between adolescence and young adulthood bear some relation to variation in adolescence on measures of the variables included in Problem Behavior Theory (Jessor & Jessor, 1977).

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Chapter 5

Explaining Adolescent Problem Drinking

Richard Jessor

Introduction

The multiple functions that the use of drugs can serve for adolescents is by now well established (Jessor, 1984). Drug use by adolescents can be a way of affirming independence from parents, signalling commonality with the peer group, expressing opposition to the norms and values of the larger society, coping with stress and with apprehensions about personal inadequacy and social role failure, and establishing a sense of personal identity. In addition, drug use can serve an important *developmental* function; it can constitute a claim on transition from a less mature to a more mature status and represent, symbolically, the passage out of adolescence and entrance into the stage of youth or young adulthood. Since all of these functions are central to the adaptations of adolescent life, it is not surprising that the use of drugs has become a salient issue for young people.

In this paper, my aim is to elaborate a psychosocial framework for the understanding of youthful drug use, and to present some of the developmental findings that have emerged from our ongoing longitudinal research (Jessor & Jessor, 1984). While the present focus will be on alcohol use rather than the illicit drugs, the general framework has been shown to apply to the latter as well, and the findings for other drugs are consonant with those for alcohol use.

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A Brief Overview of Problem Behavior Theory

The conceptual framework we have developed over the past quarter of a century was originally formulated for research on drinking behavior in a tri-ethnic community (Jessor, Graves, Hanson, & Jessor, 1968). Later modified for studies of a variety of adolescent problem behaviors, including delinquency, drug use, and precocious sexuality, it is currently referred to as Problem Behavior Theory (Jessor & Jessor, 1977). Three major sources of psychosocial variation are incorporated into Problem Behavior Theory. They are shown, in Fig. 5.1, as the Personality System, the Perceived Environment System, and the Behavior System in boxes A, B, and C, respectively. The theoretical variables within each system are all considered to be the outcome of social learning and social experience, and each has directional implications for the likelihood of occurrence of problem behavior in youth. (Problem behavior, parenthetically, is defined as behavior that departs from the norms of the larger society and that tends to elicit some kind of social control response, whether mild criticism or social rejection or even incarceration.) Each theoretical variable specifies, therefore, a *prone-ness* toward engaging in normative transgression; the greater the proneness within each system, the more likely the occurrence of problem behavior.

Since the rationale for the variables in the theory has been described in detail elsewhere (Jessor & Jessor, 1977), it is useful here just to summarize the key features of problem behavior proneness within the three theoretical systems. Proneness toward problem behavior in the Personality System is represented by lower value on academic achievement, higher value on independence, higher value on independence relative to academic achievement, greater social criticism, greater alienation, more external control, greater tolerance of deviance, and less religiosity. In the Perceived Environment System, problem behavior proneness implies less parent and friends' support and controls, lower compatibility between the expectations of parents and those of friends, lower perceived influence of parents relative to friends, greater friends' approval and lower parental disapproval of problem behavior, and more models for problem behavior among friends. In the Behavior System, problem behavior proneness refers to higher actual involvement in various problem behaviors (other than the one being predicted, of course) and lesser involvement in conventional behaviors. Taken together, the three systems yield an overall characterization of psychosocial proneness toward engaging in problem behavior, a theoretical pattern or profile specifying the greater or lesser likelihood of its occurrence.

The relevance of such a conceptual framework to adolescent alcohol use and abuse ought already to be obvious. Given both the legal and the social norms prevalent in American society, drinking per se is widely considered a transgression when adolescents are below a certain age. In addition, the excessive use of alcohol by adolescents, for example, to the point of drunkenness, or its inappropriate use, for example, before driving, are viewed with disapproval by society and generally elicit some sort of negative social sanction. Adolescent alcohol abuse can therefore be subsumed under the rubric of problem behavior, and that makes our formulation of problem behavior proneness apposite as a potential account of variation in problem drinking. The variables in Problem Behavior Theory should, in other words, constitute a set of *psychosocial risk factors* for adolescent problem drinking. That very possibility is what our research has, in fact, enabled us to explore.

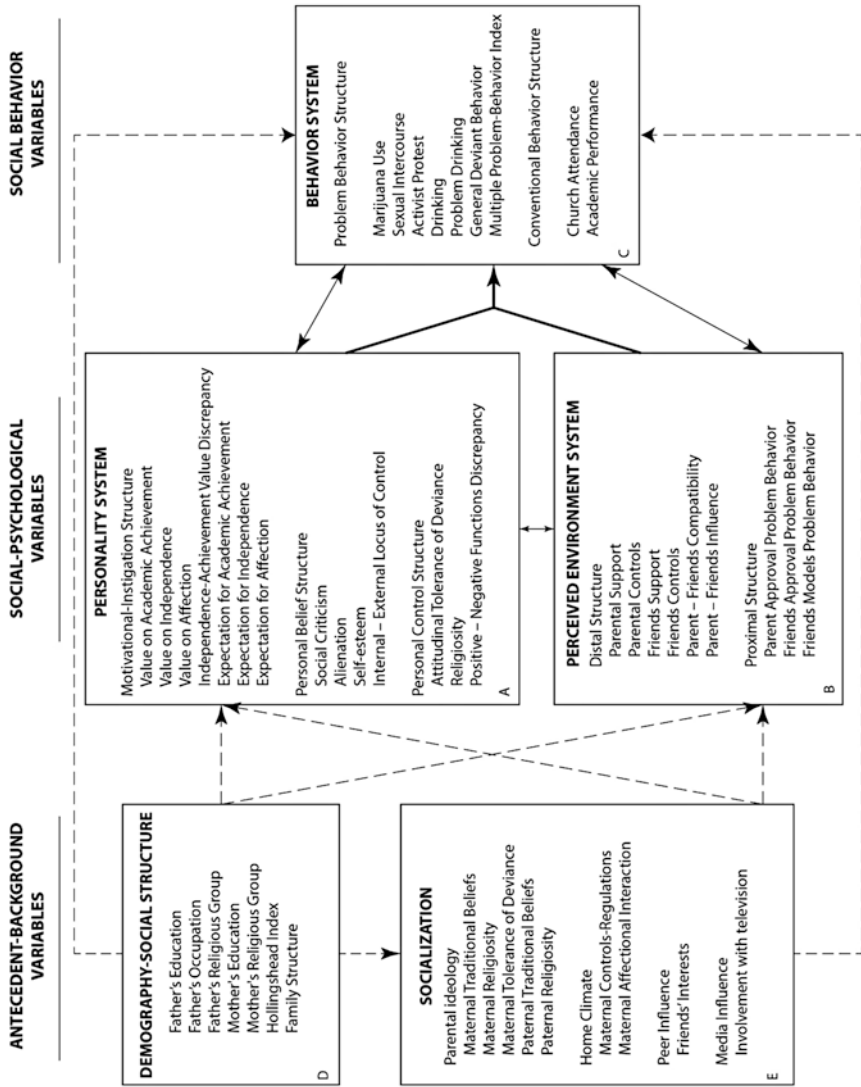


Fig. 5.1 The conceptual structure of Problem Behavior Theory (Jessor & Jessor, 1977)

The Design of the Research

The larger project from which the data on problem drinking will be drawn is a longitudinal study that began in 1969 and is still in progress. It has been carried out in two phases and has involved six waves of data collected on each participant over the years between 1969 and 1981. The first phase began in 1969 with samples of 7th, 8th, and 9th grade boys and girls drawn from three junior high schools in a small Rocky Mountain city. They filled out questionnaires annually for four successive years through 1972, at which time they had reached the 10th, 11th, and 12th grades. Thus, all the participants had by then made the transition from junior high school to senior high school. From 1972 until 1979 there was no further contact with any of the participants; after that seven-year hiatus, all of the former participants were located and asked to resume participation in the second phase of the study, now called the “Young Adult Follow-Up Study.” The fifth data wave was then collected in 1979, and the sixth one was carried out in 1981. By then, the former junior high school cohorts were 25, 26, and 27 years of age. The cohort-sequential longitudinal design for the High School Sample is shown in Fig. 5.2.

Most of the data to be presented in this paper will refer to the cohorts in this High School Sample; they are mostly middle class in socioeconomic status and Anglo in ethnicity. It should be noted, however, that an entirely independent longitudinal

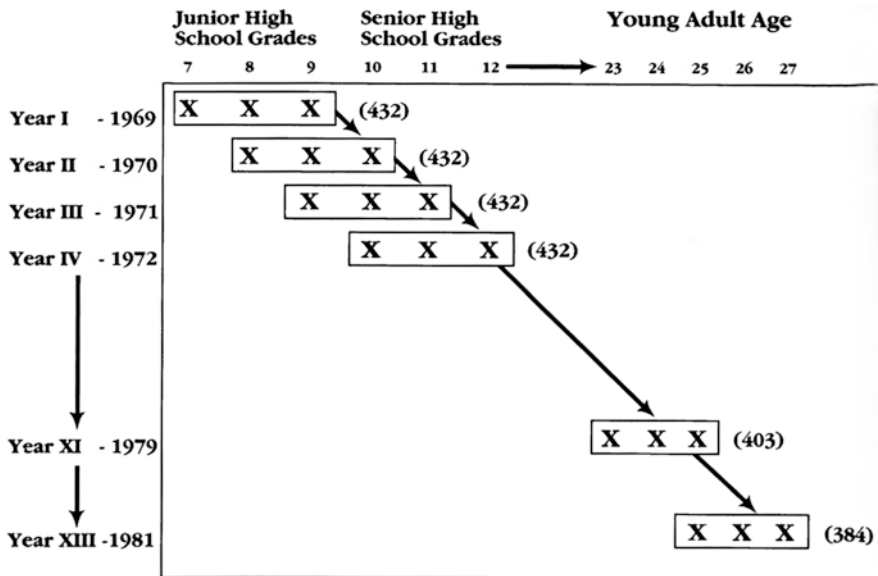


Fig. 5.2 The longitudinal design for the High School Sample

study was carried along in tandem with this one, also taking place in two phases. The first phase of the latter study began in 1970 with a sample of freshmen, both male and female, in the College of Arts and Science at the local university in the same city; they were tested annually for four successive years through 1973. After a six-year hiatus, the College Sample youth were located and invited to resume participation in the Young Adult Follow-Up Study, and they then also filled out questionnaires in 1979 and 1981. By 1981, they had reached the age of 30. The simple longitudinal design for the cohorts in the College Sample, a largely upper middle class, Anglo group, is shown in Fig. 5.3.

As can be seen in both Figs. 5.2 and 5.3, retention between Phase One and Phase Two for both the High School and College Samples was unusually high, thereby safeguarding the longitudinal integrity of the cohorts. For the High School Sample, fully 94 percent of the 1972 core participants resumed the study in 1979, and 96 percent of those continued with the study in 1981. For the College Sample, 95 percent of the 1973 core participants resumed the study in 1979, and 96 percent of those also continued in 1981. These retention rates testify to the commitment of the participants to the research and suggest that the quality of the data would be enhanced.

Data were collected in each of the six waves by a theoretically derived questionnaire that exceeded 60 pages in length and mapped all of the variables shown in the conceptual framework in Fig. 5.1. Most of the variables were measured by

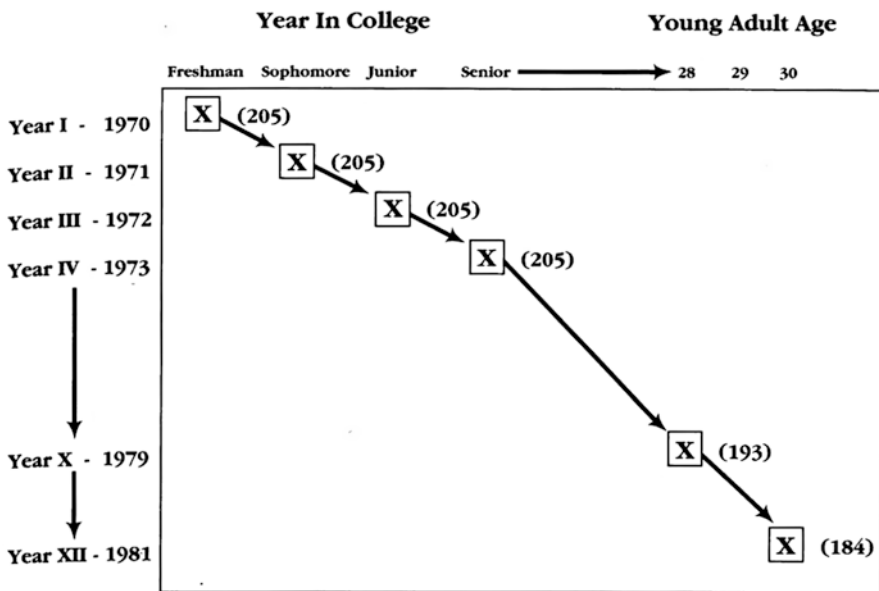


Fig. 5.3 The longitudinal design for the College Sample

psychometrically-developed, construct-validated, multiple-item scales. Many of the measures were retained unchanged across both phases of the longitudinal study; others had to be adapted to accommodate the obvious developmental changes taking place; and still other measures were added in the Young Adult Follow-Up Study to cover some entirely new domains such as marriage, family, child rearing, and work. Further details about sampling, measurement, and design can be found elsewhere (Jessor & Jessor, 1977; Jessor & Jessor, 1984; Donovan, Jessor, & Jessor, 1983).

The Prevalence of Adolescent Problem Drinking

Although the definition of problem drinking is inherently arbitrary, there are two kinds of criteria about which, especially for young people, there is reasonable consensus as to their relevance. One criterion is frequent drinking to the point of drunkenness or intoxication, and the other is drinking that results in negative social consequences and that compromises role obligations and interpersonal relationships. We have relied on both criteria, jointly, in our studies, their correlation ($r = 0.48$) in the High School Sample in 1972 being significant, as expected, but not indicating a great deal of overlap. To be classified as a problem drinker, an adolescent had to report having been drunk six or more times in the past year, *or* having experienced negative consequences due to drinking at two or more times in the past year in each of three or more life areas out of the following six: trouble with teachers, difficulties with friends, trouble with parents, criticism from dates, trouble with the police, and driving while under the influence of alcohol. Exploration of two alternative operational definitions with data from a national sample of adolescents is reported in Donovan and Jessor (1978), and the psychosocial findings tend to remain relatively invariant. Relying on this joint frequency of drunkenness and/or frequency of negative consequences criterion yields the results shown in Table 5.1.

It is apparent in the table that there is significant prevalence of problem drinking among these adolescents. Aged 16, 17, and 18 in 1972, and in grades 10, 11, and 12, the High School Sample shows that one out of four of the young men and one out of six of the young women qualify as problem drinkers. These are not inconsequential rates, especially when one considers that they are contributed to primarily by the drunkenness component of the joint criterion and that this is an age group with access to motor vehicles. Indeed, the actual frequency of drunkenness reported by the problem drinkers is much higher than the cutpoint of six might suggest. For the young men classified as problem drinkers, the mean frequency of drunkenness in the past year was 23.9, about twice a month; for the young women problem drinkers, the mean frequency of drunkenness was 17.8. By sharp contrast, the mean frequency of drunkenness in the past year among the *non*problem drinkers was 1.7 for the males and 1.8 for the females.

It is clear from these figures that adolescent problem drinkers are engaging in a behavior—drunkenness—that can place them seriously at risk, and with a frequency

Table 5.1 Percent in each drinker status

Drinker status	Males (<i>N</i> = 188)	Females (<i>N</i> = 244)
Abstainer	21	21
Former drinker	4	7
Minimal drinker	2	2
Nonproblem drinker	46	55
Problem drinker	28	16
Total	100%	100%

High School Sample: Year IV (1972)

Note: *Abstainers* have not had a drink more than 2 or 3 times in their lives; *former drinkers* have not had a drink in the past 6 months; and *minimal drinkers* have a very low level of alcohol intake per occasion—less than a can of beer, a glass of wine, or a drink of spirits

that raises public health concern. While this statement applies equally to both males and females, there is an important gender difference in the *prevalence* of problem drinking. As Table 5.1 indicates, the problem drinking rate among males (28 percent) is nearly twice the rate among females (16 percent).

Despite the arbitrariness of any classification system, the criteria used have yielded a reasonable distribution of problem and nonproblem drinkers. Not only do those classified as problem and nonproblem drinkers differ substantially in frequency of drunkenness, as just described, but the former also report 2 to 3 times the daily alcohol intake as the latter. These behavioral differences contribute support for the validity of the problem drinker classification. That accomplished, we are in a position to pursue the more fundamental issues of accounting for variation in problem drinking and for its continuity/discontinuity over time.

Problem Drinking and the Syndrome of Problem Behavior

Before taking up those issues, however, it is important to locate problem drinking more explicitly within the conceptual framework of Problem Behavior Theory shown in Fig. 5.1. If it is indeed part of the Behavior System, then it should have systematic relationships with other behaviors assigned to that same conceptual domain. To permit exploration of that question, the association of drinker status with involvement in other problem behaviors was examined, and the data are shown in Table 5.2.

The Abstainer group (those who have not had a drink more than two or three times in their lives) has been included in Table 5.2 to provide a benchmark for the contrast between the Nonproblem Drinkers and the Problem Drinkers. It is immediately apparent from Table 5.2 that being a problem drinker is associated with high

Table 5.2 Relationship of drinker status to other problem behaviors

Drinker status	% Who are marijuana users		% Who are nonvirgins		% Who are high in deviance		% Who are high in church attendance	
	Males	Females	Males	Females	Males	Females	Males	Females
Abstainers	0	2	5	4	15	2	64	52
Nonproblem drinkers	31	42	23	39	40	34	23	33
Problem drinkers	79	80	52	73	73	43	27	18

High School Sample: Year IV (1972)

rates of involvement in other adolescent problem behaviors such as marijuana use, sexual intercourse experience, and protodelinquency. It is also apparent that the rates of involvement for problem drinkers are approximately *twice as high* as those for nonproblem drinkers, a difference of major epidemiological significance. Thus, 80 percent of the female problem drinkers have used marijuana as against only 42 percent of the nonproblem drinker women; and 73 percent of them had had sexual experience as against only 39 percent of the female nonproblem drinkers.

The compellingness of these positive associations between problem drinking and other adolescent problem behaviors is further accentuated by two other observations that can be made about Table 5.2. One of these is the *negative* association that is obtained between problem drinking and a conforming or conventional behavior, in this instance, frequency of church attendance in the past year. For involvement in this behavior, the rate for *nonproblem* drinker women is nearly twice as high as it is for the problem drinker women, a complete reversal of direction, as theoretically expected. Although that particular finding doesn't hold for the males, the overall reversal of direction is apparent for them as well, once reference is made to the abstainers' rate.

The second noteworthy observation remaining about Table 5.2 is the very low absolute rates of the abstainer group; almost none of the abstainers has had experience with or involvement in other problem behaviors (the males are a slight exception in relation to high deviance). What this suggests is that the decision to begin to drink is a critical one—remaining an abstainer may function as an insulating status against engaging in any problem behavior, whereas beginning to drink—even as a nonproblem drinker—represents a watershed crossed in regard to involvement in other problem behaviors. Inclusion of the abstainer data in Table 5.2 also makes clearer that intensity of involvement with alcohol (from no involvement up to problem drinking) varies directly with involvement in those other problem behaviors.

While these data have focused on variation in drinker status and in rates of involvement in other behaviors, the basic issue of the covariation of problem drinking with other behaviors can also be explored in another way, employing now continuous rather than discrete measures (except for sexual experience for which no

Table 5.3 Intercorrelations among problem behavior measures

Problem behavior measures	Times drunk past year	Negative consequences of drinking	Marijuana involvement	Deviant behavior	Church attendance
Times drunk/past year	1.00	0.41	0.23	0.19	-0.10 ^{ns}
Neg. consequences of drinking/past year	0.52	1.00	0.20	0.34	-0.05 ^{ns}
Involvement with marijuana	0.41	0.30	1.00	0.52	-0.30
General deviant behavior	0.36	0.29	0.49	1.00	-0.14
Church attendance/past year	-0.01 ^{ns}	-0.11 ^{ns}	-0.12 ^{ns}	-0.14	1.00

High School Sample: Year IV (1972)

Note: Females above the diagonal, males below

continuous measure is available). In Table 5.3, Pearson intercorrelations among the various behaviors are presented, and much the same conclusions emerge. For both males and females, there are significant correlations among the various problem behaviors, and the two component measures of problem drinking (frequency of drunkenness and negative consequences of drinking) correlate with the other measures of problem behavior. It is of interest to mention that similar analyses of national sample data collected in 1978 are consonant with these findings, yielding somewhat higher correlations of the problem drinking measures with the other problem behavior measures, and linking them significantly with another problem behavior, involvement with cigarette smoking, as well (cf. Table 3.1 in Jessor, Donovan, & Widmer, 1980).

The covariation among problem behaviors indicated by the data in Tables 5.2 and 5.3 does not reveal whether the behaviors tend to be engaged in together, that is, on the same occasion or at the same time. We inquired about this in the Young Adult Follow-Up Study, in both 1979 and 1981. More than 80 percent of the men and about 60 percent of the women report using both alcohol and marijuana on the same occasion "at least some of the time." A considerable amount of simultaneous engagement in different problem behaviors would thus appear to be taking place.

In sum, the evidence suggests that problem drinking is not an isolated behavior reflecting something unique about the effects of alcohol. Rather, it would seem more appropriate to consider adolescent problem drinking as part of a *syndrome* of problem behavior, a larger pattern of covarying behaviors all of which in one way or another depart from the expectations of conventional society about acceptable adolescent comportment. The significance of such a conclusion is far from trivial. On the one hand, it confirms the theoretical stance of Problem Behavior Theory concerning problem behavior as a system of interrelated actions that can serve similar psychological functions. On the other hand, it suggests that since alcohol-related

problems are embedded in a lifestyle, a coherent pattern of engagement in other problem behaviors, attempts at intervention and prevention that ignore that fact are likely to be less successful.

Accounting for Variation in Adolescent Problem Drinking

It is possible now to turn to one of the enduring concerns of our research efforts, namely, to explore the reach of a psychosocial approach to explaining variation in problem drinking. Having established the measures of problem drinking among the adolescent cohorts in our longitudinal study, we are able to examine how well the concepts in Problem Behavior Theory can account for variation on those measures. Rather than deal with each individual variable in the theory, it will be more expeditious to examine simultaneously the multiple variables that constitute the key systems in the theory. For this purpose, multiple regression analyses were run employing the major variables in the Personality System, in the Perceived Environment System, in the two systems taken together (to capture the emphasis of Kurt Lewin's field theoretical approach to explanation), and finally, in an Overall Set that also includes the Behavior System variables. These different sets of theoretical measures were regressed against two measures of problem drinking, one a continuous measure, namely, frequency of drunkenness in the past year, and one a dichotomous measure, namely, problem-versus-nonproblem drinker status. The results of these multiple regression analyses are presented in Table 5.4.

The usefulness of Problem Behavior Theory is evident in the findings in Table 5.4. Each of the explanatory systems is significantly correlated with both measures of problem drinking, although the multiple correlations are considerably higher with the problem drinker status criterion measure than they are with the times-drank measure. The Perceived Environment System measures account for a somewhat higher percentage of the variance than do the Personality System measures, probably reflecting the fact that the components of the former are more proximal to problem drinking behavior whereas the components of the latter are more distal.¹ When the two systems are taken together as in the Field Pattern, there is a significant increment in variance explained for both sexes, and the Overall Set yields yet another increment. The multiple correlations of the Overall Set with problem drinker status ($R_s = 0.79$ and 0.76) account for about 60 percent of the variance for both males and females; that represents a substantial contribution to a psychosocial explanation of adolescent problem drinking.

¹The proximal-distal distinction refers to the degree to which a predictor variable directly and explicitly implicates the criterion variable. Thus, "peer models for drunkenness" is more proximal to adolescent problem drinking whereas "peer expectations for academic achievement" would be more distal from it (cf. Jessor & Jessor, 1977).

Table 5.4 Multiple correlations (R s) of adolescent (1972) theoretical measures with adolescent (1972) problem drinking

Adolescent (1972) theoretical measures	Times drunk past year		Problem drinker status	
	Males	Females	Males	Females
Personality system	0.36	0.29	0.48	0.49
Perceived environment system	0.46	0.35	0.61	0.59
Field pattern	0.58	0.40	0.72	0.70
Overall set	0.60	0.43	0.79	0.76

High School Sample

What that psychosocial explanation implicates is the pattern of *prone*ness toward problem drinking that underlies the multiple correlations for each system. Prone

- lower value on academic recognition
- higher value on independence
- independence valued more highly relative to academic recognition
- lower expectation for academic recognition
- greater attitudinal tolerance of deviance
- lesser religiosity.

Prone

- lower compatibility between parental and friends' expectations
- greater perceived influence from friends than parents
- greater friends approval for problem behavior
- greater friends models for problem behavior.

Prone

- greater involvement in proto-delinquent behavior
- greater involvement with marijuana use
- less attendance at church.

This profile of psychosocial prone

That these results are not merely parochial and confined to the idiosyncratic nature of the local sample of high school youth employed, or to the particular 1972 year of data examined, can be seen in Table 5.5. The key measures, albeit

Table 5.5 Multiple correlation (*R*s) of theoretical measures with problem drinking

Theoretical measures	Times drunk/past year				Problem drinker status			
	Males		Females		Males		Females	
	1974	1978	1974	1978	1974	1978	1974	1978
Personality system	0.43	0.44	0.45	0.47	0.37	0.39	0.37	0.41
Perceived environment system	0.47	0.42	0.49	0.42	0.4	0.35	0.39	0.36
Field theoretical pattern	0.55	0.54	0.56	0.54	0.47	0.46	0.46	0.47
Overall set	0.65	0.69	0.67	0.71	0.56	0.6	0.55	0.62

Independent national samples: 1974 and 1978

Note: Male Ns: 1974 (2006); 1978 (1666); Female Ns: 1974 (1989); 1978 (1848); Grades 10–12, drinkers only

abbreviated, of Problem Behavior Theory were incorporated into two different national sample surveys carried out by the Research Triangle Institute in 1974 and 1978 (Rachal, et al., 1975; Rachal, et al., 1980; Jessor, Donovan, & Widmer, 1980). Analyses of frequency of drunkenness and problem drinker status in both of these large sample surveys, for both sexes, yield further support for the psychosocial explanatory account provided by Problem Behavior Theory. The two independent, cross-sectional, national samples replicate to a large extent the findings from the small local samples we have been following over time. In this case, frequency of drunkenness is better explained than problem drinker status, with better than 40 percent of the variance accounted for, and the Personality System is here no less predictive than the Perceived Environment System, but on the whole the relevance of Problem Behavior Theory is again apparent. Further, these data, collected during a turbulent decade two and six years later than those for the High School Sample, suggest some degree of invariance of the psychosocial account over at least this portion of historical time (see also Jessor, Chase & Donovan, 1980; Donovan & Jessor, 1983).

Continuity of Problem Drinking: Adolescence to Young Adulthood

Up to this point, we have been looking at problem drinking in adolescence, its prevalence and its psychosocial correlates. Our focus has been cross-sectional, concerned with a particular point in time and with providing an account of variation between persons in problem drinking at that time. The employment of a longitudinal design in our research, however, makes possible a concern with very different questions, ones that have large social importance. First, it becomes possible to inquire about the natural history of problem drinking beyond adolescence, that is, about the course of development that problem drinking takes from adolescence into young adulthood. Is there continuity and to what extent? Once a problem drinker, always a problem

Table 5.6 Continuity of drinker status in adolescence and young adulthood

Adolescent (1972) drinker status		Young adulthood (1979/81) drinker status		
		Abstainer (%)	Not problem drinker (%)	Problem drinker (%)
Males	Abstainer (<i>N</i> = 31)	16	81	3
	Not problem drinker (<i>N</i> = 86)	0	60	40
	Problem drinker (<i>N</i> = 45)	0	49	51
Females	Abstainer (<i>N</i> = 49)	8	86	6
	Not problem drinker (<i>N</i> = 138)	0	80	20
	Problem drinker (<i>N</i> = 35)	0	74	26

High School Sample

drinker? Second, longitudinal design permits us to examine whether the course of development of problem drinking is merely adventitious or whether, instead, it is actually systematic and predictable from antecedent measures in adolescence. Is it possible to predict young adult problem drinking from psychosocial characteristics measured in adolescence? Can we identify early—that is, in adolescence—those youth who are likely to have alcohol-related problems as young adults?

To examine continuity of problem drinking between adolescence and young adulthood, it was necessary to classify the High School Sample participants on their drinker status in the two later waves of data as well, those collected in young adulthood, both in 1979, when they were 23, 24 and 25, and again in 1981, when they were 25, 26, and 27 years of age. The same joint criterion as had been used with their adolescent data was again employed, relying on the same cutting points for frequency of drunkenness and for negative consequences, but now over the preceding 6 months as the time interval rather than the preceding year. This change in time interval was made to take account of the generally higher level of alcohol use in this later life stage. In these analyses, our operational specification designated as a young adult problem drinker anyone who met the joint criterion for problem drinking in *either* 1979 *or* 1981, or in both years. Nonproblem drinkers in young adulthood, it follows, had to be so classified consistently, that is, in *both* 1979 *and* 1981. The data on the continuity of drinker status between adolescence and young adulthood are presented for both sexes in Table 5.6.

It is interesting to observe in Table 5.6 that there is considerable discontinuity or instability in drinker status between adolescence and young adulthood. Among the males who were problem drinkers in adolescence, fully half of them are no longer classified as problem drinkers as young adults; for females, the discontinuity is even more striking—three quarters of the adolescent problem drinker women are no longer problem drinkers as young adults. Another kind of discontinuity in drinker status can be seen when the adolescent nonproblem drinkers are followed into young adulthood: among the males, 40 percent have *onset* problem drinking by young

adulthood, and among the females, 20 percent have done the same. As for the adolescent abstainers, nearly all of them have become drinkers by young adulthood, almost all classified as nonproblem drinkers.

Although merely descriptive, such “natural history” data are uniquely valuable since little is known about this particular portion of the life trajectory, and such information can only be gotten by following lives through time. What these descriptive, developmental data reveal is that having been a problem drinker as an adolescent is, *in itself*, not very predictive about the likelihood of problem drinking later on as a young adult. The chances of a male adolescent problem drinker being a problem drinker as a young adult are about 50:50; for females, the probability is clearly greater that they will be nonproblem drinkers rather than problem drinkers. The outcome of adolescent problem drinking, therefore, even for males, is no more likely to be inexorable chronicity than it is to be “maturing out,” and, for females, the latter outcome is, in fact, much more likely to be the case.

Clearly, risk for young adult problem drinking is greater for men than it is for women in this sample: a larger proportion of male adolescent problem drinkers remain problem drinkers in young adulthood than is true for comparable females (51 percent versus 26 percent); at the same time, a larger proportion of male adolescent nonproblem drinkers onset problem drinking by young adulthood than is true for comparable females (40 percent versus 20 percent). Whether these important gender differences reflect differential cultural expectations and controls, gender-linked variation in role obligations, or women’s apprehensions in relation to possible childbearing is not something we are able to determine from our information.

In addition to examining the degree to which drinker status in adolescence predicts drinker status in young adulthood, it is possible for us to address a related but different question: does adolescent drinker status predict *other* kinds of outcomes in young adulthood? Stated otherwise, is adolescent problem drinking *consequential* for later life status, for subsequent life events, for achievement, or for other life outcomes? Does it portend a legacy for the future? The most general answer to this question turns out, with some qualifications, to be negative. Nearly 300 different measures obtained in young adulthood were analyzed in relation to the three adolescent drinker statuses: abstainer, nonproblem drinker, or problem drinker. Only a tiny handful of the measures yielded systematic differences, and some of these reflect, at least partially, the current drinker status in young adulthood rather than the earlier drinker status as an adolescent.

A few of the findings are nevertheless of interest to mention. Among the young adult males, the percent *ever arrested* is 48, 20, and 0 for those classified as problem drinkers, non problem drinkers and abstainers in adolescence, respectively; for females, the respective percentages are 23, 9, and 2. These differences hold, for both sexes, even when young adult drinker status is controlled. Among males, the percent who *smoke half a pack or more of cigarettes per day* is, in the same group order, 38, 24, and 0; among females, the percentages are 46, 23 and 6. Among males, the percent with a *history of divorce* is 11, 6, and 7; among females it is 23, 18, and 2. Finally, among males, the percent *graduating college or beyond* is 49, 50, and 61;

among females, it is 35, 41, and 71. Although such findings do suggest that there may be some systematic outcomes in later life related to degree of involvement with alcohol in adolescence, their sparseness among 300 different measures is noteworthy, and it is not possible to rule out chance as being responsible.

Overall, it seems clear and worth emphasizing that adolescent drinker status per se does not predict very much about either drinker status or a large variety of other attributes and outcomes later in young adulthood. This conclusion would seem to be just another reflection of the degree of discontinuity of drinker status between adolescence and young adulthood that was noted earlier in Table 5.6. Such findings are of major importance because they suggest that post-adolescent development and attainment are not necessarily mortgaged by adolescent problem drinking. They should also alert us to the possibility that premature labeling and social processing of adolescents as problem drinkers might very well set up expectations for chronicity that unnecessarily restrict the developmental options that our data suggest are, indeed, there.

Predicting Young Adult Problem Drinking

Although adolescent drinker status, per se, has been shown not to be predictive of young adult problem drinking, the question still remains whether young adult problem drinking may be predictable from other kinds of adolescent characteristics, perhaps the very ones that are mapped by the concepts of Problem Behavior Theory. It is to that question that we turn in this section.

Analyses Among Adolescent Problem Drinkers

In order to answer this question with our longitudinal data, we have phrased it as follows: Among adolescent problem drinkers, are the theoretical measures obtained in adolescence predictive of continuation/discontinuation by young adulthood? In other words, do the Problem Behavior Theory measures serve to identify early, that is, in adolescence, those whose problem drinking will be chronic and those who will “mature out” of problem drinking by young adulthood?

The analyses again employed multiple regression. Drinker status in young adulthood (the dichotomy of problem drinker versus nonproblem drinker) was regressed on the measures of the multivariate systems of Problem Behavior Theory collected in adolescence. Drinker status in adolescence was controlled, of course, since these analyses were run *within* the adolescent problem drinker group. The relevant results are presented in Table 5.7 for both males and females.

Among adolescent problem drinkers, the pattern of psychosocial proneness to problem behavior that obtains in adolescence significantly predicts continuation/discontinuation of problem drinking by young adulthood, that is, seven and/or nine

Table 5.7 Multiple correlations (R s) of adolescent theoretical measures with young adult problem drinking status (*among* 1972 problem drinkers)

Adolescent (1972) theoretical measures	Young adult (1979/81) problem drinker status	
	Males ($N = 45$)	Females ($N = 35$)
Personality system	0.60	0.29
Perceived environment system	0.51	0.49
Field pattern	0.71	0.49
Overall set	0.74	0.56

High School Sample

years later. The Overall Set of adolescent measures accounts for a substantial portion of the young adult criterion variance, 55 percent for the men ($R = 0.74$), and 31 percent for the women ($R = 0.56$). Although the variance accounted for among the males is nearly twice that among the females, both multiple correlations are significant beyond the 0.001 level. This interesting difference between the genders is largely due to the greater predictiveness of the adolescent Personality System measures for the males ($R = 0.60$) than for the females ($R = 0.29$); in fact, for the former, it is a more important source of variance than the Perceived Environment System ($R = 0.51$) and, in interaction with the latter, yields a substantial increment in multiple R for the Field Pattern ($R = 0.71$).

Analyses Among Adolescent Nonproblem Drinkers

The predictability of continuity/discontinuity of drinker status between adolescence and young adulthood can be addressed within the adolescent nonproblem drinkers as well. Retaining our concern for predicting problem drinking in young adulthood from measures obtained in adolescence, the research question is phrased as follows: Among adolescent nonproblem drinkers, are the theoretical measures obtained in adolescence predictive of the onset of problem drinking by young adulthood? Data relevant to this inquiry are shown in Table 5.8.

Again the findings indicate significant multiple correlations between the theoretical system measures in adolescence and the problem drinker vs. nonproblem drinker criterion in young adulthood. However, the amount of criterion variance accounted for is considerably less, for both sexes, than it was in the preceding analysis for the adolescent problem drinkers. As in those analyses, there is a gender difference here with predictability once more better for men than women.

Both sets of analyses confirm the theoretical expectation that the course of development of adolescent drinker status—and the likelihood of young adult problem drinking—are systematic rather than adventitious or circumstantial outcomes. Both analyses have shown the relevance of Problem Behavior Theory as a systematic

Table 5.8 Multiple correlations (*R*s) of adolescent theoretical measures with young adult problem drinking status (*among* 1972 not problem drinkers)

Adolescent (1972) theoretical measures	Young adult (1979/81) problem drinker status	
	Males (<i>N</i> = 84)	Females (<i>N</i> = 137)
Personality system	0.36	0.23
Perceived environment system	0.33	0.24
Field pattern	0.43	0.33
Overall set	0.58	0.35

High School Sample

account of the likelihood of continuing or initiating problem drinking in the post adolescent period. Although predictability is greater for adolescent problem drinkers than nonproblem drinkers, and for males than for females, it is nevertheless significant for both groups and both genders. The profile of adolescent theoretical attributes that is implicated in these longitudinal multiple correlations is similar to the profile that accounted for variation in problem drinking cross-sectionally in adolescence. The typical components of that profile of psychosocial proneness to problem behavior were listed in an earlier section of the paper. Such invariance between the cross-sectional and the longitudinal accounts has been noted before (Jessor & Jessor, 1977); it serves to strengthen conviction about the relevance of Problem Behavior Theory as an explanation of the developmental course of adolescent problem drinking.

It should be cautioned that while the analyses reported in this section show statistically significant predictiveness, it is not of a magnitude that would permit prediction at an individual level. Nevertheless, the findings surely are germane to considerations of early identification and the design of prevention/intervention efforts. They underscore the necessity to go beyond the phenotypic level of overt behavior, that is, whether an adolescent is a problem drinker or not, and to address the underlying, or “causal,” or genotypic level, that is, the degree of psychosocial proneness to problem behavior that characterizes that adolescent. The targeting of adolescents at risk—either for chronicity or for onset of problem drinking—will inevitably require knowledge of their profile of psychosocial risk factors.

Continuity of Problem Drinking Within Young Adulthood

The discontinuity of problem drinking that has been discussed thus far emerged from a consideration of data collected at two rather different life stages, adolescence and young adulthood. Since adolescence is a time of rapid change and the interval between the adolescent data and the young adult data was rather long—from 1972

to 1979/81, discontinuity and instability might well have been expected. It seems important, then, to consider whether discontinuity of problem drinking is apparent over a shorter time interval and one that takes place within the same life stage.

Continuity/Discontinuity of Young Adult Problem Drinking

Because the young adult phase of our larger longitudinal study is itself longitudinal in design, it is possible to address that issue. Within young adulthood, two waves of data were collected, one in 1979 when the High School Sample cohorts were ages 23, 24, and 25, and the other in 1981 when they were 25, 26, and 27. This two-year time interval, 1979–1981, occurs near the middle of the third decade of life for our participants, well within the life stage of young adulthood.

In the preceding analyses, the young adult problem drinker criterion measure was based upon data from *both* 1979 and 1981; problem drinking in *either* year qualified a participant as a young adult problem drinker. The reasons for employing such a “liberal” criterion were our anticipation of some degree of instability in drinking pattern but, more importantly, a desire to deal with any indication of problem drinking as part of young adult life rather than requiring that it be a consistent characteristic. Such an approach obviously yields a higher prevalence of young adult problem drinking and thus decreases the likelihood of discontinuity of problem drinking for adolescent problem drinkers. Despite such a definition, one that would tend to maximize continuity, considerable discontinuity is what we have seen. In the present analyses, we separate the 1979 and 1981 drinker status classifications and then examine the degree of continuity that is obtained between them across that two-year interval within young adulthood. The relevant findings can be seen in Table 5.9; drinker status shown as “Not Problem Drinkers” includes abstainers; minimal drinkers, and former drinkers, as well as nonproblem drinkers.

Even across a relatively short interval of time and within the same stage of life, there is substantial discontinuity of problem drinking. Among the men who were classified as problem drinkers in 1979, more than a quarter of them no longer meet the very same criterion only two years later in 1981. Among the women, the data are much more striking; of those classified as problem drinkers in 1979, over half are no longer problem drinkers in 1981. Unlike the pattern of discontinuity between adolescence and young adulthood that was seen earlier in Table 5.6, discontinuity that involved *both* directions of change—from problem drinker to nonproblem drinker, and from nonproblem drinker to problem drinker—the discontinuity within young adulthood seems primarily to involve the *discontinuation of problem drinking*. As can be seen in Table 5.9, only 7 percent of the 1979 nonproblem drinker men and only 4 percent of the 1979 nonproblem drinker women are classified as problem drinkers in 1981; thus, there is little onset (or resumption) of problem drinking during this interval. The comparable figures from Table 5.6 for the percentage shifting from nonproblem to problem drinking were 40 percent for men and 20 percent for

Table 5.9 The continuity of problem drinking *within* young adulthood: 1979 to 1981

1979 Problem drinker status		1981 Problem drinker status	
		Not problem drinkers (%)	Problem drinkers (%)
Males	Not problem drinkers ($N = 110$)	93	7
	Problem drinkers ($N = 49$)	29	71
Females	Not problem drinkers ($N = 189$)	96	4
	Problem drinkers ($N = 32$)	53	47

High School Sample

women. Overall, there is a decline in the actual prevalence of problem drinking between 1979 and 1981 of 4.3 percent for the men and 4.8 percent for the women.

The data in Table 5.9, therefore, have special interest. They reemphasize the discontinuity of problem drinking that we had seen earlier, and now make clear that it is still substantial even for short time intervals. Second, they reaffirm the earlier observation of greater discontinuity among women than men and show that that difference also is obtained within young adulthood. But, perhaps most intriguing, they suggest that young adulthood—at least this portion of it—might be characterized as a time of maturing out of problem drinking, that is, as a time in which there are significant rates of discontinuation of problem drinking (especially for women) and very low rates of initiating or resuming it. If this were to prove to be the case, it would be a finding of major importance.

Psychosocial Change in Young Adulthood

In trying to consider the latter possibility further—namely, that this stage of the life trajectory, the late twenties, may be a time of maturing out of problem drinking—it is important to recall that various studies have implicated an earlier age range as being the really high risk period for problem drinking and other problem behaviors. Thus, beyond the high risk 18–24 age period, some decline in prevalence might well be expected on the basis of those studies, and that may be what is reflected in the data from our somewhat older 25, 26, and 27 year-olds.

Unfortunately, such considerations do not provide an *explanation* for the decline, that is, for why it should occur. Our longitudinal psychosocial data, however, do make available certain findings that may contribute toward an answer. With six waves of data on each participant, it has been possible for us to plot the trajectories of development and change on many of the psychosocial variables from 1969 through 1981. Two developmental generalizations seem best to summarize those graphs or “growth curves.” First, the course of psychosocial development in adolescence for the cohorts in this study seems to be in a direction of increasing problem

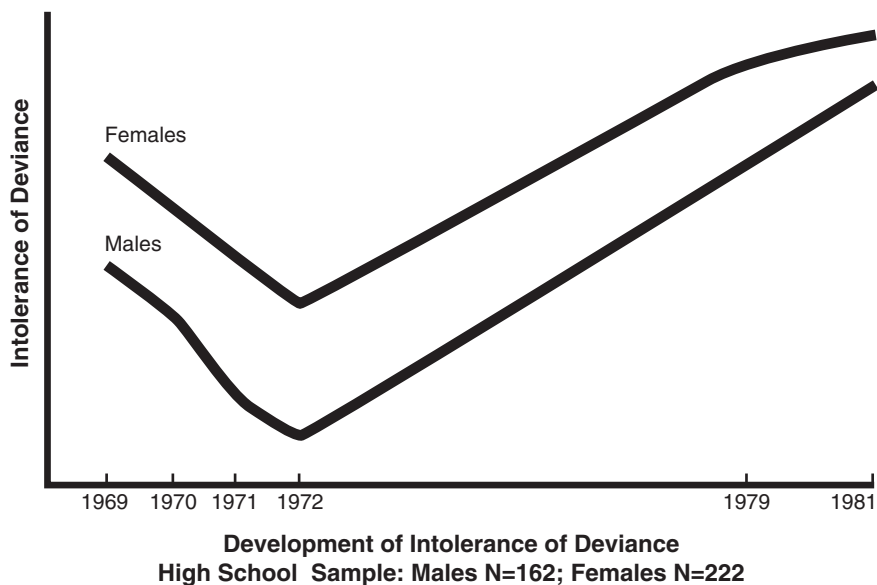


Fig. 5.4 Change over time in intolerance of deviance: High School Sample

behavior proneness; this is the conclusion we drew in our book on the earlier phase of the longitudinal study (Jessor & Jessor, 1977). Second, the course of psychosocial development in young adulthood seems to be in the opposite direction, one of decreasing problem behavior proneness; that is, there is now in young adulthood a clear developmental increase in conventionality and in psychosocial proneness toward conformity (Jessor, 1983). An almost paradigmatic illustration of both of these generalizations can be seen in Fig. 5.4.

The measure charted in Fig. 5.4 is a key Personality System variable, Attitudinal Intolerance of Deviance, that has excellent psychometric properties, established construct validity, and a stability coefficient of 0.41 for males and 0.47 for females between 1972 and 1979 (corrected for attenuation). Between 1969 and 1972 in Fig. 5.4, there is a consistent developmental decline in intolerance of deviance. That means theoretically, of course, a consistent increase in problem behavior proneness. Although women are more intolerant of deviance than men throughout, the slope of their curve in those adolescent years is similar to that of the men. What is striking about these curves is their *reversal of direction* after adolescence, that is, between 1972 and 1979. Not only is there now a consistent *increase* in intolerance of deviance across this latter time interval, but by 1979 it reaches, for both sexes, a level higher in intolerance than that of 1969 when they were all in junior high school. The added data point for 1981 makes clear that we are observing a stable developmental trend rather than an artifact dependent upon having only a single measurement in young adulthood. Thus, the High School Sample data in Fig. 5.4 strongly suggest that these cohorts are increasing in psychosocial conventionality as they reach their

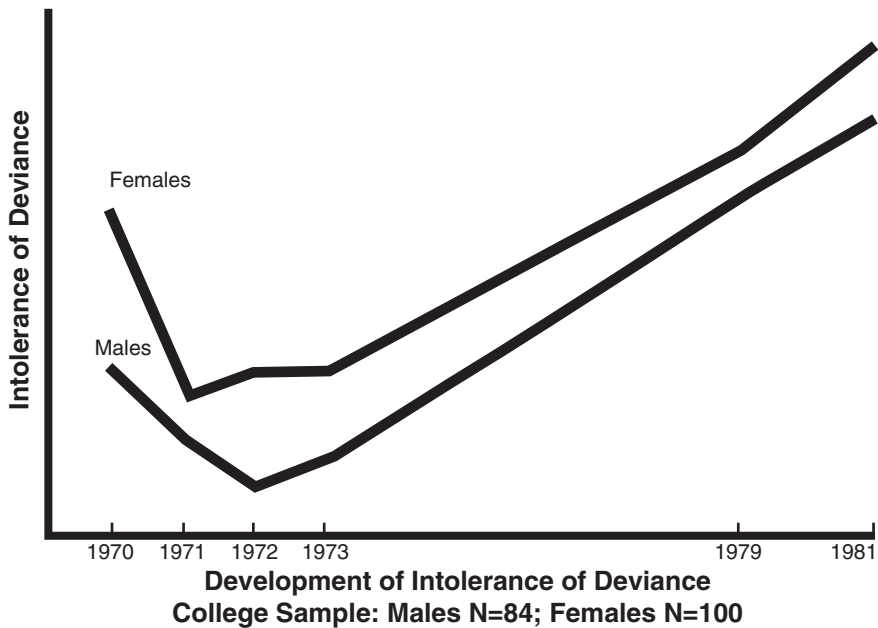


Fig. 5.5 Change over time in intolerance of deviance: College Sample

late twenties. Further corroboration of that direction of developmental change on this same measure can be seen in Fig. 5.5.

Data from the College Sample, the parallel longitudinal study that was carried along in tandem with the High School Sample, have been used in Fig. 5.5. Once again, the same major trends can be seen as were noted in Fig. 5.4: a decline in intolerance of deviance in the initial years of the prior phase of the study beginning in 1970, and then a reversal by 1979 that is sustained in 1981 at which time the college sample had reached the age of 30. Thus, the two major developmental generalizations are supported by four separate, replicated curves. Although only a single measure, Intolerance of Deviance, has been presented here, similar findings have emerged on several other theoretical measures as well (see Jessor, 1983). Development, at least in the mid- and later twenties, appears to be in the direction of greater personality, perceived environment, and behavioral conventionality. That direction may well follow from the assumption of new life roles in work and family and the occupancy of new social contexts other than that of school, both factors constituting conventionalizing influences.

Obviously, these findings are constrained by the particular cohorts involved and by the time in history when the data were collected. It is not possible, therefore, to infer that the increasing conventionality observed in our sample in young adulthood is an invariant developmental characteristic of that life stage rather than being simply a reflection of the increasing conventionality of the larger society and the

historical shift away from the radicalism of the early Seventies. In this regard, however, it is most intriguing to note that, for the College Sample cohorts in Fig. 5.5, there is already an indication of a beginning reversal of direction in their curves *within* the first phase of the study, that is, in the early Seventies and *prior to* the historical shift just mentioned. The reversal can be seen to occur by 1972 for the females and by 1973 for the males, when they were, in fact, just beyond adolescence and at the beginning of their development as young adults at the ages of 21 and 22.

The intent in presenting the data in these two figures has been to invoke a possible psychosocial explanation for the suggested trend in the High School Sample toward maturing out of problem drinking by 1981, when the participants had reached their later twenties. That explanation involves the observed decline in psychosocial proneness to problem behavior in later young adulthood. According to the logic of Problem Behavior Theory, such a decline would result in a corresponding decline in involvement in problem behavior, including, of course, problem drinking, our present concern.

Conclusion

I have sought in this paper to provide an overview of the cumulative outcome of more than two decades of psychosocial inquiry about adolescent problem drinking. Throughout this period, our research—both cross-sectional and longitudinal—has been guided by a general psychosocial perspective and by a more specific conceptual framework, namely, Problem Behavior Theory. In the latter framework, variation in adolescent problem drinking is accounted for by three explanatory systems: personality, environment, and behavior. What the research has shown is that each of these explanatory systems is significantly associated with problem drinking, and, together, they can account for a substantial portion of its variation.

But the research, especially the longitudinal study following up adolescents into young adulthood, has contributed more than just support for a particular theory. It has corroborated that problem drinking in adolescence is a serious public health issue, with one out of four young men and one out of six young women in our sample of normal high school youth meeting our criteria for problem drinking. It has also demonstrated that problem drinking, rather than being an isolated behavior, is associated with and embedded in a larger pattern or syndrome of adolescent problem behavior.

Following lives through time has enabled us also to observe the course of development and change of problem drinking as adolescents move into the third decade of life and become young adults. What has emerged from the research is a strong sense of the discontinuity or instability of problem drinking over time. Although the gap in our data *between* adolescence and young adulthood, that is, between 1972 and 1979, precludes our describing what the drinking pattern has been during that interval, it is apparent that there is considerable turnover in drinker status between those two times of measurement. About 50 percent of the males who were

problem drinkers as adolescents are no longer problem drinkers as young adults; for females the discontinuity is even greater, and the comparable figure is about 75 percent. Discontinuity is observed, also, over the much shorter 1979–1981 interval within young adulthood, with more than a quarter of the 1979 male problem drinkers and more than half of the 1979 female problem drinkers no longer problem drinkers in 1981.

These findings about discontinuity are important in helping to temper a perspective on adolescent problem drinking that would emphasize inexorable chronicity and an inescapable legacy for later life. Equally important, the findings make clear that the observed discontinuity over time is not simply random or adventitious, but systematic and predictable to a significant degree. The prediction of young adult continuity/discontinuity of problem drinking rests, however, not on the antecedent adolescent drinker status but on an assessment of antecedent psychosocial proneness to problem behavior in adolescence. These developmental findings provide further support for the usefulness of Problem Behavior Theory.

The difficulties of deriving from explanatory research its logical implications for prevention/intervention cannot be overestimated. Nevertheless, at least two possible implications from our findings should be emphasized: the importance of interventions that deal with multiple problem behaviors simultaneously; and the advisability of seeking change in all three psychosocial systems—personality, the environment, and behavior.

The research described in this paper has led us, we think, at least a small distance in the direction of greater understanding of adolescent problem drinking. If that proves to be the case, it will have been a scientific journey well worth the traveling.

Note: The research reported in this paper was carried out in longterm collaboration with Dr. Lee Jessor and, more recently, with Dr. John Donovan; it could not have been accomplished without them. I am grateful to Drs. John Donovan and Frances Costa for the special analyses of the data. Support for the research has been provided by Grant No. AA-03745 from the National Institute on Alcohol Abuse and Alcoholism (NIAAA). The material in this paper was also presented at the ceremony designating NIAAA a Collaborating Center of the World Health Organization, Washington, D.C., November 2, 1983.

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Chapter 6

Problem Drinking and Psychosocial Development in Adolescence

Richard Jessor

For more than 25 years, our research on adolescent problem drinking has been guided by a social-psychological framework known as Problem Behavior Theory. The theory was developed initially for a study of alcohol abuse and other problem behaviors in a small, tri-ethnic community comprised of Hispanic-Americans, Native-Americans, and Anglo-Americans (Jessor, Graves, Hanson, & Jessor, 1968). It was next applied in a major longitudinal study of problem behavior and psychosocial development among cohorts of junior high school adolescents and college youth (Jessor, R. & Jessor, S. L., 1977). Subsequently, it provided the theoretical context for two large-scale, national sample surveys of junior and senior high school students (Donovan & Jessor, R., 1978; Jessor, R., Chase, & Donovan, 1980). Most recently, Problem Behavior Theory has been guiding a long-term follow-up study of the earlier junior high school and college longitudinal cohorts as they have traversed from adolescence and youth well into young adulthood (Jessor, R. & Jessor, S. L., 1984). My aims in this paper are to present a brief overview of Problem Behavior Theory and to review some of the research findings it has generated; the latter will permit at least an interim appraisal of the usefulness of the theory in accounting for variation in drinking and problem drinking among young people.

The Conceptual Structure of Problem Behavior Theory

The general perspective of Problem Behavior Theory is psychosocial rather than biological, medical, or genetic. The most basic tenet of a psychosocial perspective on drinking behavior is that—like all other learned behavior—it is functional,

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purposive, and instrumental toward the attainment of goals. The goals that are attached to drinking, the meanings it has for the drinker, the various ways in which alcohol comes to be used, and even its experienced and observed effects, were all shaped by the norms and expectations of the larger culture and by the particular experiences a young person has had in the more immediate context of everyday life. An explanation of adolescent drinking and problem drinking, from a psychosocial perspective, extends beyond genetic and biological considerations, and beyond the pharmacological properties of ethanol. What it rests upon, instead, are the psychological, social, and behavioral characteristics of the youthful drinker, the relevant dimensions of the larger social environment, and the attributes of the situation in which drinking takes place. It is those properties that Problem Behavior Theory was designed to represent. The primary focus of Problem Behavior Theory is on three systems of psychosocial influence—the Personality System, the Perceived Environment System, and the Behavior System. Within each of the three systems, the explanatory variables reflect either *instigations* to problem behavior or *controls* against it, and, together, they generate a resultant, a dynamic state called *proneness*, that specifies the likelihood of occurrence of normative transgression or problem behavior. Problem behavior is defined as behavior that departs from the norms—both social and legal—of the larger society; it is behavior that is socially disapproved by the institutions of authority and that tends to elicit some form of social control response whether mild reproof, social rejection, or even incarceration.

Since proneness to engage in problem behavior is a system-level property, it is theoretically meaningful to speak of personality proneness, environmental proneness, and behavioral proneness. When proneness in all three systems is taken together, their combination generates the sovereign explanatory concept in Problem Behavior Theory—*psychosocial proneness*—that is used in the prediction and explanation of variation in problem behavior.

The concept of proneness, in specifying the likelihood of occurrence of problem behavior, is essentially synonymous with the concept of *risk*. All of the theoretical variables in the three explanatory systems may therefore be seen as *psychosocial risk factors* for problem behavior. Thus, psychosocial proneness and psychosocial risk can be considered to be essentially interchangeable notions.

The conceptual structure of Problem Behavior Theory is schematized in Fig. 6.1. Several general characteristics of the framework should be noted. First, it includes a fairly large number of variables and reflects an attempt to achieve relatively comprehensive representation in each of the psychosocial, explanatory systems. Second, some of the variables (e.g., Attitudinal Tolerance of Deviance, or Friends Models for Problem Behavior) directly implicate problem behavior, while others are linked to problem behavior only indirectly, that is, by theory (e.g., Self-Esteem, or Parent-Friends Compatibility). The former are more proximal to and the latter more distal from problem behavior. Because of the obviousness of their connection with behavior, proximal variables generally yield stronger relationships, but distal variables, being less obvious, are often of greater interest theoretically. The variables shown in

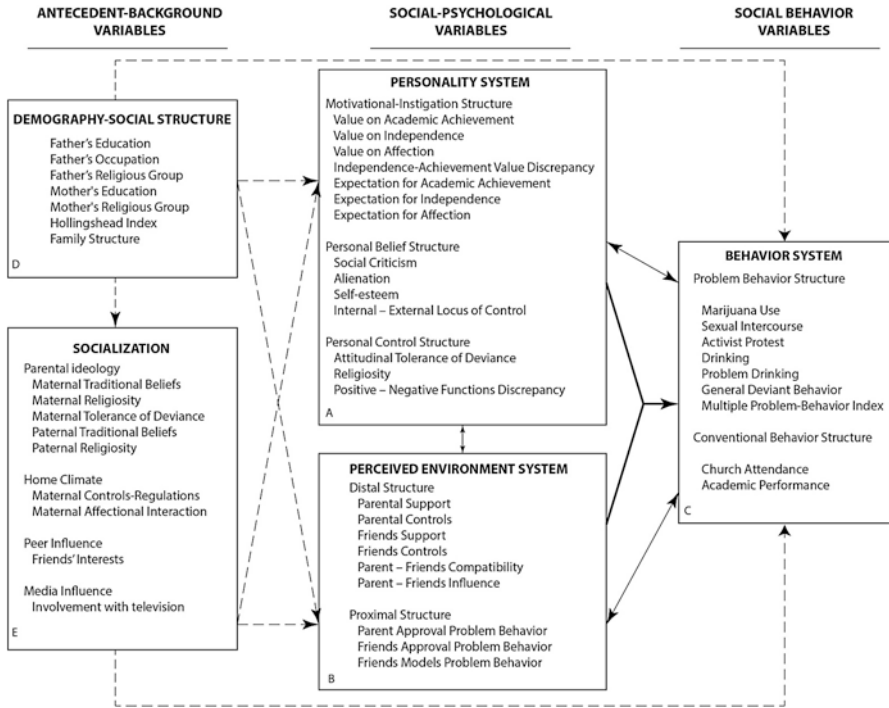


Fig. 6.1 The conceptual structure of Problem Behavior Theory (Jessor & Jessor, 1977)

the Perceived Environment System are actually organized into distal and proximal structures, but the very same distinction could also be made in the Personality System had we not sought to represent the instigation/control distinction there instead.

Third, the figure illustrates a fundamental premise of our conceptual orientation, namely, that all behavior is the result of person-environment interaction, that the logic of explanation requires mapping both of those systems simultaneously, and that causal priority cannot be allocated to either one alone. This premise is illustrated by the heavy, unidirectional arrow showing the *joint* influence of the Personality System and the Perceived Environment System on the Behavior System. It was Kurt Lewin (1951) who, perhaps more than anyone else, gave salience to this explanatory stance; he termed it the ‘field theory’ perspective in social science. After several decades of neglect, the field theory perspective has been revitalized in contemporary psychology under the concept of ‘interactionism’ put forth most vigorously by David Magnusson (Magnusson & Endler, 1977; Magnusson & Allen, 1983).

Finally, although the attention in this presentation will be focused on the three systems that are causally closest to the occurrence of problem behavior, those shown in Boxes A, B, and C, the framework does encompass the more distal systems of social structure and socialization that are more remote in time or in the causal chain and whose influence on behavior is largely mediated by the more proximal systems of variables.

Since the rationale for each variable has been elaborated in detail elsewhere (Jessor, R. & Jessor, S. L., 1977), only a brief description will be presented here. The presentation will be restricted to Boxes A, B, and C, and to specifying the theoretically problem-behavior prone direction of the variables.

The variables that constitute the Personality System (Box A) are all at the socio-cognitive level and reflect social meanings and developmental experience, unlike the so-called 'deeper', more recondite drives of psychodynamic theories. They are values, expectations, beliefs, attitudes, and orientations toward self and others, and they are organized into three structures depending upon whether they constitute instigations to problem behavior or controls against it, and, if controls, whether they are relatively proximal to or distal from problem behavior. The motivational-instigation structure is concerned with the directional orientation of action; the latter is determined by both the goals toward which a person strives and the concomitant expectations of attaining those goals. Two goals are considered particularly relevant to adolescent problem behavior: academic achievement (an orientation toward a conventional institution—the school), and independence (an orientation toward autonomy and unconventionality). Low expectations for attaining valued goals, whatever their orientation, should also be an instigation to problem behavior, either as an alternative approach to goal attainment (e.g., cheating on a test) or as a learned way of coping with failure and frustration (getting drunk in order to forget one's troubles).

The other two structures in the Personality System are both control structures, the personal belief structure being more distal and the personal control structure being more proximal to problem behavior. In the personal belief structure, the variable of social criticism refers to a rejection of societal norms, values, and practices, and the variable of alienation refers to a sense of meaninglessness in everyday roles and isolation from others. Both variables suggest an attenuation of regulatory influence and a consequent lessening of controls against problem behavior. Self-esteem, when low, suggests the absence of a stake that could be jeopardized by engaging in problem behavior, that is, there is little to lose, while an external control orientation makes moot the very idea of appropriate behavior since whatever happens is a matter of luck or chance. In the personal control structure, the variables, being more proximal, are also more obvious in their control implications. An attitude of tolerance of deviance indicates that transgressions are not deemed to be 'wrong', and low involvement with religion suggests an absence of internalization of the moral perspective of the main conventional institution in society. The positive-negative functions discrepancy indicates lower control when the positive 'reasons' for engaging in problem behavior (e.g., drinking "makes get-togethers more fun") outweigh

the negative reasons or functions (e.g., drinking “can lead to losing control over your life”).

Personality proneness to problem behavior consists, therefore, of lower value on academic achievement, higher value on independence, lower expectations of attaining both goals, greater social criticism, greater alienation, lower self-esteem, more external control, greater tolerance of deviance, less religiosity, and greater positive versus negative functions discrepancy. The more the instigation and control variables fall into this personality pattern, the greater the likelihood of problem behavior.

The variables in the Perceived Environment System (Box B) refer to environmental characteristics—supports, influence, controls, models, and expectations of others—that are capable of being cognized or perceived, that is, they are socially-organized dimensions of potential meaning. As we have argued elsewhere (Jessor, R. & Jessor, S. L., 1973; Jessor, R., 1981), it is with the perceived, or phenomenal, or meaningful environment that behavior is most invariant. In the distal structure of the perceived environment, the variables serve mainly to characterize whether the social context in which an adolescent is located is more parent- and family-oriented or more friends- and peer-oriented. The latter, in contrast with the former, would suggest less involvement with conventional norms, more exposure to models for problem behavior, and less control over transgression. In the proximal structure, the variables characterize the social context in terms of the prevalence of models and supports or approval for problem behavior. *Perceived environment proneness* to problem behavior consists, therefore, of lower parental support and controls, lower friends controls, lower parent-friends compatibility, greater friends- than parents-influence, lower parental disapproval of problem behavior, and greater friends approval for and models of problem behavior. The more this cluster of social-psychological variables obtains, the more likely the occurrence of problem behavior.

The variables in the Behavior System (Box C) reveal the degree to which our interest in the domain of problem behavior has been both differentiated and relatively comprehensive. Indeed, the theory has been applied to yet other behaviors not represented in Box C, such as cigarette smoking (Jessor, R., Donovan, & Widmer, 1980). The possibility that phenotypically very different behaviors (e.g., using marijuana, getting drunk, having sexual intercourse, smoking cigarettes, or—in the decade of the 70s—taking part in a march or a demonstration) might all serve the same genotypic function for adolescents (e.g., repudiating conventional norms, affirming independence from parents, gaining status in the peer group) is what underlies the notion of a structure of problem behavior.

Although the various problem behaviors usually elicit some form of social control response, as noted earlier, it is important to recognize their symbolic meaning and the variety of psychosocial functions they can—and have often been learned to—fulfill for adolescents. Problem behavior may be an instrumental effort to attain goals that are blocked or that seem otherwise unattainable. Thus, precocious sexual intercourse and adolescent pregnancy may be a way of attaining independence from parental authority and taking control of one’s life. Problem behavior may serve as

an expression of opposition to the norms and values of conventional society, as engaging in drug use during the Vietnam era symbolized. It may serve as a coping mechanism for dealing with anxiety, frustration, inadequacy, and failure or the anticipation of failure; heavy involvement in alcohol use would be relevant here. Problem behavior may also function to express solidarity with peers or to demonstrate identification with the youth culture, e.g., by cigarette smoking, or sharing a 'joint', and it may also serve to confirm personal identity, e.g., drinking and driving after drinking as ways of being 'cool' or 'macho'.

Perhaps the most salient function of problem behavior in adolescence is as a transition-marker, a way of placing a claim on a more mature status. Since many of the problem behaviors, especially drinking and sex, are age-graded, that is, considered by society as appropriate only for those who have reached a certain age or age-related status and inappropriate for those younger, engaging in these behaviors earlier than considered appropriate can be a way of affirming maturity and making a developmental transition toward adulthood. Overall, then, there is nothing necessarily irrational, perverse, or psychopathological about young people engaging in problem behavior; for adolescents, such behavior can fulfill important goals and can be an essential aspect of psychosocial development.

The conventional behavior structure of the Behavior System includes behaviors oriented toward two conventional institutions of society, church and school. Church attendance and academic achievement are the key variables in this structure. *Proneness to problem behavior in the Behavior System* refers, therefore, to higher involvement in *other* problem behaviors than the one being predicted or explained, and lower involvement in conventional behavior. Considering psychosocial proneness in all three systems simultaneously—Personality, the Perceived Environment, and Behavior—yields a clearer picture of the multivariate and dynamic nature of explanation in Problem Behavior Theory.

The relevance of such a conceptual framework to adolescent alcohol use and abuse ought to be obvious. Given both the legal and the social norms prevalent in American society, drinking per se is widely considered a transgression when adolescents are below a certain age. In addition, the excessive use of alcohol by adolescents, or its inappropriate use—for example before driving—are viewed with disapproval in many societies, and generally they elicit some sort of negative social sanction. Adolescent alcohol abuse or problem drinking can, therefore, be subsumed under the rubric of problem behavior, and that makes Problem Behavior Theory apposite as a potential account of variation in problem drinking. The variables in the theory should constitute, in other words, a set of theory-derived psychosocial risk factors for adolescent problem drinking.

As indicated earlier, Problem Behavior Theory has been employed in a variety of studies to account for a variety of adolescent behaviors ranging from delinquency and illicit drug use, to cigarette smoking and sexual intercourse, to drinking and problem drinking. In all of this work, by ourselves and by colleagues in the U.S. and abroad (e.g., Chassin et al., 1981; Rooney & Wright, 1982; DiTecco & Schlegel, 1982), the concepts and measures have been found useful and illuminating. As an

illustration from our own work, we found that regression analysis of overall psychosocial proneness in relation to a multiple problem-behavior index (a composite of five different problem behavior domains—problem drinking, marijuana use, non-virginity, activist protest, and general delinquency) yielded multiple correlations (R_s) ranging around 0.70 for the high school males and females and also for the college males and females. When the analyses were broken down by gender by grade subgroups in the high school, the multiple correlations for the 10th, 11th, and 12th grade males were, respectively, 0.73, 0.79, and 0.74; for the females they were, respectively, 0.83, 0.80, and 0.74. Thus, Problem Behavior Theory accounts for approximately 50% of the variance in this composite measure of adolescent problem behavior and, in some instances, for more than 60%.

The Longitudinal Design of the Developmental Study

In this paper, our aim is to report that portion of our findings that bear upon adolescent drinking and problem drinking. Most of the data will be drawn from our ongoing longitudinal study of cohorts of junior high school students, both male and female, whom we have followed from 1969, when they were ages 13, 14, and 15, through 1981, when they had reached the ages of 25, 26, and 27. (A parallel longitudinal study of college freshmen, begun in 1970, has also been carried through 1981, but those data, while corroborative, will not be reported here.)

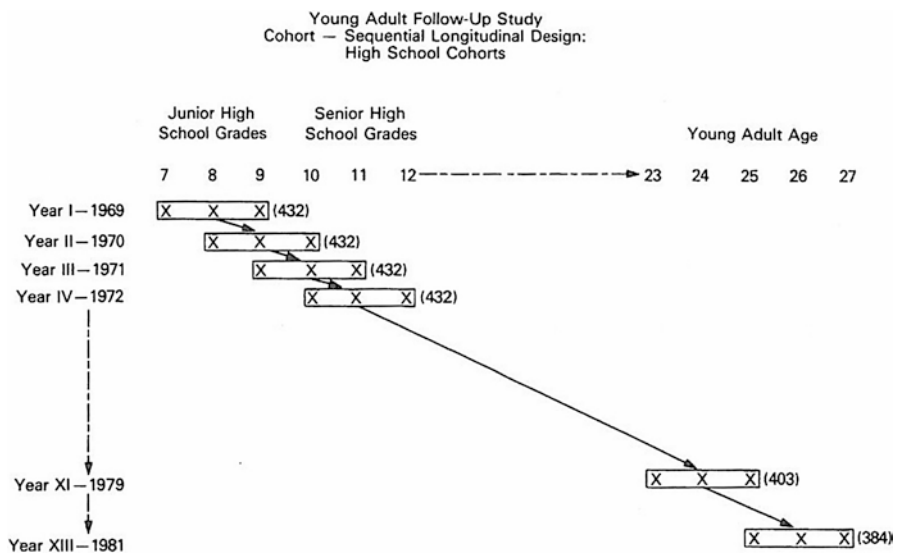


Fig. 6.2 The longitudinal design for the High School Sample from adolescence to young adulthood

The cohort-sequential research design for the high school cohorts, with six waves of data, is shown in Fig. 6.2.

Since details about the samples and the design can be found in earlier publications (Jessor, R. & Jessor, S. L., 1977; Jessor, R. & Jessor, S. L., 1984), only brief comment is needed here. From an original random sample of 1126 junior high students drawn from three schools in a small western city, 589 (52%) participated in the first year of the study in 1969. By the end of the Year IV testing in 1972, 483 students (82% of the Year I participants) were still in the study. Of these, 432 students (188 males and 244 females) had participated in all 4 years of testing; they were designated the *core developmental sample*. Located and contacted seven years later, in 1979, fully 94% resumed their participation as young adults in the fifth wave of data collection. Of those who participated in 1979, 96% participated again in the sixth data wave collected in 1981. Thus, 90% of the high school core developmental sample was retained after the 7-year hiatus for the two young-adult data waves, thereby safeguarding its integrity over the 12-year span of the study thus far. Demographically, the sample is relatively homogenous; it is almost entirely Anglo-American in ethnic background and middle class in socioeconomic status.

Data were collected in school annually in the spring of each of the first 4 years. A lengthy, theory-derived questionnaire, approximately 50 pages in length and requiring about an hour and a half to complete, was developed. It consisted largely of psychometrically-developed scales or indexes assessing all of the variables in all of the systems of the Problem Behavior Theory framework. For the fifth and sixth data waves, questionnaires were sent and returned by mail. The longitudinal data lend themselves, of course, to the usual kinds of cross-sectional analyses at each wave of data, but more important and even more interesting, they permit analyses of development and change in drinking behavior and problem drinking and of development and change in their psychosocial correlates. In the remainder of this paper, we will present findings about the utility of the theoretical framework for accounting for cross-sectional variance in problem drinking, for predicting time of onset of drinking among abstainers, and for predicting problem drinking in young adulthood from the earlier measures of key psychosocial variables or risk factors in adolescence.

Problem Drinking and the Syndrome of Problem Behavior

It is important, before presenting these findings, to make clear one of the important implications of locating problem drinking within a larger structure of problem behavior in the Behavior System, namely, that it should co-vary positively with the other problem behaviors in the structure and relate negatively to involvement in conventional behavior. Indeed, as it turns out in a fairly large and robust set of studies, the pattern of interrelations is systematic enough to suggest that problem drinking is part of a *syndrome* of adolescent problem behavior.

Table 6.1 Relationship of Problem-Drinker Status to Other Problem Behaviors

Drinker status	Percentage							
	Marijuana users				Non-virgins		High in church attendance	
	Male	Female	Male	Female	Male	Female	Male	Female
Abstainers	0	2	5	4	15	2	64	52
Non-problem drinkers	31	42	23	39	40	34	23	33
Problem drinkers	79	80	52	73	73	43	27	18

High School Sample: Year IV (1972)

In order to explore this issue, we classified our cohorts in the high school study into Abstainers, Non-problem Drinkers, and Problem Drinkers based upon their frequency of drunkenness and their drinking-related negative social consequences scores in Year IV (1972) of the longitudinal study, when they had all reached senior high school, that is, were in grades 10, 11, and 12. (Among the males, the mean frequency of drunkenness in the past year was 24 times for the Problem Drinkers and 2 times for the Non-problem Drinkers; among the females, the comparable figures are 18 and 2, respectively. The classification procedure resulted in 28% of the males and 16% of the females being classified as Problem Drinkers. For further details, see Donovan & Jessor, R., 1978, and Jessor, R., 1985, p. 112.) The interrelations between problem drinking and other problem behaviors can be seen in Table 6.1.

It is quite apparent from the different percentages in the table that being classified as a Problem Drinker is strongly associated with higher rates of involvement in other problem behaviors. Whereas 79% of the problem drinking males and 80% of the problem drinking females have used marijuana, the comparable figures for the non-problem drinking males and females are only 31% and 42%, respectively. Problem drinker status is also highly associated with being sexually-experienced, the rates for the Problem Drinkers being nearly double those of the Non-problem Drinkers. And the same direction of difference in rates is observable for the measure of self-reported delinquency or deviance. Of further interest in the table is the reversed relation of Problem Drinker status to the conventional behavior of church attendance for the females. Finally, it is noteworthy that being an Abstainer implies almost *no* involvement with other problem behaviors and very high involvement in conventional behavior. These data suggest that the decision to begin drinking may be a major transition that reverberates across a variety of other behaviors and that, rather than representing a specific behavior change, the initiation of alcohol use in adolescence may signal a change in overall lifestyle.

To establish that the covariation between problem drinking and other problem behaviors is not a finding limited to the specific cohorts in our longitudinal study,

Table 6.2 Correlation Among Selected Measures of Problem and Conventional Behavior, National Sample Data—1978 (11th and 12th graders, by sex)

Measure	1	2	3	4	5	6	7
<i>Problem behavior</i>							
1. Number of cigarettes smoked per day in the last month	–	0.39	0.42	0.36	0.40	–0.24	–0.24
2. Times drunk in the past year	0.32	–	0.65	0.53	0.52	–0.25	–0.23
3. Frequency of marijuana use in the past 6 months	0.34	0.59	–	0.58	0.49	–0.27	–0.28
4. Number of other illicit drugs ever used	0.33	0.43	0.59	–	0.43	–0.26	–0.21
5. General deviant behavior in the past year	0.32	0.46	0.43	0.36	–	–0.20	–0.28
<i>Conventional behavior</i>							
6. Church attendance frequency in the past year	–0.16	–0.24	–0.26	–0.21	–0.16	–	0.17
7. School performance	–0.22	–0.25	–0.22	–0.14	–0.28	0.12	–

Note: All correlations are statistically significant at the 0.001 level (two-tailed test). The lower triangular matrix contains the correlations for the males ($n = 1208$) with no missing data; the upper triangular matrix contains the correlations for the females ($n = 1444$)

we have examined the same issue in data from a national sample of 11th and 12th graders collected in 1978 using a questionnaire that included many of our Problem Behavior Theory measures (Jessor, R., Donovan, & Widmer, 1980; Rachal et al., 1980). In these analyses, continuous measures are used so that Pearson correlations rather than percentages can be reported.

In Table 6.2, it can be seen that there are sizeable positive correlations among all of the problem behaviors and negative correlations for all of them with both of the measures of conventional behavior. Times Drunk in the Past Year, the main component measure of problem drinking status, correlates substantially with cigarette smoking, marijuana use, the use of other illicit drugs, and general deviant behavior for both sexes. Again, in this totally independent national sample, the evidence is compelling that problem drinking is part of a larger syndrome of adolescent problem behavior, a conclusion that is consonant with its conceptualization in Problem Behavior Theory. Finally, we have addressed this same issue most recently by using maximum-likelihood factor analysis on a variety of data sets for both adolescents and young adults; consistently, a single common factor emerges, providing additional support for the notion of a syndrome of problem behavior that encompasses problem drinking (Donovan & Jessor, R., 1985).

Table 6.3 Multiple Correlations of Problem-Behavior Theory Measures with Adolescent Problem Drinking

Theoretical measures	Times drunk past year		Problem-drinker status	
	Male	Female	Male	Female
Personality system	0.36	0.29	0.48	0.49
Perceived environment system	0.46	0.35	0.61	0.59
Field pattern	0.58	0.40	0.72	0.70
Overall set	0.60	0.43	0.79	0.76

High School Sample, 1972

Problem Behavior Theory and Variation in Adolescent Problem Drinking

Having established the linkage of problem drinking to other problem behaviors, we can now turn to an examination of the usefulness of Problem Behavior Theory for explaining cross-sectional variation in adolescent problem drinking. For purposes of economy and because details have been presented elsewhere (Jessor, R. & Jessor, S. L., 1977), our analyses will focus on the multiple variables that constitute the key explanatory systems in the theory, rather than presenting data for each individual variable or psychosocial risk factor. The results of multiple regression analyses of the major variables in the Personality System, the Perceived Environment System, the two systems taken together to represent a 'field theory' perspective, and finally, an Overall Set that also includes variables from the Behavior System are all presented in Table 6.3.

Two criterion measures are employed in the regression analyses; one is a continuous measure, namely, frequency of drunkenness in the past year, and one is a dichotomous measure, namely, Problem Drinker versus Non-problem Drinker status. As can be seen in Table 6.3, the usefulness of Problem Behavior Theory is clearly established. Each of the explanatory systems is significantly correlated with both criterion measures of problem drinking, and for both sexes, with the multiple correlations being considerably and consistently higher in relation to the more comprehensive problem-drinker status measure. The Perceived Environment System measures account for more of the variance than the Personality System measures, but this is probably due to their inclusion of measures that are more proximal to problem drinking behavior, e.g., models and approval for drinking.

When the two systems are combined into the Field Pattern, there is a significant increment in variance explained for both sexes, and the Overall Set that includes measures of other problem behaviors yields yet another significant increment in variance accounted for. Considering the Problem Drinker versus Non-problem Drinker criterion measure, the multiple correlations of the Overall Set ($R_s = 0.79$ and 0.76) account for about 60% of the variance in problem drinking for both males

and females. That represents a substantial contribution to a psychosocial explanation of adolescent problem drinking.

What that psychosocial explanation implicates is the pattern of proneness towards problem drinking that underlies the multiple correlations for each system. As reflected by the individual measures that typically enter the regression equations:

Proneness in the Personality System includes:

- Lower value on academic recognition
- Higher value on independence
- Independence valued more highly relative to academic recognition
- Lower expectation for academic recognition
- Greater attitudinal tolerance of deviance
- Lesser religiosity

Proneness in the Perceived Environment System includes:

- Lower compatibility between parent and friends' expectations
- Greater perceived influence from friends than parents
- Greater friends approval for problem behavior
- Greater friends models for problem behavior

And proneness in the Behavior System includes:

- Greater involvement in proto-delinquent behavior
- Greater involvement with marijuana use
- Less attendance at church

This profile of psychosocial proneness to adolescent problem drinking follows from the conceptual structure of Problem Behavior Theory, and these data provide strong support for the theory. The basic underlying dimension that would seem to capture best the various components in the profile is a dimension of *psychosocial unconventionality*, implying a generalized skepticism about societal values, a rejection of its norms, and a readiness for non-conformity. The pattern is similar to, even isomorphic with, that emerging from comparable analyses of other problem behaviors, such as marijuana use, delinquency, or sexual precocity, and the basic findings have been independently replicated in national sample data from both a 1974 and a 1978 survey (Jessor, R. Donovan, & Widmer, 1980; Rachal et al., 1980; Rachal et al., 1975).

Predicting the Onset of Drinking in Adolescence

Earlier in this paper, it was noted that many problem behaviors are age-graded and—to retain drinking as the example—are proscribed for those under a certain age while being permitted and even institutionally encouraged for those beyond that age. Engaging in such age-graded problem behaviors early can represent for an adolescent a developmental transition from a 'less mature' to a 'more mature' status, or from 'adolescent' to 'youth' or 'young adult'. Since engaging in an

age-graded problem behavior early is a transgression of age norms, and since Problem Behavior Theory is designed to account for transgression of any norm, the theoretical concept of psychosocial proneness to problem behavior can logically be applied to such transition behavior. In this context, the concept can be seen as summarizing 'transition-proneness', and the latter should theoretically reflect the very same pattern of variables we have described as problem-behavior proneness. The concept of transition-proneness gives a strong developmental cast to Problem Behavior Theory and illuminates the developmental role played by the initiation of problem behavior during adolescence. The greater the transition-proneness, the greater the likelihood of occurrence of transition-marking behavior—including drinking—and the earlier such behavior is likely to occur.

It has been possible with the longitudinal data in our study to test that developmental proposition directly in relation to the onset of three different transition behaviors—initial sexual intercourse, initial marijuana use, and initial drinking. The results for all three of these behaviors are consonant. With respect to our concern here with drinking, the procedure was to establish five groups, a posteriori, in Year IV (1972) of the high school study based upon whether and when the transition from Abstainer to Drinker took place over the preceding 4 years of annual data collection. The five groups consisted of a group already drinking in Year I (1969), a group that began drinking in the 1969–70 year, one that began in the 1970–71 year, one that began in the 1971–72 year, and finally, one that was still abstaining by the 1972 testing. These five groups are, thus, fully ordered in relation to onset and time of onset of drinking over the 4 years of the adolescent phase of our longitudinal study.

By looking at the mean scores of these five groups on the psychosocial variables measured in Year I (1969), we can determine whether the groups are ordered in a way that is consonant with the differential transition-proneness expected on the basis of Problem Behavior Theory. Indeed, that is the case. To select one measure for illustration, the mean score on Value on Academic Achievement is perfectly ordered ($F < .001$) across these five groups, with the lowest mean value associated with the group that was already drinking in Year I, the highest mean value associated with the group that is still abstaining in Year IV, and the other three means ordered in exact relation to the time of transition or onset of drinking of the other three groups. These data are a paradigm case for the relation of variation in psychosocial transition-proneness to variation in time of onset of drinking in adolescence. Thus, it is clear that the concepts in Problem Behavior Theory can serve to represent a differential 'readiness' for developmental change through the initiation of new transition behaviors such as drinking.

In order to assess the overall usefulness of the theory in predicting variation in time of onset of drinking, we regressed the time of onset measure against the Year I (1969) psychosocial measures among all of the 1969 abstainers. The multiple correlations (R_s) for the Overall Set of variables were 0.47 for males and 0.37 for females, both correlations significant at $p < .001$. These results provide important support for the relevance of Problem Behavior Theory to the development of adolescent drinking behavior. They indicate that the theory is able to identify significant psychosocial risk factors for the onset and for the earliness of onset of alcohol use among adolescents who have not yet begun to drink.

Predicting Problem-Drinking in Young Adulthood from Psychosocial Risk in Adolescence

The final topic to be considered in relation to the usefulness of Problem Behavior Theory as a psychosocial-developmental framework to account for problem drinking is the prediction it affords of problem drinking in young adulthood. The basic model for these analyses involves the use of the fifth and sixth data waves to establish whether or not a participant in the longitudinal study met the criteria for classification as a problem drinker in *either* 1979 or 1981, and then to regress that criterion against the theoretical measures collected 7 or 9 years earlier in the fourth data wave in 1972.

Before we present those findings, it is important to emphasize that there is considerable discontinuity in problem drinking between adolescence and young adulthood. Among the high school males who were problem drinkers in 1972, only 51% were also problem drinkers in 1979 and/or 1981, while 49% were non-problem drinkers. For the females, the comparable percentages are 26 and 74, respectively. Thus, knowledge of problem drinker status in adolescence is not very predictive, by itself, of chronicity of problem drinking later on in the life trajectory, at least in the young adult portion of it that we assessed.

The results of the regression analyses are presented in Table 6.4. Problem drinker status in adolescence (1972) was controlled by running the analyses *within* the adolescent Problem Drinker group and *within* the adolescent Non-problem Drinker group separately. As can be seen in Table 6.4, the pattern of psychosocial proneness to problem behavior that obtained *in adolescence* is significantly predictive of problem drinking in young adulthood 7 or 9 years later. The Overall Set of adolescent measures of psychosocial proneness yields a multiple correlation (R) of 0.74 for males and 0.56 for females, among those who were problem drinkers in 1972. Although the variance accounted for among the males is nearly twice that among the females, both multiple correlations are significant at $p < .001$. The difference between the sexes is due primarily to the greater predictiveness of the Personality System measures for the males ($R = 0.60$) than for the females ($R = 0.29$). Among adolescent problem drinkers, then, Problem Behavior Theory specifies a pattern of

Table 6.4 Multiple Correlations of Problem Behavior Theory Measures in Adolescence with Problem Drinking in Young Adulthood

Adolescent (1972) theoretical measures	Young Adult (1979/81) Problem-Drinker Status	
	Male ($n = 45$)	Female ($n = 35$)
Personality system	0.60	0.29
Perceived environment system	0.51	0.49
Field pattern	0.71	0.49
Overall set	0.74	0.56

Problem drinkers, 1972. High School Sample

psychosocial risk for the continuation or discontinuation, that is, for the ‘chronicity’, of problem drinking across further lifespan development. (Parallel analyses among adolescent *non*-problem drinkers also yielded significant multiple correlations for young adult problem drinker status, but they were lower than those among the adolescent problem drinkers; for the Overall Set the *R*s for the males and females were 0.58 and 0.35, respectively.)

The theoretical attributes in these *longitudinal* analyses, that is, the profile of adolescent psychosocial risk factors, is similar to the profile that emerged in the *cross-sectional* analyses of adolescent problem drinking presented earlier. Such comparability between the cross-sectional and the longitudinal accounts serves to strengthen conviction about the relevance of Problem Behavior Theory as an explanation of the developmental course of adolescent problem drinking.

Conclusion

In this paper, I have endeavored to present a précis and overview of Problem Behavior Theory, the psychosocial and developmental framework that has guided our research in the area of drinking behavior for two and a half decades. The internal logic of the framework has, of course, been explored, but our focus here has been on the external linkage of the theory to alcohol use and, in particular, to adolescent problem drinking. Several points are worth emphasizing from the research findings that have been presented.

First, it is apparent that each of the explanatory systems—Personality, Perceived Environment, and Behavior—is a significant source of variance in adolescent problem drinking for both males and females. Any effort to account for variation in problem drinking that fails to include all three of those systems must remain only partially successful. Second, the notion of psychosocial proneness, encompassing the risk factors in all three systems, yields a substantial explanatory grasp of adolescent problem drinking, accounting for approximately 50% of the criterion variance. Third, the usefulness of Problem Behavior Theory has been established in a more than usually compelling way by adducing converging support from quite diverse lines of evidence: cross-sectional analysis of adolescent problem drinking, predicting the time of onset of drinking among abstainers, and predicting young adult problem drinking from psychosocial risk factors in adolescence. Fourth, the research has shown the connectedness of problem drinking with other problem behaviors and the utility of its conceptualization as part of a syndrome of functionally-related adolescent behavior. Finally, the theoretical concept of transition proneness—the developmental analogue of problem-behavior proneness—has illuminated the role that problem behavior may play in normal adolescent development.

Work on Problem Behavior Theory continues in an ongoing effort to extend its application to young adult development (Jessor, R., Donovan, & Costa, 1991), to prevention (Perry & Jessor, R., 1985), and to behavioral health (Jessor, R., 1984). Only when we have achieved a fuller appreciation of its limitations and have arrived

at a better understanding of its grasp will it be possible to make a more definitive appraisal of its ultimate usefulness.

Acknowledgments For collaboration in the development of Problem Behavior Theory and in the research it has fostered over the years, I am most indebted to Dr. Lee Jessor. Contributions to the research program from my former students, now colleagues, are also gratefully acknowledged, especially those of Drs. John W. Finney, Jr., John E. Donovan, and Frances Costa.

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Chapter 7

Problem Drinking in College

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Problem use of alcohol among college students is a serious public health problem in the United States (Goldman, 2002; Keeling, 1998; Wechsler et al., 2000, 2002). Nearly half of college students surveyed reported “getting drunk” as a reason for drinking, and 39%–44% have reported heavy episodic drinking (so-called “binge drinking”) (Johnston et al., 2004; Wechsler et al., 2002). Excessive alcohol use adversely affects not only student drinkers, but their peers as well (Abbey, 2002; Hingson et al., 2002, 2005; Meilman, 1993; Perkins, 2002; Wechsler et al., 1998a, 2002).

This study tests an explanatory model of both proximal and distal psychosocial and behavioral protective factors and risk factors as an account of heavy episodic drinking in a college student sample. It also investigates whether developmental change in these protective and risk factors is related to change in heavy episodic drinking over the first 2 years of college. In recent years, there has been a growing interest in the role of protective factors and risk factors in influencing adolescents’ involvement in problem behaviors (e.g., problem drinking and the use of illicit drugs) (Jessor, 1991, 1998). This protection/risk model, derived from Problem Behavior Theory (Jessor et al., 1991; Jessor and Jessor, 1977), has been used to explain problem drinking, including heavy episodic drinking, in samples of middle school and high school students (Costa et al., 1999; Jessor et al., 2003).

Protective factors decrease the likelihood of engaging in such problem behaviors as heavy episodic drinking. Psychosocial protective factors provide social models for positive or prosocial behavior (e.g., peer models for conventional behaviors such as volunteer work, parent models for health-enhancing behaviors such as regular exercise); social and personal controls against norm-violative behavior (e.g., paren-

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tal sanctions for transgression, attitudinal intolerance of deviance); and an environment of social support (e.g., family closeness). Behavioral protective factors refer to actual involvement in positive or prosocial activities (e.g., volunteer work or attendance at religious services) that promote conventional attitudes and values and embed young people in more conventional social groups. Protective factors are posited not only to decrease the likelihood of problem behavior involvement, but also to moderate (decrease) the impact of exposure to risk factors.

Risk factors, on the other hand, increase the likelihood of engaging in problem behaviors. Psychosocial risk factors influence involvement in such problem behaviors as heavy episodic drinking by providing models for problem behavior (e.g., peer models for heavy episodic drinking); providing opportunity for engaging in problem behavior (e.g., ready availability of alcohol); and constituting social or personal vulnerability to engaging in problem behavior (e.g., peer pressure for drinking, low self-esteem). Behavioral risk factors refer to involvement in other problem behaviors (e.g., cigarette smoking and use of illicit drugs) that constitute opportunities and encouragement for also engaging in the problem behavior of heavy episodic drinking.

A great deal of descriptive information is available on U.S. college students' alcohol use and misuse (quantity and frequency of use, prevalence of heavy episodic drinking, and negative consequences of use) and on comparative levels of use across gender, race/ethnicity, and other demographic characteristics (Johnston et al., 2004; Meilman et al., 1997; O'Malley and Johnston, 2002; Wechsler et al., 2000, 2002). Current reviews of research on college drinking, however, stress the need for multivariate studies, for tests of theoretical models, for assessment of mediation and moderation effects, and for longitudinal designs (Baer, 2002; Ham and Hope, 2003).

Among recent studies that have had an explanatory focus, most have concentrated on proximal factors, including perception of norms about drinking (Perkins, 2003; Perkins and Wechsler, 1996), motives for drinking (Galen and Rogers, 2004; Read et al., 2003), and especially, alcohol expectancies (e.g., Aarons et al., 2003; Del Boca et al., 2004; Gotham et al., 1997; Greenbaum et al., 2005; Sher et al., 1996; Wood et al., 2001). A comprehensive understanding of developmental change in college drinking has not yet emerged from the literature. Although students may bring high school drinking patterns to college (Wechsler et al., 1994; Weitzman et al., 2003; Yu and Shackel, 2001), continuation or variation in those patterns is likely to be affected by later experiences, including those in the college context itself. Living in a dormitory or apartment, for example, entails diminished exposure to parental controls and more frequent exposure to peer influences, as well as to opportunities to engage in such problem behaviors as drinking and the use of other drugs (Bachman et al., 1996; D'Amico et al., 2005; Maggs, 1997; Read et al., 2005; Schulenberg and Maggs, 2002). In addition, the new and unfamiliar college environment may include expectations and challenges that, at least for some students, can result in increased stress, lowered self-esteem, and depression, all of which constitute vulnerability to involvement in problem behaviors (e.g., heavy alcohol use) (Aseltine and Gore, 1993; Gore et al., 1997).

The protection/risk model applied in the present longitudinal research comprises a systematic set of protective and risk factors, derived from the instigations and

controls constructs in Problem Behavior Theory (see Jessor, 1991; Jessor et al., 1995), that take into account key aspects of the college context and of the individual student. The test of the model engages three research objectives: (1) to establish that psychosocial and behavioral protective factors and risk factors can account for variation in college students' heavy episodic drinking, (2) to examine whether protection moderates the impact of exposure to risk on college students' heavy episodic drinking, and (3) to explore whether changes in protective and risk factors can account for changes in heavy episodic drinking during the early college years.

Method

Study Design, Participants, and Procedures

Data for this study are from a 2-year, three-wave longitudinal study of alcohol use among college freshmen at the University of Colorado (CU), Boulder. A self-administered 32-page Survey of Personal and Social Development at CU (SPSD) questionnaire included well-established measures of a broad range of theoretically derived psychosocial and behavioral protective and risk factors (Jessor, 1991; Jessor et al., 1995, 2003), as well as of alcohol use. Privacy of responses was safeguarded by a Confidentiality Certificate, which was obtained from the National Institutes of Health.

In the fall of 2002, first-semester freshman students who were at least 18 years old and had just graduated from high school ($N = 975$; 548 men) participated in Wave 1 of the survey. The Wave 1 participants were closely representative of the entire freshman class. There were no significant differences between students in the Wave 1 sample and the other students in the freshman class ($N = 4,094$) on high school grades, admission test scores, or their grades at the end of the first year of college. The gender and racial/ethnic composition of the Wave 1 sample was not only similar to the composition of the entire freshmen class, but also to the composition of undergraduate students attending colleges and universities across the U.S. (see Wechsler et al., 1998b). A majority (56%) of the Wave 1 participants were male and 54% were in-state (Colorado) residents. Most (87%) of the sample self-described as white; 5% as Hispanic/Latino, 1% as African American, 5% as Asian American, and 2% as American Indian. Sixteen percent of participants (23% of the women, 11% of the men) were affiliated with a fraternity or sorority.

To achieve an adequate-sized sample representative of the freshman class, participants were recruited by two means: (1) mail and email sent to a stratified random sample of freshmen drawn from university records, and (2) flyers inviting freshmen to participate, posted in each building in which the survey was administered. The students received payment for filling out the questionnaires, and all participants signed informed consent forms.

Students recruited by mail ($n = 282$) and by flyers ($n = 693$) were compared on their Wave 1 demographic characteristics and on Wave 1 psychosocial and behavioral measures from the SPSPD. Of the students recruited by mail, a majority (54%) were women; of those recruited by a flyer, a majority (60%) were men. In-state students were 63% of

the mail subsample and 51% of the flyer subsample. There were about equal proportions of each subsample that were nonwhite and equal proportions that were affiliated with a fraternity or sorority. Participants recruited by mail were generally more conventional and less prone to problem behavior, compared with students recruited by flyer and with the population of freshman students as a whole. Despite these observed subsample mean differences, relations between the predictors and criterion were not biased by subsample differences. In separate regression analyses a subsample dummy variable was included, along with its interaction with each protective and risk factor. There were no significant interactions with the dummy variable (i.e., the effects of the predictor measures did not differ between the two subsamples). Combining the two subsamples provided the final Wave 1 sample ($N = 975$) that, as noted earlier, was representative of the CU freshman class as a whole and provided the increased variability sought on the key measures in the research.

Wave 2 data and Wave 3 data were collected from students still enrolled at the university in the spring of 2003 and in the spring of 2004, respectively. At Wave 2, 785 of the Wave 1 participants were resurveyed (this number represented 81% of Wave 1 participants, and 86% of those participants still enrolled at CU). At Wave 3, 709 Wave 1 participants (73%; 85% of those still enrolled at CU) were resurveyed. The effect of attrition bias on the final regression models was tested with a two-stage selection model (Berk, 1983; Heckman, 1979). Inverse mills ratios, a transformation of the predicted probabilities of dropout and other nonparticipation in the subsequent waves (Dubin and McFadden, 1984), were included in supplementary regression analyses; there was no evidence that nonrandom attrition from the sample biased the relations between protective and risk factors and the heavy episodic drinking criterion measure.

In order to focus on variation among drinkers, the sample for analysis was restricted to those students who had ever drunk alcohol by at least one of the three waves of the survey. Abstainers (those who reported never having drunk alcohol; $n = 84$) were excluded from analyses.

Measurement of Heavy Episodic Drinking

Heavy episodic drinking was assessed with the question, "In the past month, how many times did you drink five or more drinks when you were drinking?" Responses ranged from "never" to "more than twice a week," on a 7-point scale. This criterion measure correlated with measures of two other indicators of problem drinking as follows: Correlation was .84 with an item that assessed frequency of drunkenness in the past month and .40 with a seven-item scale that assessed negative consequences of drinking in the past month (e.g., getting into trouble with one's parents, and having problems at school or with schoolwork). These data provide support for the validity of the heavy episodic drinking criterion measure.

Prevalence of drinking and heavy episodic drinking. At Wave 1, when study participants were first-semester freshmen, more than three fourths of the students (76% of

men and 80% of women) reported that they had drunk alcohol in the past month, and 53% (58% of men and 47% of women) reported heavy episodic drinking at least twice in the past month. Recent national surveys indicate that two thirds of students had drunk alcohol in the past month and that 39%–44% reported heavy episodic drinking in the past 2 weeks (Johnston et al., 2004; Wechsler et al., 2000). The descriptive findings from the present sample are generally consistent with those from national-sample surveys with respect to alcohol use; however, prevalence of drinking in the past month and of heavy episodic drinking was somewhat higher in the present sample.

Comparisons across sociodemographic groups on heavy episodic drinking. Consistent with prior research (Baer, 2002; Ham and Hope, 2003), heavy episodic drinking mean scores were significantly higher ($p < .01$) for men than for women, for white students than for nonwhite students, and for fraternity/sorority members than for nonmembers. In addition, out-of-state students reported more frequent heavy episodic drinking than did in-state students ($p < .001$). In the multivariate regression analyses reported below, sociodemographic differences were partialled out.

Measurement of Psychosocial and Behavioral Protective Factors and Risk Factors

Three types of psychosocial protection (models, controls, support) and three types of psychosocial risk (models, opportunity, vulnerability) were measured. Each multiple-item measure was constructed by standardizing the items to give them equal weight and taking their mean.

Measurement of psychosocial protective factors. Models protection/family is a six-item scale ($\alpha = .75$) that assesses parental models for health-enhancing behavior (e.g., “Do your parents [or the adults who raised you] pay attention to eating a healthy diet themselves?”). Having such models encourages participation in health-enhancing behaviors and avoidance of health-compromising behaviors (e.g., excessive alcohol use). Models protection/peers is a five-item scale ($\alpha = .63$) that assesses friends as models for conventional behavior (e.g., “How many of your friends do volunteer work in the community?”). Having such models reflects greater involvement with conventional peers and more exposure to conventional activities.

Controls protection/social comprises 10 items ($\alpha = .78$) derived from three multiple-item scales that assess social regulation: (1) parental disapproval of problem behavior (e.g., “When you were in middle school and high school, how did your parents feel about kids who drank alcohol?”); (2) friends’ disapproval of problem behavior (e.g., “How do most of your friends or acquaintances at CU feel about someone your age using marijuana?”); and (3) friends’ controls against transgression (e.g., “If your friends or acquaintances at CU thought you were violating CU’s policy about academic dishonesty, would they try to stop you?”). Perceived social disapproval should serve as a social control that inhibits norm-violative behavior, including heavy episodic drinking. Controls protection/individual is composed of 15 items ($\alpha = .78$) derived from four multiple-item scales that assess attitudinal

intolerance of deviance (e.g., “How wrong do you think it is to cheat on tests or homework?”); religiosity (e.g., “How important is it to you to rely on religious teachings when you have a problem?”); positive attitude toward college (e.g., “I’m satisfied with the education I’m receiving at CU”); and perceived health effects of health-compromising behavior (e.g., “Do you think regular use of alcohol can have an effect on the health of people your age?”). These various aspects of personal regulation should deter engaging in behaviors (e.g., excessive alcohol use) that may be detrimental to health as well as violative of conventional social norms.

Support protection was measured using five items ($\alpha = .72$) that assess family closeness (e.g., “It’s fun when my family does things together”) and express interest and support from teachers (e.g., “My teachers at CU try to help students when they are having problems”). Positive relationships with adults, both at home and in college, provide a supportive environment for conventional behavior; behavior that violates social norms may risk the loss of that support.

Measurement of psychosocial risk factors. Models risk/peers is an eight-item scale ($\alpha = .77$) that assesses social models for substance use among friends and among other students at the university (e.g., “How many of your friends or acquaintances at CU use marijuana?”). Exposure to peer models for substance use can influence students to engage in these behaviors.

Opportunity risk was assessed by an item that asks, “If you wanted some beer, wine, or liquor, how easy would it be for you to get some?” Social contexts that offer easy availability of alcohol should enhance the likelihood of engaging in heavy episodic drinking.

Vulnerability risk/peers is measured using a three-item scale ($\alpha = .67$) that assesses perceived peer pressure to smoke and drink (e.g., “Do your friends or acquaintances at CU ever encourage you to get drunk?”). Social pressure to smoke and drink constitutes a self-evident risk factor for substance use, including heavy episodic drinking. Vulnerability risk/individual is composed of eight items ($\alpha = .68$) derived from two multi-item component scales, both of which measure personal vulnerability to problem behavior: felt stress (e.g., “In the past month, how much stress or pressure have you felt because of your schoolwork?”) and low self-esteem (e.g., “How well do you make decisions about important things in your life?”). High levels of stress and low self-esteem both constitute psychosocial risk because substance use, including heavy episodic drinking, may be perceived and used as a way to cope with negative feelings.

Measurement of the behavioral protective factor. Behavioral protection was assessed using an item asking about frequency of attendance at church or religious services during the past month. Attendance at religious services constitutes behavioral protection because it tends to promote orientations and social networks incompatible with behaviors that violate social norms.

Measurement of behavioral risk factors. Behavioral risk was assessed with measures of three other problem behaviors—cigarette smoking, marijuana use, and delinquent-type behavior. Cigarette smoking was assessed with the item: “During the past month, how many cigarettes have you smoked on an average day?” Response options ranged from 1 (“none at all”) to 9 (“about 2 packs or more a

day”). Marijuana use was measured with the item: “In the past month, how often have you used marijuana (or hash)?” Response options ranged from 1 (“not at all”) to 7 (“every day”). On the latter two measures, never-users were assigned a score of zero. Delinquent-type behavior is a seven-item scale ($\alpha = .71$) that assesses frequency in the past month of engaging in the behaviors stealing, cheating, vandalism, and aggression. Smoking and marijuana use constitute risk because they also involve substance use. Participation in delinquent-type behavior suggests a general tolerance for norm-violating behaviors that may also include heavy episodic drinking.

All bivariate correlations of the protective and risk factors with the heavy episodic drinking criterion measure were significant and in the theoretically expected directions, except two that were essentially zero (models protection/family and vulnerability risk/individual). The predictors with the largest correlations were controls protection/social ($-.38$), models risk/peers (.38), cigarette smoking (.33), and marijuana use (.42); the other correlations were in the .10s and .20s.

Results

Accounting for College Student Heavy Episodic Drinking: A Test of the Explanatory Model

In order to summarize, in a single analysis, the key patterns in the data across the three separate waves, the heavy episodic drinking criterion measure was regressed on the set of protective and risk factors in a random-effects maximum likelihood linear regression analysis (Johnson, 1995). The data were transformed into a pooled time-series data set. Each participant contributed one record for each wave for which he or she reported having ever drunk alcohol and had complete data for this analysis ($n = 858$). The data wave in which each observation was recorded is indicated by a variable for the number of months that students had been in college at that wave. Because the factors that affect heavy episodic drinking may be correlated over time, within students, independence among the observations cannot be assumed. The random-effects model accounts for this nonindependence and accurately estimates the standard errors (Rabe-Hesketh and Everitt, 2004) by fitting a linear regression that allows individuals to deviate from the mean intercept, while observations can deviate from individual-specific intercepts. (Additional analyses, using random-effects ordered logistic regression for the pooled time-series data, found results that were similar in direction, magnitude, and level of significance; not tabled, tables available from the authors.)

Results from the random-effects linear regression analysis are shown in Table 7.1. Frequency of heavy episodic drinking was significantly ($p < .05$) associated with two of the five psychosocial protective factors (controls protection/social and controls protection/individual); with three of the four psychosocial risk factors (models risk/peers, opportunity risk, and vulnerability risk/peers); with the behavioral protective

Table 7.1 Random-effects maximum likelihood linear regression and fixed-effects maximum likelihood linear regression of heavy episodic drinking on psychosocial and behavioral protective and risk factors: Final model, Waves 1–3^a

Measures entered	Random-effects model <i>b</i> , ^b final step	Fixed-effects model <i>b</i> , ^b final step
Sociodemographic background		
Months in college	.02 [‡]	.02 [‡]
Gender (male = -1, female = 1)	-.25 [‡]	^c
In-state student	-.15 [†]	–
Fraternity/sorority	.50 [‡]	–
Nonwhite	-.40 [†]	–
Socioeconomic status	.00	–
Psychosocial protective factors		
Models protection/family	.07	.08
Models protection/peers	.01	.00
Controls protection/social	-.47 [‡]	-.50 [‡]
Controls protection/individual	-.22 [*]	-.32 [*]
Support protection	.04	.13
Psychosocial risk factors		
Models risk/peers	.47 [‡]	.29 [†]
Opportunity risk	.12 [†]	.11 [*]
Vulnerability risk/peers	.10 [*]	.09
Vulnerability risk/individual	-.13	-.03
Psychosocial protection × Risk interactions		
Models protection/family × Vulnerability risk/peers	-.13 [*]	-.15 [*]
Support protection × Vulnerability risk/individual	-.28 [†]	–
Models protection/peers × Models risk/peers	–	-.18 [§]
Behavioral protective factor		
Church attendance	-.12 [†]	-.08 [§]
Behavioral risk factors		
Cigarette smoking	.25 [‡]	.05
Marijuana use	.34 [‡]	.12
Delinquent behavior	.04	.01

Notes: *N* = 858, each with complete data from at least one of the three waves of the survey; no. of observations = 2053

^aThese analyses include only those who were ever-drinkers in at least one wave

^bUnstandardized regression coefficients; standardized coefficients are inappropriate with interaction terms (see Aiken and West, 1991, pp. 40–47)

^cThe relationship between heavy episodic drinking and time-invariant variables—gender, residency, participation in Greek life, race, and socioeconomic status—cannot be estimated in fixed-effects models

[§]*p* < .10

^{*}*p* < .05

[†]*p* < .01

[‡]*p* < .001; one-tailed test *t* tests

factor (church attendance); and with two of the three behavioral risk factors (cigarette smoking and marijuana use). Thus, at least one measure in each of the four sets of theoretical predictors was significant in the random-effects regression model, indicating that each type of protection and risk is relevant in the account of heavy episodic drinking (i.e., some unique variance was accounted for by each set of predictors).

To test for moderator effects, interactions between psychosocial protective and risk factors and between behavioral protective and risk factors were tested for significance, and the model was then re-estimated, omitting the nonsignificant interactions. Models Protection/Family moderated the effect of Vulnerability Risk/Peers, in that the positive relationship between Vulnerability Risk/Peers (peer pressure) and heavy episodic drinking is attenuated for students with above-average levels of Models Protection/Family. In addition, Support Protection moderated the effect of Vulnerability Risk/Individual. Vulnerability Risk/Individual (stress, low self-esteem) is not a significant risk factor for most students, except for those students with low levels of Support Protection.

The proportion of criterion variance accounted for by the set of protective and risk factor measures is not available from the random-effects maximum likelihood regression analysis but can be determined from ordinary least squares (OLS) regression analysis of the data from each wave. Those analyses (not tabled; tables available from the authors) showed that, after controlling for sociodemographic background variables, the protective and risk factors accounted for an additional quarter of the variance in heavy episodic drinking in each of the three data waves (22%, 23%, and 27%). OLS regression analyses also provide the proportion of variance accounted for uniquely by each set of theoretical predictors—psychosocial and behavioral protection and risk factors—by assessing the decrease in R^2 when each set is deleted, in turn, from the complete model (Cohen and Cohen, 1983). The largest proportion of unique variance was accounted for by the behavioral risk factors, ranging from 4% to 6% across the three waves. Psychosocial risk accounted uniquely for 2%–6% of variance; psychosocial protection accounted uniquely for 1%–2%; and behavioral protection accounted uniquely for less than 1% in each wave.

Overall, these findings provide support for the protection/risk explanatory model in relation to the first two research objectives: The protection/risk model provides a substantial account of variation in college-student heavy episodic drinking; each type of protective and risk factors is important in that account; and there is evidence for protection moderating the effects of exposure to risk.

Accounting for Developmental Change in College-Student Heavy Episodic Drinking

To determine whether the same explanatory model can account for developmental change in heavy episodic drinking, a fixed-effects maximum likelihood linear regression model was used to examine the relationship between changes in the protective and risk factors and changes in heavy episodic drinking across the three

waves of data and the 14-month interval. Fixed-effects regression estimates the effect of intra-individual changes in the independent variables on intra-individual changes in the dependent variable (Allison, 1994; Johnson, 1995), while removing any bias in coefficients that results from observed or unobserved factors that do not change over time. Thus, effects of the time-invariant sociodemographic measures cannot be estimated and are not included in this analysis. Fixed-effects models control for time-invariant but unobserved differences that may emerge when using samples that are less than perfect random samples (Stata Corporation, 2003).

The results of the fixed-effects regression of change in heavy episodic drinking on changes in the predictors are also shown in Table 7.1. The positive coefficient for the months-in-college measure indicates that the average student increased his or her frequency of heavy episodic drinking across the three waves. Among the psychosocial protective factors, changes in controls protection/social and controls protection/individual were, as expected, negatively associated with changes in heavy episodic drinking. These are the same predictor measures that were significant in the random-effects model. Among the psychosocial risk factors, changes in models risk/peers and opportunity risk were positively associated, as expected, with changes in heavy episodic drinking. None of the behavioral protective and risk factors was significant, indicating that change in heavy episodic drinking was not related to within-person variability in these other behaviors over time, after controlling for changes in psychosocial protection and risk.

Change in Models Protection/Family moderated the relationship between change in Vulnerability Risk/Peers and change in heavy episodic drinking, in that change in Vulnerability Risk/Peers was more strongly associated with change in heavy episodic drinking for those students who decreased in Models Protection/Family. Models Protection/Family was also one of the significant moderators in the random-effects analysis. An additional moderator effect was just over the .05 significance level ($p = .054$); change in Models Risk/Peers was more strongly associated with change in heavy episodic drinking for those students who decreased in Models Protection/Peers.

To examine further the relationship between within-individual changes in heavy episodic drinking and within-individual changes in protection or risk at the person level, mean changes in protection and risk were examined within two subgroups: (1) students whose heavy episodic drinking increased from Wave 1 to Wave 3 (45% of the Wave 1 ever-drinkers) and (2) students whose heavy episodic drinking stayed the same or decreased. Analyses of variance (not tabled; tables available from the authors) showed that, although there was an increase in controls protection/social for both subgroups, the increase was significantly smaller for those students whose heavy episodic drinking increased. Church attendance declined more for those whose heavy episodic drinking increased than for those whose heavy episodic drinking stayed the same or decreased. With regard to the risk factors, there were increases over time in most of the risk factors in both subgroups (peer models for substance use, availability of alcohol, peer pressure for substance use and marijuana use); however, the increases were significantly larger for those students whose heavy episodic drinking increased.

In summary, developmental change in heavy episodic drinking over the first 2 years of college was primarily associated with change in aspects of the social environment (controls protection/social, models risk/peers, and opportunity risk), as well as with change in controls protection/individual; the effect of change in vulnerability risk/peers was attenuated for those who increased in models protection/family. Interactions of gender with the protective and risk factors in all regression models were tested for significance, and, with only one exception (in the Wave 2 OLS regression), parameter estimates did not differ for men and women.

Discussion

The findings provide support for the psychosocial and behavioral protection/risk explanatory model, accounting for significant variation in heavy episodic drinking in this sample of college students. Both protective factors and risk factors contributed uniquely to the variance accounted for. The lower the protection and/or the higher the risk, the more frequent the engagement in heavy episodic drinking. There is also empirical support for the role of psychosocial protection as a moderator of the impact of psychosocial risk on heavy episodic drinking. Findings were similar across three separate data waves and across alternative analytic methods, and they apply similarly to college men and college women. The explanatory model also accounted significantly for change in heavy episodic drinking across the first 2 years of college.

It is important to note that it was the social contexts in which college students are embedded—both family and peer contexts—that emerged as salient in these analyses. Although their salience could, of course, depend on the adequacy of the individual-level measures, it is the case that measures of controls protection/individual, especially intolerance of deviance, have historically been strong and consistent predictors of problem drinking and other problem behaviors in samples of secondary school students, college students, and young adults (Jessor and Jessor, 1977; Jessor et al., 1991). Coefficients for controls protection/individual in both the random-effects and fixed-effects models, although significant, are considerably weaker than those for controls protection/social. Controls protection/social (a composite measure that included both peer controls and parental and peer disapproval) and models risk/peers generally had the largest main effects on heavy episodic drinking. Controls protection/social had also emerged in earlier research as a key protective factor in relation to alcohol use and other problem behavior involvement among students in middle school and high school (Costa et al., 2005). The importance of peer models as a social-context risk factor is also consistent both with earlier applications of the protection/risk model to samples of secondary-school students (Costa et al., 1999, 2005; Jessor et al., 2003) and with current literature on college drinking (Borsari and Carey, 2001; Ham and Hope, 2003; Schulenberg and Maggs, 2002).

Consistent evidence was found for two moderator effects. Although vulnerability risk/individual was not a significant risk factor for the sample as a whole, the moderator effect of support protection indicates that vulnerability risk/individual (high stress and low self-esteem) is, indeed, associated with more frequent heavy episodic drinking for those students with low perceived support from parents and teachers. The moderator effect of models protection/family indicates that when models protection/family (parental models for health-enhancing behavior) was high, the impact of vulnerability risk/peers (peer pressure for drinking and smoking) on heavy episodic drinking was attenuated. These moderator findings suggest that positive adult influences (support and models) can diminish the impact of risk factors on heavy episodic drinking among college students.

Establishing significant moderator effects is important for the theory behind the protection/risk explanatory model. It is well established that moderator effects are difficult to detect in nonexperimental field studies and that effects are typically small, involving only from 1% to 3% of the variance (Chaplin, 1991; McClelland and Judd, 1993). In the present study, the moderator effects (accounting for about 1% of variance) are noteworthy for their consistency across both random- and fixed-effects regression analyses.

Consonant with findings from other research in samples of college students (Fenzel, 2005; Kim et al., 1997; Wechsler et al., 1995), more frequent church attendance was associated with less frequent heavy episodic drinking; other problem behaviors (e.g., cigarette smoking and marijuana use) were associated with more frequent heavy episodic drinking. These findings are also consonant with the covariation that has been well-established among various problem behaviors (Donovan and Jessor, 1985; Donovan et al., 1988; Elliott, 1993; Jessor and Jessor, 1977; Osgood et al., 1988).

Heavy episodic drinking, the focus of this study, is only one facet of a pattern of problem drinking in college. Frequency of drunkenness was also examined as a criterion measure in additional regression analyses, and results were very similar to those for the heavy episodic drinking measure; proportions of variance accounted for were similar and the key predictors from the explanatory model were essentially the same ones.

As in many other studies (Fenzel, 2005; Ham and Hope, 2003), college men in the present study reported higher frequencies of heavy episodic drinking than did college women. Despite this expected difference in mean levels, the same psychosocial and behavioral protective and risk factors, with only one exception, were related to heavy episodic drinking for both men and women in both the cross-sectional and the longitudinal analyses. The absence of gender differences in the ways in which protective and risk factors influence heavy drinking among college students is an important finding, and it is also consistent with recent findings of others (Fenzel, 2005).

The salience of contextual protective factors in the present findings suggests the importance of intervention efforts targeted at the context of college life itself. Controls and supports were the most salient aspects of context, emphasizing the role of rules, regulations, and clear standards in a supportive environment. The signifi-

cance of adult figures (parents and teachers) in the lives of college students was reinforced by the findings that parent and teacher support moderated the impact of personal vulnerability risk (stress and low self-esteem) on students' heavy episodic drinking and that parent models for health behavior moderated the impact of peer pressure for substance use. Last, the relationships of the behavioral risk measures (cigarette smoking and marijuana use) with heavy episodic drinking suggest that intervention efforts might well target the larger pattern of substance use behavior, rather than programming for each of the behaviors separately.

There are several limitations to the study that should be emphasized. First, the sample was drawn from a single university and this, of course, constrains the generalizability of the findings. Nevertheless, since the primary aim of the study was to test the adequacy of an explanatory model, a single university sample is entirely appropriate for that objective. Replication of the model in tests on other campuses seems a promising undertaking. The findings are also consistent with findings when the model was applied to students in secondary school (Costa et al., 1999; Jessor et al., 2003). A second limitation is that participants did not constitute a random sample. They did constitute about one fifth of the entire freshman class, however, and they were shown to be closely representative of that class on indicators of academic achievement, race/ethnicity, and gender.

A third limitation is that measurement of several variables relied on a single item. A single-item measure of heavy episodic drinking is widely used, however (Ham and Hope, 2003), and in the present study it was shown to correlate substantially with other measures of problem drinking (i.e., frequency of drunkenness and negative consequences of drinking). In addition, the four single-item measures of the protection and risk predictors all emerged as consistent and significant predictors of the heavy episodic drinking criterion measure, consonant with our earlier research.

The results were consistent, overall, in three separate data waves, across different analytic methods, in both cross-sectional and longitudinal analyses, and for both genders. The study has shown that the protective and risk factors articulated in the explanatory model play a significant role in college-student heavy episodic drinking across the early college years.

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Part II
Health-Related Problem Behaviors:
Marijuana Use

Chapter 8

Marijuana Use in High School and College

Richard Jessor, Shirley L. Jessor, and John Finney

The prevalence of marijuana use among youth, in spite of the fact that it is illegal and carries the possibility of harsh legal sanctions, constitutes a phenomenon of substantial social-psychological interest. Studies of marijuana use considered as a transgression should be able to contribute to the social psychology of problem behavior; research on marijuana use from the point of view of its role among youth should contribute to the social psychology of adolescent development; and investigation of marijuana use as a socially learned behavior should reveal something useful about the more general problem of personality-environment interaction. Unfortunately, with a few exceptions, most of the drug use research thus far has remained descriptive or epidemiological with little concern for broader social-psychological implications.

The present research on marijuana use is part of a larger, ongoing study of the socialization of problem behavior in youth. The general orientation we have employed is that of social learning theory (Rotter, 1954; Rotter, Chance, & Phares, 1972) as extended and applied to the area of deviance or problem behavior (Jessor, Carman, & Grossman, 1968a; Jessor, Collins, & Jessor, 1972; Jessor, Graves, Hanson, & Jessor, 1968b; Jessor & Jessor, 1973; Jessor, Young, Young, & Tesi, 1970; Weigel & Jessor, 1973). Conceptualizing marijuana use as problem behavior is useful in several respects. First, treating it as a specific instance of a more general class of behaviors establishes a logical basis for its covariation with other problem behaviors, a basis which would not exist if drug use were approached as a unique phenomenon. Second, such a conceptualization suggests the kinds of explanatory variables that should be brought to bear—namely, those personal and social variables that can logically account for the

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occurrence of behaviors likely to elicit negative sanctions from established agents of social control. Third, since concern with much of youthful problem behavior is not simply with whether or not an individual engages in it but also with whether he engages in it earlier or later than his peers, the utility of Problem Behavior Theory is that it can be applied with equal logic to this issue of differential age of onset.

As with any other class of behavior, problem behavior such as marijuana use is considered to be purposive, goal oriented, or functional. Functions of problem behavior which may be important enough to the actor to counter the likelihood of negative sanctions, or which may derive from the very fact that the behavior is deemed sanctionable by those in authority, include the following: (a) an instrumental effort to achieve otherwise unavailable goals; (b) a learned way of coping with personal frustrations and anticipated failure; (c) an expression of opposition to or rejection of conventional society, including the very norms which define the behavior as a problem; (d) a negotiation for or claim upon status transformation or developmental transition; and (e) a manifestation or demonstration of solidarity with peers or of membership in a subculture. Given the variety and complexity of these possible alternatives, no single personality or situational variable is likely to provide a sufficient explanation of such problem behaviors as marijuana use. What has seemed to us to be required is a multivariate network of both person and situation attributes logically connected with the behavior involved.

The general network we have employed has been described elsewhere (see Jessor, Graves, Hanson, & Jessor, 1968b, especially Chaps. 2–5). The portions of it dealt with in this study include a personality system, a perceived environment system, and a behavior system. The personality system is composed of three related structures (a motivational instigation structure, a belief structure, and a personal control structure), and each structure consists of specific variables linked directly or indirectly to the occurrence of problem behavior. The perceived environment system is composed of a distal and a proximal structure, the former referring to variables in the environment which are only indirectly implicative of the behavior of concern (e.g., value compatibility between parents and peers), and the latter being composed of environmental variables linked quite directly or closely to the behavior (e.g., perceived social support for marijuana use). The behavior system includes the behavior under consideration and the functions or meanings associated with it, other kinds of problem behavior, and, for purposes of establishing discriminant validity, behaviors which are nonproblem, that is, which are conventional or conforming.

Considering such a social-psychological network in relation to a behavior such as drug use makes clear the insufficiency of explanations which emphasize only a small portion of it. For example, attempts to account for the prevalence of marijuana use among students by reference to its normative status in the peer group or in the student culture are logically unable to account for its nonuse by a substantial percentage of students in the same situation, or to account for which of the students are users and which are not. Personality or individual difference variables are obviously necessary to accomplish the latter objectives.

Four general hypotheses were examined in the marijuana use data to be presented in this paper. First, marijuana use should covary with other kinds of problem behaviors since they occupy a similar location in the conceptual network. Second,

variation in marijuana use should be systematically related to variation in the personality and perceived environment variables specified in the network. Third, the onset of marijuana use among nonusers should be predictable, over a time interval, from initial differences on those same personality and social variables measured at the beginning of the interval. And fourth, irrespective of initial differences, those who begin marijuana use during the time interval should manifest greater relative change on the personality and social variables, in the theoretically expected direction, than those who remain nonusers. Examination of the latter two hypotheses is possible because of the longitudinal design of the larger project. Tests of all four hypotheses are replicated at the high school and college levels and, within those levels, among males and females.

By turning now to the specific variables in the network that has been outlined, we can present some of the content of the social psychology of marijuana use. With respect to the variables in the personality portion of the network, both values and expectations are considered to motivate behavior choice. Value for a conventional goal such as academic achievement should be negatively related to marijuana use, whereas value for the goal of independence should relate positively. More critical to explaining actual behavioral directionality should be *the relation between* these two values which have opposite implications—the more independence is valued *relative to* the value placed on achievement, the more likely is involvement with marijuana. Expectation for academic achievement, when low, should conduce to engaging in alternative nonconventional behaviors, including marijuana use. The two belief variables, alienation and social criticism, should be positively related to marijuana use. Alienation, as we measured it, emphasizes a belief about self, including a sense of isolation from others, concern about identity, and role dissatisfaction. Social criticism emphasizes a belief about the larger, American society, especially a conviction about the inadequacy of its policies, its mores, and its institutions. The personal control structure includes a variable of attitudinal tolerance toward transgression and a variable of religiosity—the more tolerant the attitude and the less religious the outlook, the greater the likelihood of involvement with problem behavior such as marijuana use. Thus, the personality system is linked to problem behavior through the interaction of variables reflecting both instigation and controls. It is of interest to note that those variables are all relatively distal from actual marijuana use itself; that is, their connection to the behavior is theoretical rather than immediately obvious. The empirical findings about such distal personality variables are, therefore, of special importance for evaluating the utility of the social-psychological network.

With respect to the perceived social environment, the distal portion consists of two variables related to agents of socialization: parent-peer compatibility, and parent-peer influence. The former variable refers to the degree of consensus between parents and friends in their general expectations and values for the actor, and the latter refers to the relative importance attributed by the actor to parents' and friends' opinions. Insofar as the perceived social environment is relatively peer oriented rather than parent oriented, to that extent there should be greater involvement with marijuana. The environmental variables which are proximal—social support for drug use and friends' approval for drug use—refer to perceived models and pressure in the social environment to engage in drug use and expected criticism or approval

from peers for doing so. Obviously, the greater the social support and approval, the more likely is the use of marijuana.

With respect to the variables in the behavior system, the more the involvement with marijuana, the more likely is involvement with other problem or problem-prone behaviors such as drunkenness, general deviant behavior (lying, stealing, aggression), sexual behavior, and activism and the less likely is involvement with conventional behavior such as church attendance, academic achievement (grades), and participation in school clubs and organizations.

To summarize, the social psychology of the student marijuana user that emerges from this network of variables includes: (a) greater instigation to use (stemming from higher value on independence, lower value on achievement, and lower expectations for achievement); (b) lesser belief controls against use (greater social criticism and alienation); (c) lesser personal controls against use (greater tolerance of transgression and lesser religiosity); (d) greater environmental support for use (greater peer orientation and greater models and supports); and (e) greater experience with other behaviors of a problem or problem-prone nature. From this perspective, marijuana use, like other learned behaviors, is a functional outcome of the interaction of personality, social, and behavioral attributes.

Method

Subjects

The subjects of this research were drawn from two separate but parallel longitudinal studies, one of junior and senior high school students and one of college students in a large university in the same community in one of the Rocky Mountain states. For the high school study, a random sample of 2,220 students, stratified by sex and grade level, was designated from the enrollment at three junior and three senior high schools. The entire sample was contacted individually by letter and asked to participate in a 4-year study of personality and social development in youth. Parents of each student sampled were also contacted by letter and asked for signed permission for their child's participation in the research. Of the originally designated sample, an initial Year 1 cohort of 949 students agreed to participate, and the Year 1 data were collected in April 1969.¹ Of those who had not graduated in the interim, 81%

¹Although persistent follow-up efforts were made to gain the cooperation of the 2220 subjects initially designated, the fact that parental permission was a necessity and the fact that participation required remaining after school for 1½ hours or so on a spring afternoon both contributed to the lower than desirable initial percentage of participation. The fact that only 42% of the originally designated random sample of students ultimately participated in the research means that findings on the starting cohort cannot be generalized back with confidence as descriptive of the school population. While this limitation is unfortunate, it does not in any way preclude the testing of hypotheses nor does it diminish the significance of developmental analyses of the starting cohort itself.

($N = 692$) of the initial cohort were retained in Year 2 (April 1970), and of the latter, 82% ($N = 605$) were subsequently retained in Year 3 (April 1971). The cross-sectional data reported in this paper were drawn from the Year 2 testing, while the data for the analyses of change involved both the Year 2 and the Year 3 testing. In Year 2, subjects were in Grades 8 through 12; in Year 3 subjects were in Grades 9 through 12.

The college study was begun a year after the initiation of the high school study. A random sample of 497 freshmen students, stratified by sex, was drawn from the registration list of the freshman class in the College of Arts and Sciences of the University. Of the designated sample, 276 freshmen agreed to participate, and the Year 1 data in the college study were collected in April 1970. Of the initial cohort of 276 students, 248 (90%) were retained in Year 2 (April 1971). The cross-sectional data reported for the college study were drawn from the Year 1 testing, the same year (1970) used for the high school cross-sectional data, and the college change analyses involved both the Year 1 and Year 2 data. Thus, comparisons between the two studies always are referring to the same point or the same interval in time.

Procedure

Data were collected by means of an elaborate questionnaire approximately 50 pages in length and requiring about 1½–2 hours to complete. The questionnaire consisted largely of psychometrically developed scales or indexes assessing the personality, social, and behavioral variables mentioned earlier, as well as other concepts not dealt with in this paper. Many of the measures had been devised and validated in earlier research and are described in previous publications (Jessor, Graves, Hanson, & Jessor, 1968b). Further details about the content of the questionnaire and the types of measures used may be found in Jessor (1969) and in Jessor et al. (1972). For nearly all of the measures dealt with in this paper, Scott's homogeneity ratios and Cronbach's alphas indicate adequacy of scale properties.

Questionnaires were administered in small group sessions outside of class hours. Although all subjects signed their names to the final page of the questionnaire to permit follow-up over time, a guarantee of complete confidentiality was given. Name sheets were removed from questionnaires and stored in a safe-deposit box in a bank vault, and all data were subsequently analyzed by code number only. Interest in the research was uniformly high, and the quality of the data was generally excellent.

Establishment of the Drug User Groups

A 4-page section of the questionnaire dealt with various aspects of drug use experience including perceived social support for use, positive and negative functions of use, use of LSD and amphetamines as well as marijuana, the nature of the initial experience with drugs, and the frequency of use of the various drugs during the

preceding 6 months. Included in this section were four questions designed as a scale of increasing involvement with marijuana and referred to as the marijuana behavior report (MBR) scale:

1. Have you ever tried marijuana?
Never ____ Once ____ More than Once ____
2. Have you ever been very high or “stoned” on marijuana to the point where you were pretty sure you had experienced the drug’s effects?
Never ____ Once ____ More than Once ____
3. Do you or someone very close to you usually keep a supply of marijuana so that it’s available when you want to use it?
No ____ Yes ____
4. Do you use marijuana a couple of times a week or more when it’s available?
No ____ Yes ____

Each item was scored from 0 to 2 yielding a scale score ranging from 0 to 8. Since the items were of increasing “difficulty,” the lower end of the scale referred to nonuse or to experimentation without commitment to regular use, whereas the upper end of the scale referred to marijuana involvement based on safeguarding an available supply and engaging in regular use. The utility of a similar scale was initially explored with college students by Sadava (1970, 1972b); he found the MBR scale steps to be associated with a variety of factors such as frequency of use, length of time since initial use, social support for use, and commitment to continued future use. Scores on the MBR scale were used in the present research to establish contrasting marijuana involvement groups. In the junior high sample (Grades 8 and 9), the frequency of any degree of involvement at all was too small to enable more than the establishment of two groups within each sex: those with no involvement (MBR score = 0) and those with any involvement (MBR scores = 2–8). In the senior high sample (Grades 10, 11, and 12), *three* groups were established within *each sex*: those with no involvement (MBR score = 0), those with minimal involvement (MBR score = 2), and those with relatively heavier involvement (MBR score = 4–8). In the college sample, the MBR scale was also used to establish three contrasting groups within each sex, the cutting points being slightly different due to the greater proportion of heavier users (MBR scores = 0–2, 4–6, and 8).

The groups established on the basis of MBR scores were used to examine the relevance of the social-psychological variables described earlier, with the general expectation being that groups differing in MBR score differ significantly in the expected direction on the variables in the explanatory network. Thus, these were the groups employed in the analyses of the cross-sectional data used to test our first two hypotheses.²

²An examination was made of the various groups considered in this paper in terms of age and of background or social origin variables, including father’s education, father’s occupation, and fundamentalism of father’s religious group. There were no significant differences on any of these measures for the junior high or the senior high groups, male or female. In the college study, the heavily involved males (MBR score = 8) came from families with fathers significantly higher in education

For testing the latter two hypotheses, those dealing with the shift from nonuse to use of marijuana over a year's interval, another approach to establishing contrasting groups was employed. The aim of this approach was to locate subjects who had never used marijuana in the initial year and who had either remained nonusers or had begun using marijuana by the subsequent year's testing. For this purpose, only Question 1 above was employed. Among the combined junior and senior high school males, there were 158 nonusers who remained nonusers a year later, and 26 nonusers who had become "more-than-once" users by the subsequent year; for the combined high school females, the comparable figures were 215 and 37. For college males, the nonusers who remained nonusers totalled 36, while the number who shifted from nonuser to more-than-once-user status was 14; the comparable figures for the college females were 38 and 12. These contrasting groups were the ones employed to examine whether the measures of the social-psychological variables taken in the initial year were predictive of the shift from nonuser to user status by the subsequent year.

Results

The presentation of results is organized in two sections, the first dealing with the cross-sectional analyses based on the MBR groups and the initial year data, and the second presenting the longitudinal or change analyses based on the nonuser-to-nonuser and the nonuser-to-user groups and employing both initial- and subsequent-year data.

For purposes of providing context and for comparison with other studies, it is useful at this point to describe the prevalence of marijuana use in the high school and college samples in both years. For reported use of marijuana *more than once*, the rates were as follows in 1970: junior high males ($n = 159$), 7% and junior high females ($n = 202$), 9%; senior high males ($n = 130$), 33% and senior high females ($n = 200$), 20%; college freshmen males ($n = 132$), 52% and college freshmen females ($n = 143$), 55%. For 1971 the comparable rates were: junior high males ($n = 85$), 24% and junior high females ($n = 108$), 23%; senior high males ($n = 172$), 34% and senior high females ($n = 236$), 33%; college sophomore males ($n = 120$), 70% and college sophomore females ($n = 128$), 70%. As can be seen, the rates were, with one exception, quite comparable for both sexes at each school level. They increased substantially as school level (or age) increased, and they showed, also with one exception, a marked increase in rates of marijuana use over the 1970 to 1971 interval.³

and lower in religious fundamentalism; however, they were not higher in occupational level. None of the college female differences were significant. Given the overall commonality of demographic background variables, they were not considered useful for inclusion in any further analyses.

³ It is of interest to note that a 1968 survey, at the same university, of the entire student body, including graduate students, reported a rate of only 32% of the respondents having used marijuana (Mizner, Barter, & Werme, 1970).

Part I: Cross-Sectional Analyses

The data relevant to appraising the relationship of the social-psychological variables to variation in marijuana use in the initial year are presented in Tables 8.1, 8.2, and 8.3 for the junior high, senior high, and college freshmen samples, respectively. The separate presentation of the data for these samples, and for both sexes in each sample, enables multiple, independent tests of the hypothesized associations.

The findings in Table 8.1 provide consistent support for the hypothesized relationships between the variables in the social-psychological network and marijuana use. Looking first at the personality system, measures in each structure—motivational instigation, belief, and personal controls—vary as expected between nonusers and any use of marijuana among junior high youth, both male and female. Users value achievement less and independence more than nonusers and also show a greater discrepancy between the two values, in the direction of independence, than do nonusers. They also have lower expectations for achievement, but this is significant only for females. With respect to the belief structure, users tend toward greater alienation and social criticism although only one of the differences reaches significance at the junior high level. In regard to personal controls, the users are substantially more tolerant of deviance and show relatively less religiosity. Turning to the perceived environment, we find that both distal and proximal variables are significantly discriminating, with users perceiving less compatibility between peers and parents, acknowledging greater peer-relative-to-parent influence on their views, and perceiving greater models, pressures, and peer approval for drug use. In terms of theory, the users show greater instigation toward problem behavior and lesser personal controls against transgression; given their greater environmental support for marijuana use, its greater occurrence follows as a logical consequence.

The logic of that consequence is strengthened by the findings for the functions of marijuana use. Despite the fact that their use of marijuana is relatively infrequent, averaging only about once a month, junior high users report substantially less negative functions or meanings (loss of self-control, physical damage) associated with marijuana use, and show a greater discrepancy of positive (self-development, appreciate beauty, being on my own) over negative functions than do nonusers. Other problem or problem-prone behaviors involving alcohol, sex, activism, and general deviant behavior vary directly with marijuana use, and conventional behaviors involving church, school, and clubs and organizations tend to vary inversely.

The data for the senior high sample in Table 8.2 and for the college sample in Table 8.3 are consonant with the findings in Table 8.1, with certain of the variables being even more discriminating among the older groups (for example, the belief measures, especially social criticism) as might be expected.

Considered together, the data from the three samples provide strong and consistent support for the first two hypotheses underlying the research, namely, that marijuana use covaries with other instances of the class of problem or problem-prone behavior and that the personality and social variables in the network are associated as specified with variation in marijuana use. What is especially intriguing about the

Table 8.1 Mean Scores on Personality, Social, and Behavior Measures for Marijuana Involvement Groups: Junior High Sample—Initial-Year Data

Measures	Marijuana involvement groups			
	Females		Males	
	None (n = 174)	Some (n = 28)	None (n = 138)	Some (n = 21)
<i>Personality</i>				
<i>Motivational instigators</i>				
Value-achievement	71.1	55.1****	72.9	63.4**
Value-independence	72.9	77.2*	72.6	78.7**
Independence-achievement value discrepancy	91.5	112.1****	89.7	105.3****
Expectations for achievement	55.3	42.6***	55.6	46.5
<i>Beliefs</i>				
Alienation	36.9	38.3	36.3	37.2
Social criticism	29.3	30.6	28.1	30.6*
<i>Personal controls</i>				
Attitude toward deviance	178.8	135.5****	174.8	125.2****
Religiosity	13.4	11.5**	13.0	11.5
<i>Perceived social environment</i>				
<i>Distal</i>				
Parent-peer compatibility	12.2	9.7****	11.9	10.0**
Parent-peer influence	19.0	21.5**	17.2	23.0****
<i>Proximal</i>				
Social support for drug use	8.8	15.1****	8.1	14.4****
Friends' approval for drug use	1.9	3.0****	1.9	3.0****
<i>Behavior</i>				
<i>Marijuana related</i>				
Frequency use/6 months	.0	5.6***	.0	6.7*
Positive functions marijuana	23.9	25.1	21.5	25.0**
Negative functions marijuana	33.8	22.8****	33.7	24.8****
Positive over negative functions discrepancy	19.1	31.2****	16.9	29.1****
<i>Other behavior</i>				
Deviant behavior	35.4	41.2****	36.6	48.9****
Petting experience	.6	1.4****	.5	1.3****
Times drunk/year	1.3	4.7	1.4	8.5
Activism behavior	1.8	3.4***	2.0	3.9**
Church attendance/year	44.2	24.9**	38.3	14.8**
Grade point average	2.9	2.6	2.7	2.5
Involvement in school clubs	2.0	1.6	1.8	1.0***

Note: Groups are based on marijuana behavior report score: none = 0; some = 2–8. The asterisks next to the means of the some involvement group refer to the significance level of a two-tailed *t* test between the some and none group means

**p* < .10
 ***p* < .05
 ****p* < .01
 **** *p* < .001

Table 8.2 Mean Score on Personality, Social, and Behavior Measures for Marijuana Involvement Groups: Senior High Sample—Initial-Year Data

Measures	Marijuana involvement groups					
	Females			Males		
	None (n = 146)	Mild (n = 22)	Moderate (n = 32)	None (n = 82)	Mild (n = 11)	Moderate (n = 37)
<i>Personality</i>						
<i>Motivational instigators</i>						
Value-achievement	65.1	54.0	52.8****	64.7	62.6	53.5**
Value-independence	74.6	77.8	82.4****	70.7	72.3	78.1****
Independence-achievement value discrepancy	99.5	113.8	119.7****	96.0	99.6	114.6****
Expectations for achievement	57.9	50.7	51.8*	57.7	47.7	51.0*
<i>Beliefs</i>						
Alienation	35.7	36.8	34.1	36.2	36.2	36.9
Social criticism	30.3	32.2	32.6**	29.2	30.5	31.8****
<i>Personal controls</i>						
Attitude toward deviance	173.5	156.6	152.7****	161.2	151.9	145.0**
Religiosity	13.1	11.1	9.8****	11.8	11.0	10.3*
<i>Perceived social environment</i>						
<i>Distal</i>						
Parent-peer compatibility	12.6	11.3	11.6	12.3	11.7	11.2*
Parent-peer influence	21.2	21.9	23.8***	18.9	20.4	22.7****
<i>Proximal</i>						
Social support for drug use	10.7	14.3	18.9****	10.1	14.6	16.6****
Friends' approval for drug use	1.9	2.7	3.3****	2.0	2.6	3.2****
<i>Behavior</i>						
<i>Marijuana related</i>						
Frequency use/6 months	.0	1.1	31.3****	.0	1.6	33.8****
Positive functions marijuana	22.6	24.7	26.9****	20.7	20.9	25.1****
Negative function marijuana	32.3	26.7	22.1****	32.3	28.3	22.3****
Positive over negative functions discrepancy	19.3	27.0	33.5****	17.5	21.5	31.7****
<i>Other behavior</i>						
Deviant behavior	36.4	40.7	42.6****	37.4	40.8	46.4****
Heavy petting experience	.9	1.4	1.8****	.7	1.5	1.6****
Intercourse experience	.2	0.5	.8****	.2	.7	.8****
Times drunk/year	1.2	3.9	11.2**	1.9	7.8	11.6***
Activism behavior	2.0	2.7	3.5***	1.8	1.7	3.1**
Church attendance/year	38.8	22.5	15.4****	33.8	18.1	12.4****
Grade point average	3.1	2.9	2.8*	2.8	2.6	2.4**
Involvement in school clubs	2.9	1.7	1.7****	2.2	2.4	1.6**

Note: Groups are based on marijuana behavior report score: none = 0, mild = 2, moderate = 4–8. The asterisks next to the means of the moderate involvement group refer to the significance level of a two-tailed *t* test between the moderate and the none group means

**p* < .10

***p* < .05

****p* < .01

*****p* < .001

Table 8.3 Mean Scores on Personality, Social, and Behavior Measures for Marijuana Involvement Groups: College Sample—Initial-Year Data

Measures	Marijuana involvement groups					
	Females			Males		
	None (n = 73)	Moderate (n = 51)	Heavy (n = 19)	None (n = 68)	Moderate (n = 37)	Heavy (n = 27)
<i>Personality</i>						
<i>Motivational instigators</i>						
Value-achievement	62.9	60.0	54.9*	64.5	62.5	57.6
Value-independence	73.1	76.6	80.2****	69.9	75.6	78.0***
Independence-achievement value discrepancy	100.0	106.6	115.3****	95.4	103.1	110.3***
Expectations for achievement	49.4	48.5	43.8	49.4	49.6	44.6
<i>Beliefs</i>						
Alienation	34.0	35.5	34.6	35.8	37.0	38.5**
Social criticism	34.4	38.3	40.2****	34.7	37.0	41.3****
<i>Personal controls</i>						
Attitude toward deviance	134.0	118.5	111.9****	121.6	118.9	107.2**
Religiosity	11.7	9.3	8.3****	10.7	9.2	8.8**
<i>Perceived social environment</i>						
<i>Distal</i>						
Parent-peer compatibility	13.0	11.9	10.5****	11.7	10.6	10.5**
<i>Proximal</i>						
Social support for drug use	13.6	19.5	21.9****	13.6	16.9	21.3****
Friends' approval for drug use	2.4	3.5	3.9****	2.6	3.4	3.6****
<i>Behavior</i>						
<i>Marijuana related</i>						
Frequency use/6 months	.7	13.0	56.2****	.3	8.9	59.1****
Positive functions marijuana	21.1	23.1	25.4****	21.1	22.8	27.0****
Negative function marijuana	16.6	12.9	11.7****	15.6	13.2	11.6****
Positive over negative functions marijuana	15.5	21.2	24.7****	16.4	20.6	26.4****
<i>Other behavior</i>						
Deviant behavior	27.1	29.2	31.3***	28.1	29.1	32.3****
Intercourse experience	.3	.7	.7****	.3	.6	.6***
Times drunk/year	1.7	2.9	4.3*	4.9	5.5	12.5**
Activism behavior	.3	.8	1.4****	.4	.7	1.3****
Church attendance/year	7.9	2.6	1.5****	7.8	7.3	2.0****
Grade point average	2.8	2.7	2.5	2.6	2.4	2.4

Note: Groups are based on marijuana behavior report score: none = 0–2, moderate = 4–6, heavy = 8. The asterisks next to the means of the heavy involvement group refer to the significance level of a two-tailed *t* test between the heavy and the none group means

**p* < .10

***p* < .05

****p* < .01

*****p* < .001

consistency of these findings across sex, across school levels, across school contexts, and across different intensities of use or involvement with marijuana is that they suggest the existence of a social-psychological constancy, a continuity in the meaning and function of drug use in youthful society. This implication is considered further in the Discussion section.

For purposes of a fuller appraisal of the explanatory utility of the variables in the social-psychological network, multivariate analyses were performed. Stepwise multiple-regression analyses were run separately for selected personality variables (independence-achievement value discrepancy, expectations for achievement, alienation, social criticism, attitude toward deviance), for perceived environment variables (parent-peer influence and social support for drugs), and for both of these sets combined into what we have called a field-theoretical approach.⁴ For the set of personality measures, the multiple *R*s with the MBR scale are .42 for the combined high school males, .42 for the combined high school females, .44 for the college males, and .55 for the college females. These *R*s are all significant and account for about 21% of the variance in MBR scores, on the average. For the set of perceived social environment measures, the multiple *R*s are .69 for high school males, .64 for high school females, .67 for college males, and .70 for college females. These *R*s are all substantially higher than those for the personality measures, as might be expected, since they involve more proximal variables; the variance accounted for is about 46%, on the average. Combining personality and environmental measures increases slightly the amount of variance in MBR scores accounted for, to about 47% on the average, with the multiple *R*s reaching the values of .69, .65, .69, and .71 for the four groups in the order given above. For the high school samples, the independence-achievement value discrepancy and the tolerance of deviance variables enter the personality regression first; in the college, the social criticism variable is first to enter. For the perceived environment regression, social support for drugs enters first for both high school and college samples. Where personality and perceived environment variables are used together in a field-theoretical regression, social support enters first, but the second variable to enter is always from the personality set.

⁴In both the high school and the college studies, the average Pearson intercorrelation among these seven predictors was .20, with the highest correlation being about .45 and the lowest being about .00. In the high school study, the highest correlation of a personality measure with the MBR scale was that for independence-achievement value discrepancy, .38; the highest correlation of a perceived environment measure with the MBR scale was that for social support for drugs, .65. For the college study, the best personality correlation with MBR was for social criticism, .44; the best environmental correlation was again social support for drugs, .66. Since the sets of personality and perceived environment measures are themselves correlated substantially, their combination in a multiple correlation is not likely to increase the correlation with the MBR criterion much above the *R* of the perceived environment measures alone.

Part II: Longitudinal Analyses

Hypotheses 3 and 4 are at issue in the change analyses: First, among nonusers there are initial differences on the variables described above such that they are predictive of the onset of marijuana use over time. Second, there is greater relative change in the problem-prone direction on the measures of these variables over the year's interval for those who shift to user status than for those who remain nonusers.

In order to examine these hypotheses, comparisons were made between two groups, nonusers in the initial year who remained nonusers by the subsequent year (NU-NU) and nonusers in the initial year who had begun marijuana use by the subsequent year (NU-U). The junior and senior high were combined for these analyses since the pattern of their cross-sectional findings was parallel. The mean initial-year scores on the same set of variables reported earlier for the cross-sectional analyses are presented in Table 8.4 for these groups in the high school study.

The high school data in Table 8.4 provide support for our third hypothesis. On a number of variables measured *prior to* the onset of marijuana use, that is, when all the subjects were nonusers, there are significant differences between those who became users by a year hence and those who remained nonusers. The differences are in the theoretically expected, problem-prone direction; they occur on measures of personality, environment, and behavior, and they obtain for both males and females, although stronger on instigators and beliefs for males. Since the measures antedate the onset of marijuana use, the data indicate that they are predictive of its prospective occurrence. Thus the data enable a stronger, although still inferential, claim on a causal role for these variables than could be based on the cross-sectional associations demonstrated earlier.

Stepwise multiple-regression analyses were carried out to examine the extent of predictability of the shift from nonuser to user status, employing the same seven variables reported for the multivariate analyses of the cross-sectional high school data. The multiple R s for the personality variables for males and for females were .35 and .17, respectively, with the attitude toward deviance measure the one to enter first in both cases. For the perceived environment measures, the multiple R s were .36 and .34 for males and females, with peer-versus-parent influence first to enter for the former, and social support for drugs first for the latter. For the personality and environment variables combined, the multiple R s were .39 for the males and .34 for females. All of these multiple correlations are significant, and even though the amount of variance accounted for is small, about 15% at best, the fact that the criterion being predicted was measured a year later than the predictors does add to our confidence in the utility of the theoretical variables.

Another approach to assessing that utility is to gauge the degree of accuracy that can be achieved by these variables in the correct assignment of the nonuser subjects in the initial year to the nonuser or user categories in the subsequent year. A discriminant function analysis employing the seven initial-year predictors yielded a significant discriminant function which assigned the 184 males with 72% accuracy and the 252 females with 73% accuracy to their actual subsequent-year status as users or nonusers. The mean differences shown in Table 8.4, the significant multiple

Table 8.4 Initial-Year Mean Scores on Personality, Social, and Behavior Measures for Marijuana Nonusers Who Remain Nonusers and for Nonusers Who Begin Use by the Subsequent Year: High School Combined Sample

Measures	Marijuana change groups			
	Females		Males	
	NU-NU (n = 215)	NU-U (n = 37)	NU-NU (n = 158)	NU-U (n = 26)
<i>Personality</i>				
<i>Motivational instigators</i>				
Value-achievement	69.3	68.2	71.3	66.2
Value-independence	72.7	74.5	70.5	74.5
Independence-achievement value discrepancy	93.4	96.3	89.3	98.2**
Expectations for achievement	57.1	52.4	57.0	52.0
<i>Beliefs</i>				
Alienation	36.4	37.4	36.0	38.4**
Social criticism	29.8	30.6	27.9	31.2***
<i>Personal controls</i>				
Attitude toward deviance	181.4	163.0**	175.7	142.8*****
Religiosity	13.8	11.7***	12.9	11.0*
<i>Perceived social environment</i>				
<i>Distal</i>				
Parent-peer compatibility	12.3	11.8	12.2	11.4
Parent-peer influence	19.4	21.1*	17.3	20.7*****
<i>Proximal</i>				
Social support for drug use	9.1	11.9*****	8.4	10.5**
Friends' approval for drug use	1.7	2.5*****	1.8	2.2**
<i>Behavior</i>				
<i>Marijuana related</i>				
Positive functions marijuana	23.3	24.8	21.2	22.7
Negative function marijuana	34.0	30.7***	34.3	27.6*****
Positive over negative functions discrepancy	18.3	23.1***	16.0	24.4*****
<i>Other behavior</i>				
Deviant behavior	34.5	40.7*****	35.9	43.7*****
Petting experience	.6	1.0**	.4	1.0**
Intercourse experience ^a	.2	.4	.1	.0**
Times drunk/year	.9	1.9	.7	1.7**
Activism behavior	1.7	2.3*	1.7	2.4
Church attendance/year	45.6	24.6*****	38.3	23.4**
Grade point average	2.9	2.7*	2.8	2.5
Involvement in school clubs	2.3	1.9	2.0	2.4

Note: NU-NU = nonusers who remain nonusers; NU-U = nonusers who begin use by the subsequent year. Groups are based on all junior and senior high nonusers in the initial year (1970) and whether or not they begin use by the subsequent year (1971). The asterisks next to the means of the NU-U group refer to the significance level of a two-tailed *t* test between it and the NU-NU group mean.
^aThe means on intercourse experience are based on senior high subjects only

**p* < .10

***p* < .05

****p* < .01

*****p* < .001

Rs, and the significant discriminant functions combine to strengthen the support for Hypothesis 3 among the high school subjects.

Since Hypothesis 4 is concerned with the differential magnitude of theoretically expected *change* over the year interval on the measures of the variables in the network, it was necessary to control for the initial differences on these measures already shown in Table 8.4 between the NU-NU group and the NU-U group. The procedure employed was to compute residual gain scores for each group based upon the discrepancy between a subject's *actual* subsequent-year score and the score which would be predicted for him from the regression of subsequent-year scores on initial-year scores. Residual gain scores, unlike raw gain scores, are uncorrelated with initial scores on a measure. Separate regressions were computed for the male groups and the female groups in the high school study, and the mean residual gain scores are shown in Table 8.5.

The residual gain score data provide support for Hypothesis 4. Nearly all the differential changes are in the theoretically expected direction, and a number of them reach significance. Among the females, the group that shifts to using marijuana, the NU-U group, decreases over the year in value for achievement relative to the group that remains nonuser, the NU-NU group; the NU-U group, relative to the NU-NU group, increases on the independence-achievement value discrepancy, decreases in intolerance of deviance, decreases in parent-peer compatibility, increases in social support for drugs, increases in positive functions of marijuana use, decreases in negative functions, and increases on deviant behavior, sex, activism, and times drunk, while decreasing in church attendance and grade point average—all of these changes being significant in magnitude in the theoretically expected direction. The data are similar for the males. It is clear from these findings that amount of theoretically expected change on the variables is associated with the shift in behavioral status, in this case from nonuser to user status. Whether change on the variables precedes or follows the behavioral shift cannot be determined from these particular findings since the gain score measures do involve the subsequent-year data.

The college study data are not supportive of the longitudinal hypotheses in the way the high school study data are. Comparisons of the college NU-NU group with the college NU-U group on initial-year mean scores yielded almost no measures that were discriminating and several where the direction was reversed although not significantly. Thus there is no support at all from the college study for Hypothesis 3. With respect to Hypothesis 4, some support is evident, but it is modest. None of the motivational instigator variables show significant change differences; among the belief variables, alienation residual gain scores for the NU-U females and social criticism for the NU-U males do show the relative increase as expected; with respect to personal controls, there is a decrease in intolerance of deviance for both male and female NU-U groups, but it is significant for females only; social support for drugs increases significantly for both sex groups as does the positive-over-negative functions discrepancy score; but none of the behaviors, problem or conventional, show a significant difference in residual gains between the NU-NU group and the NU-U group. The possible reasons for the relative failure of the college study to support the longitudinal hypotheses, while at the same time providing substantial support for the cross-sectional hypotheses, are considered in the Discussion.

Table 8.5 Mean Residual Gain Scores on Personality, Social, and Behavior Measures for Marijuana Nonusers Who Remain Nonusers and for Nonusers Who Begin Use by the Subsequent Year: High School Combined Sample

Measures	Marijuana change groups			
	Females		Males	
	NU-NU (<i>n</i> = 215)	NU-U (<i>n</i> = 37)	NU-NU (<i>n</i> = 158)	NU-U (<i>n</i> = 26)
<i>Personality</i>				
<i>Motivational instigators</i>				
Value-achievement	.87	-5.01*	.40	-2.45
Value-independence	-.22	1.30	-.41	2.47
Independence-achievement value discrepancy	-1.10	6.35**	-.72	4.37*
Expectations for achievement	.37	-2.12	.56	-3.39
<i>Beliefs</i>				
Alienation	.14	-.79	.09	-.56
Social criticism	-.03	.20	-.13	.81
<i>Personal controls</i>				
Attitude toward deviance	1.79	-10.39**	.95	-5.76
Religiosity	.14	-.86	.08	-.51
<i>Perceived social environment</i>				
<i>Distal</i>				
Parent-peer compatibility	.26	-1.52****	.15	-.93**
<i>Proximal</i>				
Social support for drug use	-.79	4.54****	-.75	4.71****
<i>Behavior</i>				
<i>Marijuana related</i>				
Positive functions marijuana	-.46	2.71****	-.32	1.90
Negative function marijuana	.71	-4.34****	.56	-3.59****
Positive over negative functions discrepancy	-1.08	6.52****	-.90	5.83****
<i>Other behavior</i>				
Deviant behavior	-.67	3.92****	-.55	3.35****
Petting experience	-.05	.31**	-.06	.36***
Times drunk/year	-1.21	3.85**	-.68	2.40**
Activism behavior	-.07	.42****	-.01	.06
Church attendance/year	.98	-6.12*	.08	-.56
Grade point average	.03	-.21***	.01	-.07
Involvement in school clubs	-.01	.07	.02	-.12

Note: NU-NU = nonusers who remain nonusers; NU-U = nonusers who begin use by the subsequent year. Groups are based on all junior and senior high nonusers in the initial year (1970) and whether or not they begin use by the subsequent year (1971). The plus or minus signs indicate the direction of gain for a given group *relative to* the direction of overall gain for the sample as a whole. The asterisks next to the means of the NU-U group refer to the significance level of a two-tailed *t* test between it and the NU-NU group mean

**p* < .10

***p* < .05

****p* < .01

*****p* < .001

Discussion

The primary concern of this paper has been to establish the relevance of a more general social psychology of problem behavior to the specific behavior of marijuana use in youth. Marijuana use was considered functional and adaptive, like other socially learned behavior, and the outcome of personality instigations and controls and environmental opportunities and supports that constitute an interrelated network. Support for this theoretical approach was sought in both cross-sectional and longitudinal analyses. Cross-sectional differences between nonusers and users, or between youth relatively less involved with marijuana and youth relatively more involved, were demonstrated at the junior high, senior high, and college levels, for both males and females, on a variety of personality, social, and behavioral variables. These same variables were then shown to be predictive, over time, of the onset of marijuana use among previous nonusers, and to evidence greater theoretically expected change over the year interval among those who became users relative to those who remained nonusers. The longitudinal findings are of special importance since they rely upon measures of variables which were made prior to the initial occurrence of marijuana use and, therefore, are predictive of it in a stronger sense than that term is usually used. Taken together, the replicated cross-sectional findings across school levels, sexes, and intensities of use (yielding multiple R s near .70) and the general consonance of the cross-sectional with the longitudinal findings add up to compelling support for the social-psychological network in which marijuana use was embedded.

That support makes clear that personality as well as environmental factors play a significant role in the variation of social behaviors such as marijuana use. While the perceived environment appears to play a much stronger role than does personality, it should be noted that the personality variables were nearly all distal from marijuana use, that is, only theoretically rather than obviously or immediately implicative of it. Unlike the proximal environmental variable of social support for drug use, for example, which directly implies the behavior (and which empirically turned out to be its most powerful predictor), such distal personality variables as independence-achievement-value discrepancy link up with marijuana use only by conceptualizing the latter as an instance of problem behavior which can, for example, serve to repudiate authority, to lay a claim on a more mature status, or to cope with the frustrations of assigned immaturity. Despite its distal relation to marijuana use, the system of personality variables alone contributed significantly to accounting for the variance in marijuana use and when combined with the environmental variables, added a small increment to the total variance accounted for. This role of the personality variables is important to emphasize because of the tendency in contemporary social behavior theory to give excessive attention to the situation. To make the personality contribution even clearer, the junior, senior, and college samples were split at their own medians on social support for drugs, and multiple regression analyses were run *within* the high- and the low-social-support subgroups using five personality variables. By controlling in this way for social support, the contribution of personality

can be placed in sharper relief. Within the high-social-support subgroups, the multiple *R*s all remained significant. Within the low-social-support subgroups, the range of variation on MBR was severely attenuated by the control on social support. Nevertheless, the personality variables remained significant in three out of the six low-social-support groups. The conclusion to be drawn from this analysis is that personality is, indeed, central to variation in drug use, whether there is high social support for it or not.

The continuity of the patterning of variables in the three different school level samples, for both sexes, is noteworthy. This is especially so when the different intensities of marijuana use at the different school levels are considered; thus the junior high users report an average frequency of use, over the preceding 6 months, of about 6 times, the senior high users report about 30 times, and the college heavy users report about 60 times. Despite this 10-fold difference between junior high and college, the same variables distinguish the nonusers from the users or the moderate from the heavy users. This social-psychological constancy implies that the meaning of marijuana use is quite pervasively shared and that there are in operation processes of socialization and even institutionalization to which youth of all ages are exposed. While the notion of a youth subculture is often invoked to explain such processes, it may not be the only source. The mass media, in their efforts to exploit the youth culture, and even the agencies of social control themselves, in their very efforts to prevent marijuana use, may well contribute to spreading a common definition of its social meaning to society as a whole. When the larger society is emphatic that it opposes marijuana use, it may well teach at the same time that opposition to the larger society can be expressed by using marijuana. It is, of course, possible that the continuity we have found is due to the nature of the particular research community in which the data were collected, a university city where communication probably occurs across the different school levels, junior high to college.

Although the constancy in patterning of the relations of variables in the network with variation in marijuana use is a salient outcome of the cross-sectional analyses, there are at least two differences between the high school and college levels that bear mention. First, the variable of social criticism, while operating similarly at both levels, is substantially more related to marijuana use in college than it is in high school. The Pearson correlation of social criticism with the MBR score is .20 for the combined junior and senior high school sample while it reaches .44 for the combined college sample. Second, low expectations for achievement, while significantly related to marijuana involvement in the junior and senior high samples, shows no such relation at the college level. These two findings suggest a possibly greater ideological role of marijuana use in college and less of a role in coping with failure than may be the case with marijuana use in high school.

The other way in which the college findings diverged from the high school findings may also be related to the preceding point. It is recalled that while the college cross-sectional data neatly paralleled the high school cross-sectional data, this was not the case for the longitudinal findings. Whereas the same variables were strongly predictive in the high school findings of the shift from nonuser to user status, there

was no support for such an outcome in the college findings. How is it that variables which successfully differentiate college students in relation to marijuana use at a given point in time do not serve to predict the onset of use among the college nonusers? Part of the explanation may lie in the relatively high rates of use among our college sample. By the second year (1971), 70% of the students had used marijuana more than once, a percentage high enough to provide a modal norm of use. Under such circumstances of widespread use and availability, the prediction of onset may depend more on factors such as the crowd one happens to find oneself in or the vicissitudes of a particular relationship than on the systematic pattern of variables specified in the Problem Behavior Theory. Other factors which were not measured here, such as a negative orientation toward taking any drugs or medications at all, for example, may also sustain nonuse; but once use is begun, for whatever reason or under whatever situational vagaries, a process of peer socialization may well get started which influences the new user in the direction of other users and away from nonusers on a variety of personality, social, and behavioral attributes.

The present findings, while emerging from a particular orientation, are quite consonant with those reports in the literature which have shown some concern for social-psychological aspects of drug use. Several of the factors stressed by Suchman (1968) in his early paper invoking the "hang-loose ethic" are similar to our results, especially his emphasis on marijuana use as a sign of dissent from conventional society and its Protestant ethic. Goldstein (1971a, 1971b) has shown marijuana use to be related to greater nonconformity, greater rebelliousness toward rules and conventions, and greater insecurity among a cohort of college students currently being followed over time. Sadava's (1972a) recent results with freshmen at a Canadian university measured at the beginning of the freshman year and again near its end, and using several of our measures, are similar to those reported here. A number of our findings are also consonant with the social-psychological factors in alcohol and drug use emphasized by Davis (1972) in his perceptive review and with findings from the pioneering work of Blum (1969) on high school and college students.

Beyond their consonance with the work of others, the present results gain strong support from their similarity to findings in our own analyses in the larger project of other areas of significant social behavior and behavior change. Variables similar to those reported here have been shown to predict the transition from abstainer to drinker among high school youth (Jessor et al., 1972) and to account for the shift from ordinary nonproblem drinking to problem drinking among high school students who drink (Jessor & Jessor, 1973). Current analyses in the area of sex behavior indicate the relevance of several of the variables (e.g., the independence-achievement value discrepancy) to the shift from virginity to nonvirginity among high school seniors.

The utility of the present social psychology of problem behavior is enhanced by the scope of its applicability. Problem Behavior Theory helps to reveal the social-psychological commonalities between marijuana use and other behaviors, rather than following the relatively sterile course of emphasizing its uniqueness.

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Chapter 9

Understanding the Initiation of Marijuana Use

Richard Jessor

This chapter reports the use of a social psychology of problem behavior to account for onset and for variation in time of onset of marijuana use among high school youth. It represents an effort to go beyond epidemiological and descriptive studies of prevalence; instead, it seeks to embed marijuana use in a theoretical framework that enables systematic prediction of its occurrence and that reveals the relation of its occurrence to adolescent development as a whole. Since the framework has been described elsewhere (Jessor, Collins, & Jessor, 1972; Jessor, Graves, Hanson, & Jessor, 1968; R. Jessor & S. L. Jessor, 1973a, 1973b; S. L. Jessor & R. Jessor, 1974, 1975; Jessor, Jessor, & Finney, 1973; Rohrbaugh & Jessor, 1975; Weigel & Jessor, 1973), and since the very same paradigm has recently been applied to predicting the onset of drinking (R. Jessor & S. L. Jessor, 1975), only a brief introduction is given here.

The concept of “problem behavior” or “deviance” refers to behavior that departs sufficiently from the regulatory norms of the larger society to result in or evoke or imply some sort of social control response. Much of what constitutes problem behavior in adolescence, however, is relative to *age-graded* norms, norms that may proscribe the behavior for those who are younger while permitting or even prescribing it for those who are older. Such behaviors, for example, engaging in sexual intercourse, come to be seen as characterizing the occupancy of a more mature status and hence engaging in them for the first time can serve to mark a transition in status from “less mature” to “more mature” for an adolescent. It is in this regard that a social

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psychology of problem behavior becomes relevant to processes of adolescent growth and development. The theoretical aim of specifying a proneness to engage in problem behavior becomes largely synonymous with the aim of specifying a proneness toward transition among adolescents. By theoretically mapping the concept of “transition proneness” onto the concept of “deviance proneness,” it is possible to exploit the developmental implications of Problem Behavior Theory in adolescence.

A fairly comprehensive social psychology comprising three major explanatory systems—personality, the perceived social environment, and behavior—has been employed. Within each system, variables are specified that have logical implications for the likelihood of occurrence of problem behavior or of conformity. In the personality system, values and expectations for achievement and independence, personal beliefs such as social criticism, internal-external control, alienation, and self-esteem, and personal controls such as altitudinal tolerance of deviance and religiosity are some of the major variables assessed. In the perceived social environment system, the main variables are social-psychological rather than demographic; they include value compatibility between parents and friends, relative influence of parents versus friends, parental supports and controls, parent attitude toward deviance, and friends’ approval of and models for deviance. The behavior system is comprised of various problem behaviors (marijuana use, problem drinking, premarital sexual intercourse, and general deviant behavior such as aggression, lying, and stealing) and various conventional behaviors (church attendance and school achievement). Problem behavior, in this social-psychological framework, is conceptualized as the outcome of the interaction of variables that instigate or conduce toward departure from norms and of variables that control against such transgression; in terms of the theory, the pattern of variables constitutes a deviance proneness or a proneness to engage in problem behavior.

Four important questions are addressed in the present research. First, is there a pattern of personality, environment, and behavioral attributes among *nondrug* users that constitutes a proneness or a social-psychological “readiness” to begin use of marijuana? Second, does such a prior pattern signal not only onset but also variation in time of onset? Third, is variation in time of onset of marijuana use systematically related to variation in the developmental trajectories of the associated personality, social, and behavioral attributes? And fourth, is length of time since onset related to prevalence of other problem or transition-marking behaviors?

Method

Participants

In the spring of 1969, a random sample of 1126 students stratified by sex and grade level was designated in Grades 7, 8, and 9 of three junior high schools in a small city in the Rocky Mountain region. Students were contacted by letter and asked to participate over the next 4 years in a study of personality, social, and behavioral development. Parents were also contacted and asked for their signed permission. Permission was received for 668 students and, of these, 589 (52% of the random

sample) were tested in April 1969, becoming the Year 1 cohort of the study. By the end of the Year 4 (1972) testing, 483 students were still in the study, representing 82% retention of the initial cohort. Of these, there were 432 students (188 boys and 244 girls) for whom there was no missing year of data, and this latter group constituted our core sample for longitudinal or developmental analyses. Demographically, the core sample is relatively homogeneous—almost entirely Anglo-American in ethnic background and middle-class in socioeconomic status.

Procedure

Data were collected annually in April–May of each year, 1969–1972, by means of an elaborate, theoretically derived questionnaire requiring about 1½ hours to complete. The questionnaire consisted largely of psychometrically developed scales or indices assessing the concepts in the social-psychological framework. Administration of the questionnaire took place outside of class in small group sessions. A guarantee of strict confidentiality was given since participants had to sign their names in order to permit annual follow-up. Reaction to the questionnaire was, in general, one of strong personal interest, and the quality of the self-report data can be considered to be very high.

Establishment of Marijuana Onset Groups

In order to address the four major questions slated in the introduction, it was necessary to classify the students as to their experience with marijuana over the study years. Since information about marijuana use was not collected in the initial year, 1969, it is possible to classify students as to their use or nonuse only for 1970–1972. During these years, among a variety of other questions about drug use, students were asked: “Have you ever tried marijuana?” (response categories: never, once, more than once), and “Did your *first* experience with drugs take place within the past 12 months?” (response categories: yes, no). On the basis of their responses to these questions, students were classified as users (response of more than once) or as nonusers for each of the three yearly intervals, 1969–1970, 1970–1971, and 1971–1972. From these classifications, it was possible to establish the marijuana onset groups required for the present analyses. Four groups were established: (a) *nonusers* ($n = 258$; 113 males and 145 females): those students who reported no use of marijuana over the study years; (b) *initiates* 1971–1972 ($n = 45$; 24 males and 21 females): those students who began use of marijuana in the last year of the study; (c) *initiates* 1970–1971 ($n = 48$; 18 males and 30 females): those students who began use of marijuana a year earlier than the preceding group; and (d) *users* ($n = 69$; 26 males and 43 females): those students already using marijuana before the 1970 testing. (The total N of 420 is less than the 432 in the core developmental sample since there were five students with missing data and seven students from the user group, four males and three females, who reported subsequent discontinuation of marijuana use and were therefore dropped from these analyses. Groups b, c, and d, it follows, were all current users in 1972.)

The groups are ordered, therefore, in relation to time of onset of marijuana use, the nonusers showing no onset, the initiates 1971–1972 showing latest onset, and the initiates 1970–1971 showing earliest onset among these three groups *none of whom had yet begun use as of 1970*; the users, of course, having already begun prior to 1970, constitute an important reference group against which to compare the other three. In terms of our basic interest in deviance or transition proneness, an examination of these four transition groups on the social-psychological measures collected *in 1970* should reveal whether there is an ordering on the measures that is consonant with—and therefore predictive of—the subsequent order of onset of marijuana use.

Measurement of the Social-Psychological Variables

The measures of the variables in the personality, perceived environment, and behavior systems have been described elsewhere (e.g., see R. Jessor & S. L. Jessor, 1975). Details regarding the item content and the scoring of the 1969 version of the questionnaire appear in Jessor (1969). For the most part, the scales have very adequate psychometric properties as shown by Scott's homogeneity ratio and Cronbach's alpha index of reliability. Measurement stability over time, as indicated by interyear correlations, is substantial, and various kinds of validity, including construct validity, have been established in the various studies cited earlier.

Results

The results are organized around the major questions stated in the introduction. First, data—both univariate and multivariate—are presented to enable the assessment of the predictability of onset and of time of onset of marijuana use. Second, figures showing the developmental trajectories of several of the social-psychological predictors over the study years are presented to enable examination of the degree to which marijuana onset is associated with personality, social, and behavioral development. And third, data on the prevalence of other problem or possible transition behaviors permit an appraisal of the degree to which they covary with the length of time since onset of marijuana use.

Predicting Onset and Time of Onset of Marijuana Use

The first approach to predicting onset from antecedent measures was to examine the mean scores of the four groups on the theoretical variables in 1970 *when only one of the groups had experience with marijuana but the other three had not*. Since the data for males and females are very similar, they are presented for the sexes combined. The means and the associated *F* ratios for 19 theoretical variables are shown in Table 9.1.

Table 9.1 1970 Mean Scores on Transition-Prone Attributes for Each Transition Group (Sexes Combined)

Measure	Transition Group				F
	Nonusers	Initiates, 1971–1972	Initiates, 1970–1971	Old users	
Personality system					
<i>Motivation-instigation structure</i>					
Value on achievement	72.37	69.13	67.37	55.32	21.23**
Value on independence	71.81	72.12	74.40	75.55	2.07
Independence-achievement value disjunction	89.44	92.99	97.03	110.23	27.31**
Expectations for achievement	57.98	56.05	50.48	45.26	9.71**
<i>Personal belief structure</i>					
Alienation	35.76	37.24	37.85	37.83	3.52*
Social criticism	28.64	28.83	30.98	31.30	7.45**
<i>Personal control structure</i>					
Attitude toward deviance	184.51	160.30	156.60	135.28	38.22**
Religiosity	13.70	12.29	11.43	10.98	10.13**
Negative function drugs	34.80	33.52	29.03	23.31	59.43**
Perceived environment system					
<i>Distal structure</i>					
Parent-friends compatibility	8.81	7.84	7.96	6.72	15.08**
Parent-friends influence	17.89	19.22	20.64	23.01	22.51**
Parental support	7.66	7.16	7.28	6.39	8.12**
Parental control	7.57	7.33	6.79	6.78	5.98**
<i>Proximal structure</i>					
Friends' approval drug use	3.32	3.96	4.69	6.14	70.47**
Parental approval drug use	1.09	1.11	1.17	1.41	9.16**
Friends model drug use	3.34	3.36	4.58	6.03	71.52**
Behavior system					
General deviant behavior/past year	34.09	39.51	41.10	44.83	58.33**
Church attendance/past year	36.04	25.11	18.40	18.41	11.31**
Grade point average/past year	3.03	2.95	2.85	2.80	3.10*

* $p < .05$

** $p < .001$

The data in Table 9.1 provide substantial support for the relation of marijuana onset to a deviance- or transition-prone pattern of social-psychological attributes existing prior to onset. Group a, the nonusers who reported no onset during the study years, had the most conventional or least deviance-prone scores on each of the measures. They had the highest value on achievement, the lowest value on indepen-

dence, the smallest independence-achievement value disjunction, and the highest expectations for achievement within the motivational instigation structure of the personality system. In terms of personal beliefs, nonusers were least alienated and least socially critical; and in terms of personality controls, they showed the highest attitudinal intolerance of deviance, strongest religiosity, and highest negative functions of (reasons against) drug use. With regard to the distal structure of the perceived social environment system, nonusers evidenced the greatest parents-friends compatibility, the greatest influence of parents relative to that of friends (the lower the score, the greater the parent influence), and the greatest parental support and controls. In the proximal structure, nonusers reported least friends' and parents' approval of drug use and least friends' models of drug use. With respect to the behavior system, finally, the nonusers had the lowest deviant behavior score and reported the largest frequency for church attendance and the highest grade point average. This remarkably consistent pattern is, theoretically, the pattern that is most conventional or conforming in nature.

The pattern gains significance from the fact that in almost every case, Group d, the old users, was the group whose mean scores provide the most extreme contrast—the pattern that is, as expected, most deviance prone. And, of crucial importance, the mean scores of Groups b and c are, on most of the variables, ordered exactly in accord with their order of subsequent onset of use, with Group b being closer to Group a and Group c being closer to Group d. The overall F ratios, with few exceptions, are highly significant. These data, then, provide pervasive support of the relationship of theoretically deviance- or transition-prone attributes to both onset and time of onset of marijuana use during adolescence.

The second approach to predicting time of onset enables an appraisal of the strength of the overall framework. Multiple regression analyses were carried out using the 1970 measures as predictors and time of onset (membership in Group a, b, or c) as the criterion score. Group d was not included so that the criterion score could represent variation in time of onset among students who were *all* nonusers in 1970. The multiple correlations for a set of predictors similar to those listed in Table 9.1 were .61 for males, .44 for females, and .49 for the sexes combined. All of these are significant at $p < .001$, thus providing direct support for the usefulness of the theory in predicting onset of marijuana use.¹

¹In making inference to the social-psychological variables, it is important to rule out alternative factors that might account for findings such as group differences in age or in background characteristics. Although old users were significantly older than each of the three other groups, the difference between age means was small, ranging between 3 and 5 months. Among the three groups not yet using marijuana as of 1970, however, no difference between groups was as large as 2 months and none was significant. Hence, age could not be a factor in variation in time of onset among the 1970 nonuser groups. Another way of stating this is to report that among the nonusers in 1970 the correlation between age in months and time of onset was .07. With respect to demographic attributes, there were no differences among the transition groups in father's occupation, father's education, or mother's education, or in the liberalism-fundamentalism of father's or of mother's religious group membership.

Table 9.2 1972 Mean Scores on Transition-Prone Attributes for Each Transition Group (Sexes Combined)

Measure	Transition Group				F
	Nonusers	Initiates, 1971–1972	Initiates, 1970–1971	Old users	
Personality system					
<i>Motivation-instigation structure</i>					
Value on achievement	67.94	58.28	57.52	52.90	14.48**
Value on independence	74.42	76.27	76.90	77.00	1.22
Independence-achievement value disjunction	96.48	107.71	109.37	114.10	17.53**
Expectations for achievement	59.59	50.89	54.38	51.72	5.15*
<i>Personal belief structure</i>					
Alienation	35.06	36.47	35.68	36.91	1.92
Social criticism	28.93	30.60	32.02	33.54	17.61**
<i>Personal control structure</i>					
Attitude toward deviance	171.72	144.38	140.28	146.11	22.64**
Religiosity	16.46	13.03	11.16	11.62	14.56**
Negative function drugs	33.17	25.14	23.63	22.62	72.50**
Perceived environment system					
<i>Distal structure</i>					
Parent-friends compatibility	8.75	7.24	7.48	7.07	13.02**
Parent-friends influence	3.35	3.69	3.93	3.79	4.98*
Parental support	7.75	6.98	7.02	6.74	7.27**
Parental control	6.20	6.16	5.38	5.34	5.65**
<i>Proximal structure</i>					
Friends' approval drug use	3.51	5.78	6.46	6.36	102.19**
Parental approval drug use	1.17	1.42	1.67	1.80	20.43**
Friends model drug use	4.54	7.24	7.94	8.12	128.63**
Behavior system					
General deviant behavior/past year	35.79	43.18	45.10	43.15	45.66**
Church attendance/past year	28.20	22.13	8.72	13.50	9.73**
Grade point average/past year	3.15	3.01	2.84	3.00	3.89**

Note: Since the score range for some of the measures—e.g., religiosity, parent-friends influence—was changed between 1970 and 1972, developmental comparisons between Tables 9.1 and 9.2 mean scores would be misleading in those cases

* $p < .05$

** $p < .001$

Another way of examining the relation of the social-psychological variables to variation in onset of marijuana use is to compare the groups on the same measures *at the end of the study*, in 1972. Mean scores in 1972 should reflect variation in length of involvement with marijuana, that is, the outcome of the transition. The data relevant to this issue are presented in Table 9.2.

The data in Table 9.2 are strongly related to the time of onset variation. In a number of instances, the means of the two groups that made the transition, Groups b and c, moved closer to the mean of Group d and further away from Group a, the group that did not make the transition to use. The multiple correlations against the onset criterion score were considerably higher: .69 for males, .72 for females, and .68 for the sexes combined. Thus, the 1972 measures of the social-psychological framework account for nearly 50% of the variance in the onset criterion, almost twice as much as was accounted for by the 1970 antecedent measures.

Onset of Marijuana Use and Social-Psychological Development

The demonstration of a social-psychological readiness to begin use of marijuana that is in fact predictive of its onset and the demonstration that time since onset is related to subsequent social-psychological outcome both suggest that *the course of social-psychological development during adolescence should vary depending on whether and when marijuana use begins*. This issue is addressed in this section by plotting the actual course of development over the study years of the four transition groups on a variety of measures of the theoretical variables. For many of the variables, scores are available for all four years, 1969–1972, whereas for others they are available only in the latter 3 years.

Fig. 9.1 presents the “growth curves” of attitude toward deviance (the higher the score the greater the intolerance) for the four transition groups for 1969–1972. The nonusers (Group a) were most intolerant in 1969 and remained most intolerant throughout; while becoming significantly more tolerant over the years, they nevertheless were still less tolerant in 1972 than any of the other groups *in 1969*. Group d, the users, was the group most tolerant of deviance in 1969, and they showed no significant change over the study years on this measure. The two groups that make the transition from nonuse to use during the study are intermediate in tolerance of deviance at the outset, and both become significantly more tolerant by the end. What is especially interesting is that the two initiate groups, originally significantly more intolerant than the users, converge on the latter group so that by 1972 there is no difference between their means, making the means of all three groups significantly different from the mean of the nonusers. Using marijuana has, it would appear, “homogenized” the two previously nonuser groups with Group d on this attitudinal measure of personal control. The curves in Fig. 9.1, then, evidence a systematic relation between the development of a personality attribute and the time of onset of marijuana use in adolescence.²

Fig. 9.2 presents the curves for value on achievement and again the same characteristics are apparent. On this measure, the two initiate groups were close to the nonuser group in 1969, and all three were significantly higher than the user group.

²All references in this section to differences being significant either over time for the same group or between different groups at a given time are based on two-tailed *t* tests with $p < .05$.

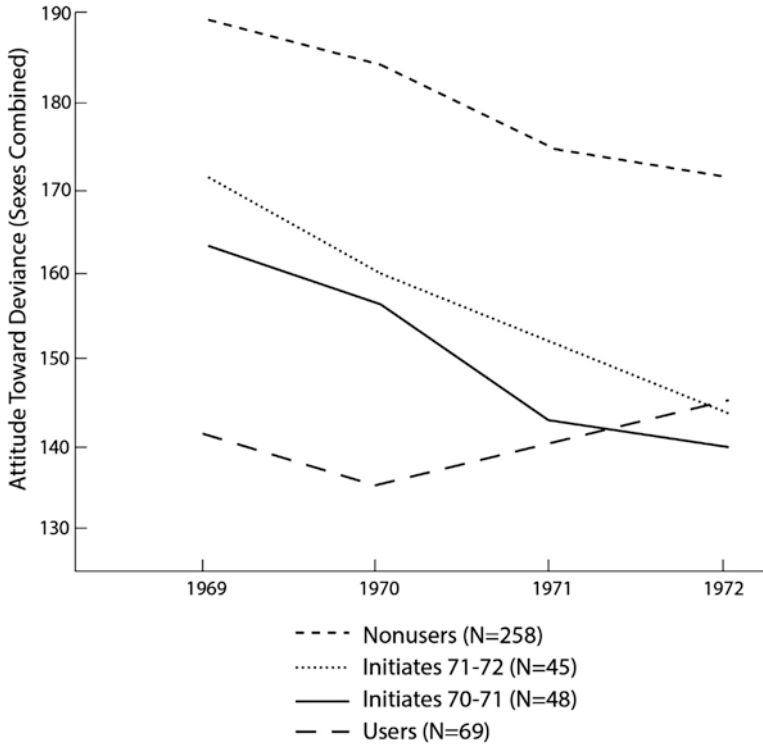


Fig. 9.1 Development of attitude toward deviance and the onset of marijuana use

Although all groups declined in value on achievement over the study years, the slope was steeper for the initiate groups than for the nonusers, and by 1972 there was an evident convergence with the users. In 1972 there was no significant difference among the two initiate groups and the user group, and all three were significantly lower in value on achievement than the nonusers.

Fig. 9.3 represents the development of an attribute of the perceived environment, the perceived prevalence of friends models for drug use. Here again, across 1970–1972, the different courses of development associated with variation in time of onset of marijuana use are observable. Again there was convergence of the two initiate groups with the user group by 1972; what is of further interest is the fact that the steepest slope of increase for each initiate group occurred during its respective year of onset of marijuana use.

On another measure of the perceived environment, total friends’ approval for a variety of problem behaviors, the four groups were perfectly ordered in 1970 with regard to likelihood of onset, and the two transition groups again converged, by 1972, on the user group. In 1972, the three user groups were all significantly higher in total friends’ approval for problem behavior than the nonusers (Fig. 9.4).

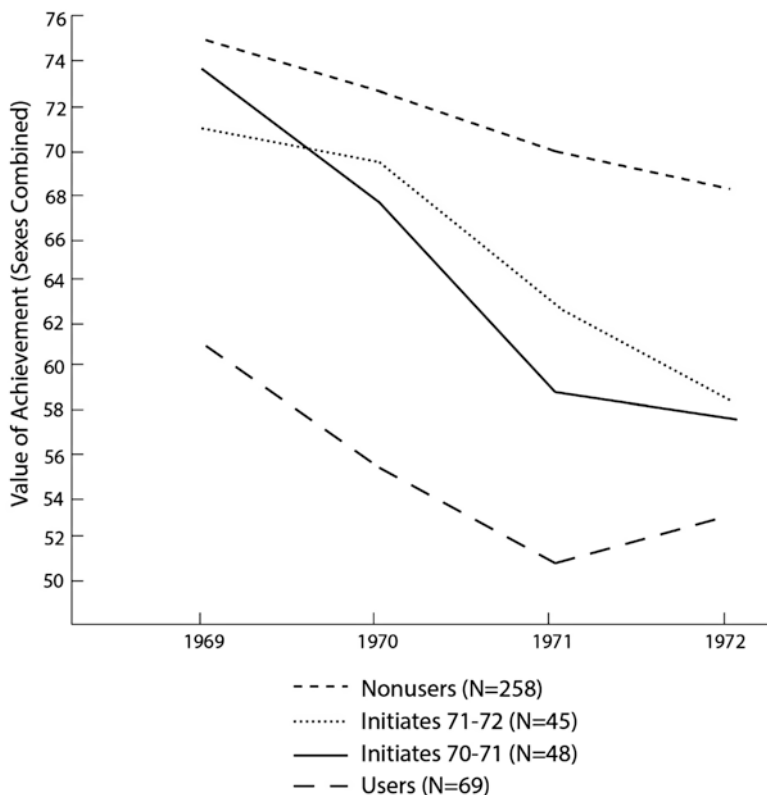


Fig. 9.2 Development of value on achievement and the onset of marijuana use

Fig. 9.5 represents a measure from the behavior system, general deviance, a measure that focuses on such behaviors as lying, stealing, property destruction, and aggression, and makes no reference to drug use, alcohol use, or sex. The curves are consistent in showing the developmental phenomena previously noted: the initial ordering in regard to likelihood of transition, the marked convergence on the mean of the user group, and, in this case again, the occurrence of the steepest slopes of increase in the year in which marijuana onset took place. In 1972, the nonusers were significantly lower in general deviant behavior than the other three groups, and there was no significant difference among the latter.

The figures, taken together, make a strong case for a systematic *developmental relationship* between onset of marijuana use and other social-psychological attributes. These findings are a unique and important outcome of the longitudinal research design.

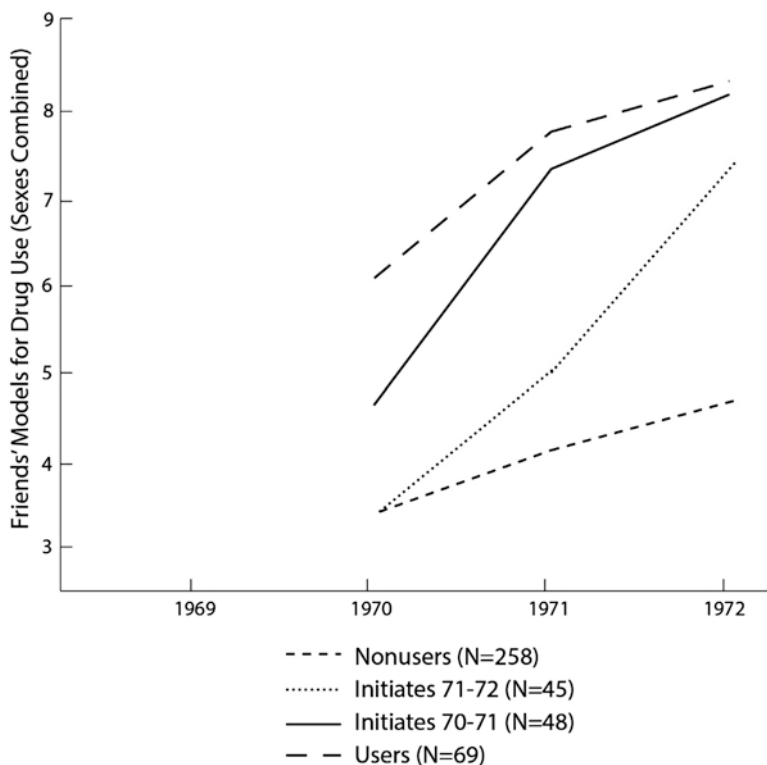


Fig. 9.3 Development of friends' models for drug use and the onset of marijuana use

Onset of Marijuana Use and Prevalence of Other Transition or Problem Behaviors

The relation of time of onset of marijuana use to prevalence of other problem or possible transition behaviors, for example, experience of sexual intercourse, problem drinking, or participation in activist protest, is shown in Table 9.3.

There is a significant relation between the onset of marijuana use and the prevalence of each of the three behaviors shown in Table 9.3. Both initiate groups showed higher prevalence in 1972 than the nonuser group, and the groups are ordered in direct relation to length of time since onset. Rates for these three behaviors in the early onset group are about three times the rates in the nonuser group, a difference in magnitude that is of obvious social significance. Thus, the onset of marijuana use cannot be seen as an isolated transition or behavior change but instead is related to other problem or transition behaviors—as it should be according to Problem Behavior Theory.

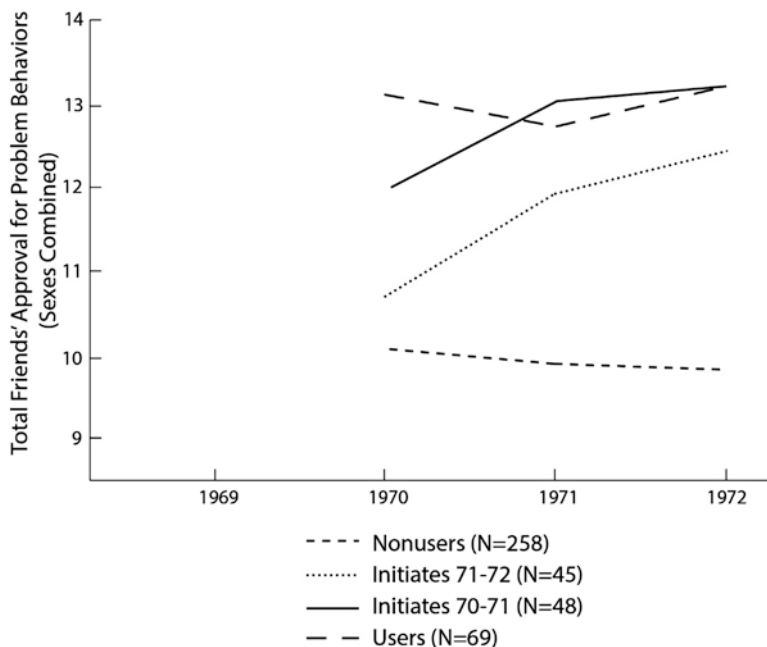


Fig. 9.4 Development of total friends' approval for problem behaviors and the onset of marijuana use

Discussion

The aim of this report has been to assess the utility of a social psychology of problem behavior for predicting the onset of marijuana use. Onset and time of onset were shown to be systematically related to a social-psychological pattern of attributes defined in the theory as deviance or transition proneness. That pattern includes lower value on achievement and greater value on independence, greater social criticism, more tolerance of deviance, and less religiosity in the personality system; less parental control and support, more friends' influence, and more friends' models and approval for drug use in the perceived environment system; more deviant behavior, less church attendance, and lower school achievement in the behavior system. The nonusers of marijuana tend to represent the opposite pattern, a pattern of relative conventionality or conformity.

Of special importance, the longitudinal data enabled the examination of the developmental trajectories of these theoretical attributes in relation to marijuana onset. It was quite clear that the course of adolescent development varies significantly in relation to whether and when marijuana onset occurs. Beginning to use

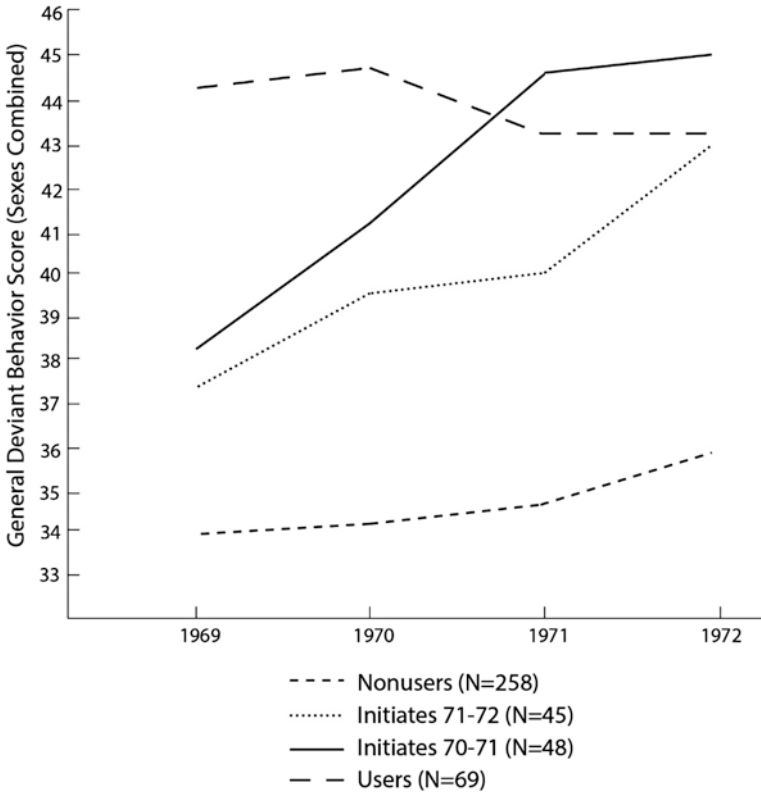


Fig. 9.5 Development of general deviant behavior and the onset of marijuana use

Table 9.3 Marijuana Transition Groups and Prevalence of Other Problem Behaviors, Year 4 (1972) Data, Sexes Combined

Transition group	% reporting each behavior		
	Sexual intercourse	Problem drinking	Activist protest
Nonusers	17	19	9
Initiates (1971–1972)	41	58	20
Initiates (1970–1971)	48	67	34
χ^2	28.1*	61.6*	22.8*

* $p < .001$

marijuana is associated with a developmental divergence from nonusers and a convergence on the social-psychological characteristics of those who are already users. The word “associated” is important to stress since, of course, no causal interpretation of the relations among the changes is warranted.

Finally, it was shown that marijuana onset is related to the prevalence of other problem or transition-marking behaviors such as sexual intercourse experience, problem drinking, or participation in activist protest. The conclusion to be drawn is that deviance or transition proneness is not specific to a given behavior but constitutes instead a more general developmental notion.

Several limitations of the present study remain to be acknowledged. First, the fact that the participants in the longitudinal research represent only 52% of the originally designated random sample precludes generalizing to the larger population. Second, not all of the measures of the theoretical variables employed in the larger project were related to onset of marijuana use or showed differential change over time in relation to onset; these include measures of internal-external control, self-esteem, and values and expectations for affection. And third, while prediction of marijuana onset from antecedent characteristics was significant, it should be emphasized that only about 25% of the variance in the onset criterion was accounted for.

In evaluating the import of such limitations, several balancing points need to be kept in mind. The loss of 48% of the original random sample in no way constrains the kind of comparisons between groups in the sample that were the primary objective of this study. In addition, the obtained sample yielded a wide range of variation on all of the measures employed, variation that made the desired comparisons between groups entirely feasible. Further, since the 52% who did participate were those willing to make a voluntary commitment to 4 years of involvement, the validity of the self-report data on which the research rests was clearly enhanced. Another point is that the findings were not restricted to a small handful of measures; instead, an unusually large number of variables was assessed, and significant findings occurred on at least some measures in each of the three major social-psychological systems—personality, the perceived environment, and behavior—and in each of the theoretical structures within the three systems. Finally, the results are consonant with numerous other studies of marijuana use among youth. The relative unconventionality of users was reported by Suchman (1968) in his study of “the hang loose ethic.” The importance of peer models and support has been emphasized in Kandel’s work (1973), and by Sadava (1971) and Johnson (1973); and the relation between marijuana use and other problem behavior has emerged in a variety of studies (for useful reviews of the literature see Braucht, Brakarsh, Follingstad, & Berry, 1973; McGlothlin, 1975; Sadava, 1975). A study that, like ours, reports data collected before involvement with marijuana was done with college students (Haagen, 1970). Nevertheless, the antecedent differences between subsequent users and nonusers parallel those we have reported, especially in relation to variation in conventional orientations and behavior.

The utility of the theoretical concept of deviance or transition proneness has also been supported in our analyses of other possible transition-marking behaviors. These include the onset of drinking (R. Jessor & S. L. Jessor, 1975) and the shift from virginity to nonvirginity (S. L. Jessor & R. Jessor, 1975). The relations among these transitions are elaborated in a lengthy report of the overall study (R. Jessor & S. L. Jessor, 1977). The concept, as defined in relation to a social psychology of problem behavior, appears to identify an important disposition toward personal development and change in adolescents.

Acknowledgments The research reported here is part of a larger, longitudinal study of “The Socialization of Problem Behavior in Youth” supported by the National Institute on Alcohol Abuse and Alcoholism, Grant AA-00232, R. Jessor, principal investigator. The author is indebted to John Finney and Shirley L. Jessor for their invaluable contributions.

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Chapter 10

Problem Behavior Theory and the Use of Marijuana

Richard Jessor and Shirley L. Jessor

In this chapter, we report some findings from a longitudinal study in which junior high school and college students were followed across four annual testings. Although the objectives of the study were broad and encompassed adolescent development in general, our concern here is focused primarily on the use of marijuana and on its personality, environmental, and behavioral antecedents, correlates, and consequences. Inasmuch as the strategy of longitudinal research is the unifying theme of this volume, a few comments about our own orientation to that theme may be helpful before turning to the study itself.

The uses of longitudinal or panel research are often too narrowly—and sometimes too optimistically—construed. Increasingly, one finds the same coda at the end of articles reporting on cross-sectional research findings: an exhortation that longitudinal study is needed to determine the causal structure of the obtained associations. The narrowness lies in the restriction of interest in longitudinal design to its relevance for causal inference only; the optimism lies in the rather naive notion that causal inference is easily attainable through mere temporal extension of observation. Neither perspective seems appropriate. In addition to their potential relevance to causal concerns, panel studies are uniquely important because of the *descriptive information* they can yield about process and change: descriptions of the course of human development, of the trajectories of psychosocial growth, or of the contour of

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Jessor, R., & Jessor, S. L. (1978). Theory testing in longitudinal research on marijuana use. In D. B. Kandel (Ed.), *Longitudinal research on drug use: Empirical findings and methodological issues* (pp. 41–71). Washington, DC: Hemisphere Publishing Corporation.

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behavioral trends. Descriptive data of this sort on youth are almost nonexistent at present, and their future accumulation depends entirely upon longitudinal study. It would indeed be unfortunate, as Wohlwill (1973) cautions, if we allowed traditional preoccupation with experimental paradigms to divert us from efforts to describe the natural course of individual change. Another unique use of longitudinal study is for assessing the adequacy of theories that contain propositions about development and change. Such dynamic formulations are obviously dependent upon time-extended research strategies.

The main contribution of panel design to causal inference itself would appear to derive from the temporal structure it imposes upon observation. Knowledge of temporal order and sequence does permit the rejection of certain alternative inferences. But causal inference depends ultimately on logic and theory rather than on an inevitable or automatic outcome of any research design. Causal inference is a presumption that, as Blalock (1964) points out, “can never be proved beyond all doubt no matter what the nature of one’s empirical evidence” (p. 3). The problem remains the enduring, elusive, and general one of how to organize observations so they will have a coercive impact on inference, how to make a particular causal interpretation so compelling as to be almost inescapable. Generally, the compellingness of an inference increases as multiple lines of evidence converge upon it and as claims for alternative inferences can be empirically refuted or weakened. In an earlier work (Jessor, R., Graves, Hanson, & Jessor, S. L., 1968/1975, pp. 137–149), we discussed a variety of strategies in cross-sectional field research for *minimizing inferential ambiguity*. Longitudinal design is a particularly advantageous strategy toward that same end, but it would seem prudent to keep in mind that it is really only one more strategy in the armamentarium of inference.

In light of this perspective, our own longitudinal research was designed to make use of a variety of different strategies all of which, if convergent, might add an increment to the compellingness of interpretation: (1) the employment of a theoretical framework and of theory-derived measures; (2) a pervasive reliance on various kinds of replication—across time, across sex, across school levels, across cohorts within a school level, and across functionally related behaviors; (3) the demonstration of systematic cross-sectional relationships preliminary to examining time-extended ones; (4) the description of change over time in both “predictor” and “criterion” measures, with reliance on the logical implications of parallel change or concomitant variations; (5) the prediction, over time, of the onset of a new behavior, with reliance on the logical implications of successful forecasting of the initial occurrence of a behavioral event; and finally, (6) the demonstration of a systematic relation between time of onset of a behavior and variation in the course of psychosocial development, with reliance on the logical implications of such direct covariation. These various strategies provide the general structure for the chapter, and each is further elaborated to make its implications clearer; it should be noted, however, that only the last three depend uniquely upon the longitudinal design of the research.

A Social-Psychological Framework for the Study of Problem Behavior

The investigation of drug use in our research was part of a larger interest in exploring the utility of a social-psychological theory of problem behavior and development in youth. Formulated initially to guide a study of deviance in a triethnic community (Jessor, R., et al., 1968/1975), the framework has since been modified and extended to bear on problem behavior among youth in contemporary American society—drug use, drinking and problem drinking, sexual experience, activist protest, and general deviance including stealing, lying, and aggression (Jessor, R., 1976; Jessor, R., Collins, & Jessor, S. L., 1972; Jessor, R., & Jessor, S. L., 1973a, 1973b, 1975; Jessor, R., Jessor, S. L., & Finney, 1973; Jessor, S. L., & Jessor, R., 1974, 1975; Rohrbaugh & Jessor, R., 1975; Weigel & Jessor, R., 1973). In addition, the logical implications of the framework for adolescent development and change have also been elaborated. Because theory can increase the relevance of the observations achieved to the inferences sought, it has played a central role in our overall strategy. By enabling a behavior such as drug use to be embedded in a network of concepts, theory also makes it possible to see the logical relation to other behaviors and to variation in personality and environmental characteristics.

Because of limitations of space and because the entire social-psychological framework is extensively discussed in R. Jessor and S. L. Jessor (1977), our presentation here is fairly brief. The conceptual structure of Problem Behavior Theory is schematized in Fig. 10.1, and our discussion follows largely from it. In this chapter, we are concerned with the three boxes of variables labeled A, B, and C: the Personality System, the Perceived Environment System, and the Behavior System, respectively. The variables in all three of the systems lie at what is essentially a social-psychological level of analysis. The concepts that constitute personality, or the person system, (values, expectations, beliefs, attitudes, orientations toward self and others) are cognitive and reflect social meanings and social experience. The concepts that constitute the environment (supports, influence, controls, models, expectations of others) are those that are amenable to logical coordination with personality concepts and that represent environmental characteristics capable of being cognized or perceived; that is, they are socially organized dimensions of potential meaning for actors. Behavior, too, is treated from a social-psychological perspective, emphasizing its socially learned purposes, functions, or significance rather than its physical parameters. The occurrence of behavior is considered the logical outcome of the interaction of personality and environmental influence; in this respect, the formulation represents a social-psychological field theory, assigning causal priority neither to person nor to situation.

Each system is composed of structures of variables interrelated and organized so as to generate a resultant: a dynamic state designated “problem-behavior proneness” that has implications for a greater or lesser likelihood of occurrence of problem behavior. Instead of tracing the rationale for the selection of the particular variables and developing the reasoning that underlies their relation to problem behavior, it must suffice here just to list the characteristics of problem-behavior proneness in each system. In the Personality System, the main characteristics of proneness to problem behavior include lower value on academic achievement; higher value on independence; greater value on

independence relative to value on achievement; lower expectations for academic achievement; greater social criticism and alienation; low self-esteem and orientation to an external locus of control; greater attitudinal tolerance of deviance; lesser religiosity; and more importance attached to positive, relative to negative, functions of problem behavior. The more these personality characteristics obtain for a person at a given point in time—the more they constitute a coherent pattern, constellation, or syndrome—the more personality proneness to problem behavior they theoretically convey.

Our conceptual focus in the environment system has been on the environment as perceived, the environment of socially learned significance, the environment constituted out of “definitions of the situation” (Thomas, 1928). Logically, the perceived environment is the one that should have the most invariant relation to behavior, as we have argued elsewhere (Jessor, R., & Jessor, S. L., 1973b). (In that same paper, incidentally, we have shown that the environment represented by demographic characteristics is conceptually so remote from behavior that the correlations of such measures with marijuana use, at least in our samples, are close to zero.) Within the perceived environment, we draw an important distinction between “regions,” or structures, in terms of their proximal, versus distal, relation to behavior. Proximal variables (for example, peer models for marijuana use) directly implicate a particular behavior, whereas distal variables (for example, the degree of normative consensus between parents and peers) are more remote in the causal chain and therefore require theoretical linkage to behavior. Problem-behavior proneness in the Perceived Environment System consists of low parental support and controls; low peer controls; low compatibility between parent and peer expectations; and low parent, relative to peer, influence within the distal structure. In the proximal structure, problem-behavior proneness includes low parental disapproval of problem behavior and both high friends models for and high friends approval of engaging in problem behavior.

The Behavior System is differentiated into a problem-behavior structure and a conventional-behavior structure. *Problem behavior* refers to behavior socially defined either as a problem, as a source of concern, or as undesirable by the norms of conventional society or the institutions of adult authority; it is behavior that usually elicits some kind of social-control response. The latter, of course, may be as minimal as an expression of disapproval or as extreme as incarceration. The possibility that phenotypically very different behaviors (for example, smoking marijuana, engaging in sexual intercourse, or taking part in a peaceful demonstration) may all serve the same social-psychological function (for example, overt repudiation of conventional norms or expressing independence from parental control) is what underlies the notion of a structure of problem behavior. Research that is behavior specific, perhaps focusing on drug use alone, risks being theoretically parochial and ignores the important significance of the concept of problem behavior as one that may subtend functionally similar, mutually substitutable, even simultaneously learned, alternative social behaviors. The array of behaviors in the problem-behavior structure makes possible, not only an examination of their interrelations, but also—in providing multiple criterion variables—a more exhaustive appraisal of the explanatory capability of Problem Behavior Theory. Related to the making of such an appraisal is the conventional-behavior structure, which includes behaviors that should enable a demonstration of discriminant validity in the application of Problem Behavior Theory.

Thus far, our interest in Fig. 10.1 has been cross-sectional. We have been concerned with describing problem-behavior proneness separately within the Personality and Perceived Environment Systems and, thereby, with separate linkages to the Behavior System, but as the heavy arrow connecting boxes A and B with C suggests, a further cross-sectional aim is to examine the *joint* relation between those two systems and behavior, that is, to take what we have termed the *field theoretical approach* to explanation.

Not dealt with as yet are the logical implications in Problem Behavior Theory for development and change, some comment on which is necessary. Although no time dimension is represented in Fig. 10.1, implications for change over time can be drawn from the theory by the elaboration of the notions of age grading, age norms, and age expectations in relation to problem behavior (for a recent review of some of these considerations of age stratification and differentiation, see Elder, 1975; see also Riley, Johnson, & Foner, 1972). Neugarten and Datan (1973), in a very provocative essay, have pointed to the fact that “every society has a system of social expectations regarding age-appropriate behavior . . . [and] . . . individuals themselves are aware of age norms and age expectations in relation to their own patterns of timing” (pp. 59, 61). Much of what we have discussed as problem behavior is, of course, relative to age-graded norms; that is, the behavior may be permitted or even proscribed for those who are older, while being proscribed for those who are younger. Drinking, as one example, is proscribed for those under legal age but is permitted and even institutionally encouraged for those who are beyond that age; sexual intercourse, normatively acceptable for adults, is a normative departure for a young adolescent, and one that is likely to elicit social controls. Consensual awareness among youth of the age-graded norms for such behaviors carries with it, at the same time, the shared knowledge that occupancy of a more mature status is actually characterized by engaging in such behavior. Thus, engaging in certain behaviors for the *first* time can mark a transition in status from “less mature” to “more mature,” from “younger” to “older,” or from “adolescent” to “youth” or “adult.”

Many of the important transitions that mark the course of adolescent development involve behaviors that depart from the regulatory age norms defining appropriate or expected behavior for that age or stage in life. It is important to emphasize that *behavior that departs from regulatory norms is precisely what Problem Behavior Theory is meant to account for*, and this becomes the basis for the systematic application of Problem Behavior Theory to developmental change in adolescence. By mapping the developmental concept of *transition proneness* onto the theoretical concept of *problem-behavior proneness*, it becomes possible to use Problem Behavior Theory to specify the likelihood of occurrence of developmental change through display of age-graded, norm-departing, transition-marking behaviors.

In summary, we have sketched out the structure and content of Problem Behavior Theory and its logical implications for both cross-sectional and longitudinal variation in problem behavior including the use of marijuana. Testing those implications leads us to examine both cross-sectional and panel data in accordance with the various strategies noted at the outset of the chapter. Before doing that, however, the general methodology of the research and the research design itself need to be described.

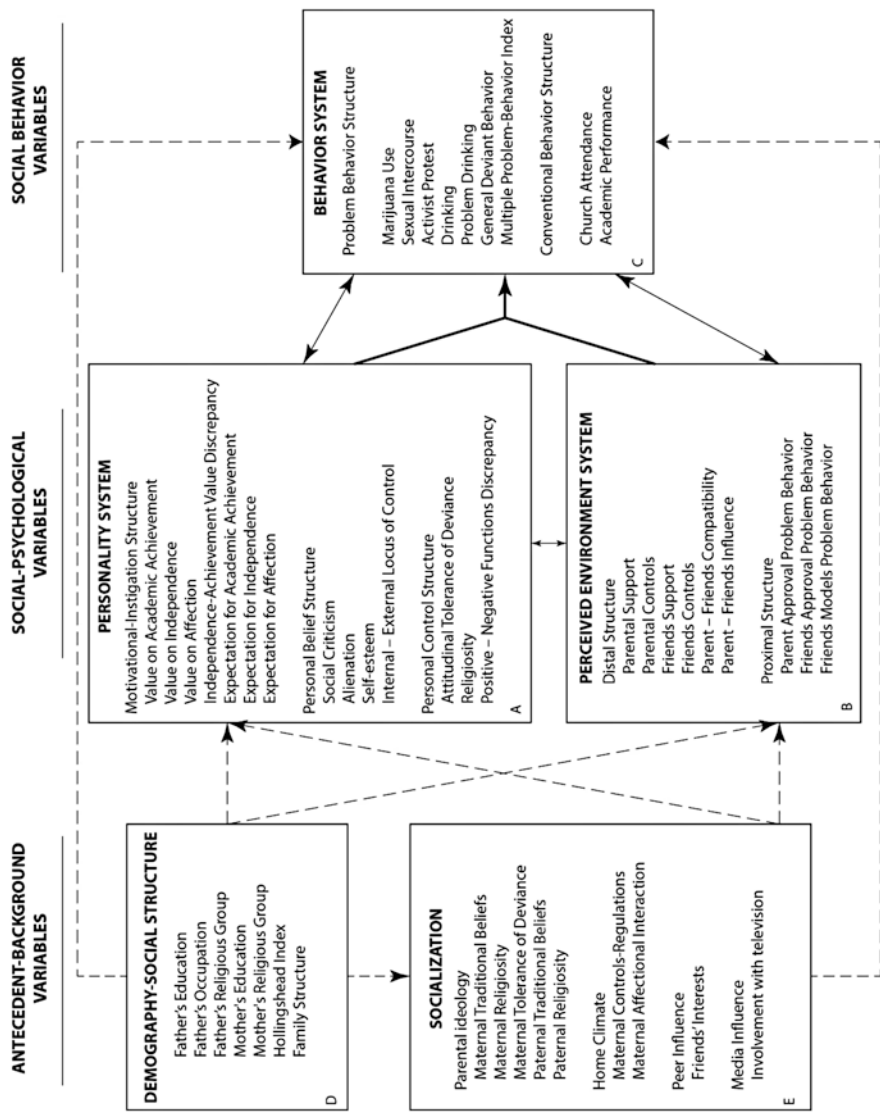


Fig. 10.1 The conceptual structure of Problem Behavior Theory (Jessor & Jessor, 1977)

Design of the Research

The larger research project included two parallel, but separate, short-term, longitudinal studies, one of high school youth and one of college youth. In each study, each participant was tested on four successive annual occasions so that there were four temporally ordered data points over an actual time span of 3 years. The initial data in the high school study were collected in April–May of 1969, and the final data were collected at the same point in the spring of 1972. The initial data in the college study were collected in April–May of 1970; final data, in the spring of 1973.

As part of a larger sampling design for the high school study, a random sample of 1,126 students, stratified by sex and grade level, was designated in grades 7, 8, and 9 of three junior high schools in a small city in the Rocky Mountain region. Students were contacted by letter and asked to participate in a 4-year study of personality, social, and behavioral development. Parents were also contacted by letter and asked for signed permission for their child's participation. Permission was received for 668 students and, of these, 589 (52% of the random sample) took part in the Year I testing in the spring of 1969. By the end of the Year IV testing in 1972, 483 students were still in the study, representing 82% retention of the Year I participants. Of these, there were 432 students (188 boys and 244 girls) for whom there was no missing year of data. It is this latter group that constitutes our high school core sample for longitudinal or developmental analyses, and it is this sample on which the high school data presented in this chapter are based. The sample is actually composed of six separate, sex-by-grade cohorts as of 1969: seventh-grade males ($N = 75$), seventh-grade females ($N = 96$), eighth-grade males ($N = 60$), eighth-grade females ($N = 82$), ninth-grade males ($N = 53$), and ninth-grade females ($N = 66$). By the final year in 1972, these students—initially all in junior high school—had reached senior high school and were in grades 10, 11, and 12.

The core sample, then, represents good retention (73%) of the initial-year participants over four annual testings; it provides a wide range of variation on all measures; and it is large enough to permit the kinds of breakdowns needed for the analyses reported later on in the chapter. Although generalization to the parent population is precluded by the fact that the core sample constitutes only 38% of the original random sample, the core sample is, nonetheless, satisfactory for the testing of hypotheses about variation in behavior and development. Demographically, the core sample is relatively homogeneous: almost entirely Anglo-American in ethnic background and middle class in socioeconomic status.

Data were collected in April–May of each year by an elaborate questionnaire, approximately 50 pages in length, requiring about an hour and a half to complete. The questionnaire consisted largely of psychometrically developed scales or indexes assessing the variety of personality, social, behavioral, and demographic variables shown in the conceptual framework in Fig. 10.1. Although many of the measures derive from and were validated in previous work (for example, Jessor, R., et al., 1968/1975), prior to its present use, the entire questionnaire was pretested and scales were revised to increase their appropriateness for the student samples. The

majority of scales were kept constant over the testing years, but modifications were made in some, and new ones were added at various times. Administration of the questionnaires took place in small group sessions outside of class, and strict confidentiality was guaranteed because questionnaires had to be signed to permit follow-up.

For the college study, a random sample of 497 freshman students was designated in the College of Arts and Sciences of a university in the same Rocky Mountain city. When contacted by letter in the spring of 1970 and asked to participate in the research over the next four years, 462 students were still in school. Of those contacted, 276 (60%) participated in the spring 1970 initial testing. By the end of the Year IV testing in 1973, 226 students were still in the study, and 205 of these had no missing year of data. The latter group (92 men and 113 women) constitutes the core developmental sample in the college study; the members represent 41% of the original random sample and 74% of the participants who had been tested in the freshman year.

Dropping out of school or moving away from the community were negligible in the high school study. In the college core sample, by 1973, 64% were still at the same university, 20% were at another university, and 16% had dropped out of school at some point and not returned, even though remaining in the study.

In the college study, data were also collected by questionnaires, administered in small group sessions, with confidentiality guaranteed. The questionnaire was very similar to that used in the high school, and many of the scales were, in fact, identical. Table 10.1 lists most of the major scales reported on in this chapter; it shows the number of items in each scale, the possible score range, Scott's homogeneity ratio (about .33 is considered optimal), and Cronbach's alpha reliability for both the high school and the college studies. For the most part, especially where scales have more than a few items, measurement properties are quite satisfactory.

Interest in the study was high among both the high school and the college students, and the quality of the questionnaire data is generally excellent. Participants seemed especially to appreciate the comprehensiveness of the questionnaire and its coverage of a wide range of content. Analyses of the attrition subsequent to the initial year of testing indicate that those who left the study were very similar on their initial-year data in both studies to those who stayed. Thus, selective dropout from the studies does not seem to be a source of additional bias beyond the original erosion from the designated random samples.

Several features of the research design are worth emphasizing in relation to the methodological orientation of the study as a whole. The first and most apparent one is the provision made for pervasive replication of observations and findings. For example, in both the high school study and the college study, there is opportunity to carry out four, separate, annual cross-sectional tests of the explanatory usefulness of the social-psychological framework. In addition, within any year, findings can be replicated across sexes, across age or grade groups, and across the two different school contexts. Considering the six sex-by-grade cohorts in the high school study and the two sex cohorts in the college study, there are actually eight independent subsamples in which any theoretical relationship may be separately examined. The possibility for such replication over time and across samples lessens the likelihood

Table 10.1 Scale Properties of the Year IV Measures in the High School Study (1972) and College Study (1973) Questionnaires

Measure	High School Study				College Study			
	Number of items	Score range	Scott's H.R.	Cronbach's alpha	Number of items	Score range	Scott's H.R.	Cronbach's alpha
Personality System								
<i>Motivational-instigation structure</i>								
Value on academic achievement	10	0-90	.53	.91	10	0-90	.48	.90
Value on independence	10	0-90	.35	.84	10	0-90	.28	.78
Value on affection	10	0-90	.41	.87	10	0-90	.45	.89
Expectation for academic achievement	10	0-90	.57	.92	10	0-90	.49	.90
Expectation for independence	10	0-90	.36	.85	10	0-90	.21	.71
Expectation for affection	10	0-90	.42	.88	10	0-90	.48	.90
<i>Personal belief structure</i>								
Social criticism	9	9-45	.20	.69	13	13-52	.30	.85
Alienation	15	15-60	.23	.81	15	15-60	.23	.81
Self-esteem	10	10-40	.29	.80	10	10-40	.33	.83
Internal-external control	22	22-110	.13	.77	18	18-90	.15	.76
<i>Personal control structure</i>								
Tolerance of deviance	26	0-234	.36	.93	20	0-180	.36	.92
Religiosity	7	0-28	.55	.89	5	4-20	.49	.82
Perceived Environment System								
<i>Distal structure</i>								
Parental support	2	2-10	.56	.71	2	2-10	.59	.74
Parental controls	2	2-10	.46	.62	2	2-10	.41	.58
Friends support	2	2-10	.52	.68	2	2-10	.59	.73
Friends control	2	2-10	.16	.28	2	2-10	.34	.51
Parent-friends compatibility	3	3-15	.56	.79	3	3-15	.56	.79
Parent-friends influence	2	2-6	.47	.64	2	2-6	.44	.61
<i>Proximal structure</i>								
Parent approval problem behavior	4	α	.33	.66	4	α	.22	.53
Friends approval problem behavior	4	α	.28	.61	4	α	.26	.58
Friends model problem behavior	3	α	.45	.71	4	α	.27	.59

(continued)

Table 10.1 (continued)

Measure	High School Study				College Study			
	Number of items	Score range	Scott's H.R.	Cronbach's alpha	Number of items	Score range	Scott's H.R.	Cronbach's alpha
Behavior System								
<i>Problem-behavior structure</i>								
Marijuana behavior involvement	4	0–8	.65	.88	4	0–8	.52	.81
General deviant behavior	26	26–104	.21	.85	20	20–80	.16	.74
Multiple problem-behavior index	5	0–5	.28	.66	5	0–5	.13	.43

^aThese scale scores are the sum of *z* scores from separate subscales. In the High School Study, a constant of 11.0 was added to the *z*-score sums.

that findings would reflect the vicissitudes of a particular testing year or that the idiosyncrasies of a particular sample would be given more credence than deserved. Second, the previously noted descriptive interest in psychosocial development can obviously be pursued by following the cohorts through time with repeated measures. Third, the design makes possible the testing of the predictive implications of the theory by permitting the accumulation of data temporally antecedent to the event being predicted, for example, the initial use of marijuana among those who had not begun using it until after the Year I testing. The fourth and final feature worth mentioning, as it is not obvious in the structure of the design, is the role played by the theory in the content of the measures employed. Most of the major measures were theoretically derived to capture the logical properties of the concepts in the framework; as such, they make the data they yield germane to the testing of the theory in a way that ad hoc measures usually do not.

With this discussion in mind, we can turn to the presentation of specifically selected data from the overall longitudinal project. The presentation of data is organized around the several inferential strategies already listed. The strategy of reliance upon theory serves throughout as the background against which the data constitute the figure. The strategy of replication is illustrated in the context of the other strategies. Thus, we can begin with the first strategy that refers to a particular analytic mode: the analysis of cross-sectional relationships.

Cross-Sectional Analysis as Part of a Longitudinal Strategy

Because the appraisal of theoretical expectations on the basis of cross-sectional data is the conventional practice in most studies, a word should be said about our inclusion of this kind of analysis as part of a set of strategies in longitudinal research. If the research enterprise itself can be looked at as a developmental process through

time, it might be argued that the establishment of cross-sectional relationships should be an ontogenetically prior stage to the investigation of time-extended relationships. The latter, precisely because of the time dimension involved, is likely to be a much more refractory and uncertain endeavor than the former. The prior demonstration that the relationships sought do indeed obtain at a cross section in time constitutes the kind of preliminary step to longitudinal inquiry that can provide the latter with both rationale and focus. Support for the cross-sectional utility of the theory serves, in short, to make its longitudinal appraisal a logical next step (and in any case, cross-sectional analyses offer the fringe benefit of giving the longitudinal researcher something to do while waiting for time to pass).

Our focus in this section is on a measure of increasing involvement with marijuana—the marijuana behavior involvement scale—and on marijuana user versus non user status. The marijuana behavior involvement scale includes four items:

1. Have you ever tried marijuana?
Never ____ Once ____ More than Once ____
2. Have you ever been very high or stoned on marijuana to the point where you were pretty sure you had experienced the drug's effects?
Never ____ Once ____ More than Once ____
3. Do you or someone very close to you usually keep a supply of marijuana so that it's available when you want to use it?
No ____ Yes ____
4. Do you use marijuana a couple of times a week or more when it's available?
No ____ Yes ____

Data on this measure from the 1970 testing in both the high school and college were reported in R. Jessor, S. L. Jessor, and Finney (1973); the data considered here are from the Year IV (1972) testing in the high school study, and they are presented in Tables 10.2 and 10.3.

The data in the first column of Table 10.2 are correlations of the measures in the three structures of the Personality System with the measure of marijuana behavior involvement, for males and females separately. Support for the hypothesized personality-behavior linkage (the arrow, in Fig. 10.1, between box A and box C) is clear and quite pervasive. The strongest and most consistent relations between personality and marijuana involvement are those of the measures of the personal control structure, every one of which is significantly associated, and some of which are substantial in magnitude. Adolescents who are more intolerant of deviance and more religious have lesser involvement with marijuana. In the three areas of drinking, drug use, and sex, the more that importance is attached to positive, relative to negative, functions of these behaviors, the lower the control these functions exert and the greater the involvement with marijuana. Drug disjunctions, the most proximal of the three functions-disjunction measures, has, as expected, the strongest relation to marijuana use. Of importance to note is the comparability of these personal-control findings for males and females.

Next in importance in accounting for involvement with marijuana are the motivational-instigation measures. The strongest correlation for both sexes is the

Table 10.2 Pearson Correlations between Personality System Measures and Selected Behavior System Measures in the High School Study, Year IV (1972)

Personality System measures	Behavior System measures					
	Marijuana behavior involvement		Deviant behavior in past year		Church attendance in past year	
	Male ^a	Female ^b	Male ^a	Female ^b	Male ^a	Female ^b
<i>Motivational-instigation structure</i>						
Value on academic achievement	-.27***	-.31***	-.21**	-.39***	.10	.24***
Value on independence	.09	.19**	.09	.13	-.21**	-.08
Value on affection	-.22**	-.19**	-.02	-.13	-.01	.17*
Independence-achievement value discrepancy	.31***	.39***	.24**	.44***	-.23**	-.27***
Expectation for academic achievement	-.16*	-.14*	-.28***	-.29***	-.04	.09
Expectation for independence	.06	.23***	.08	.11	-.21**	-.24***
Expectation for affection	-.12	.01	.02	-.05	-.12	.02
<i>Personal belief structure</i>						
Social criticism	.33***	.35***	.19*	.18**	-.11	-.21**
Alienation	.08	.08	.09	.14*	-.08	-.05
Self-esteem	.10	.08	.10	-.05	-.19*	-.04
Internal-external control	-.17*	-.06	-.27***	-.12	.03	.10
<i>Personal control structure</i>						
Tolerance of deviance	-.41***	-.40***	-.61***	-.57***	.18*	.22**
Religiosity	-.27***	-.31***	-.17*	-.27***	.58***	.48***
Drinking disjunctions	.16*	.18**	.22**	.31***	.02	-.10
Drug disjunctions	.58***	.64***	.27***	.44***	-.10	-.36***
Sex disjunctions	.28***	.38***	.35***	.37***	-.22**	-.32***

^aN = 188^bN = 244

*p < .05

**p < .01

***p < .001

Table 10.3 Correlations between Measures of the Perceived Environment System and Selected Behavior System Measures in the High School Study, Year IV (1972)

Perceived Environment System measures	Behavior-system measures					
	Marijuana behavior involvement		Deviant behavior in past year		Church attendance in past year	
	Male ^a	Female ^b	Male ^a	Female ^b	Male ^a	Female ^b
<i>Distal structure</i>						
Parental support	-.31***	-.21**	-.28***	-.13	-.04	.11
Parental controls	-.15*	-.07	-.04	-.01	.18*	.09
Friends support	.00	.13	-.11	.14*	-.01	-.02
Friends controls	-.43***	-.35***	-.24**	-.22**	.19*	.20**
Parent-friends compatibility	-.31***	-.33***	-.25***	-.25***	.08	.17*
Parent-friends influence	.29***	.18**	.16*	.25***	-.02	-.19**
<i>Proximal structure</i>						
Parent approval problem behavior	.34***	.28***	.19*	.04	-.28***	-.29***
Friends approval problem behavior	.55***	.60***	.36***	.49***	-.32***	-.32***
Friends model problem behavior	.60***	.61***	.44***	.52***	-.22**	-.26***

^aN = 188

^bN = 244

*p < .05

**p < .01

***p < .001

independence-achievement value discrepancy; as expected, the more independence is valued relative to the value on academic achievement, the greater the involvement with marijuana. This finding is supported by the negative correlations with the measures of value on achievement and expectation for achievement, and also by the positive correlations (females only) with value on independence and expectation for independence. Finally, among the measures of personal beliefs, social criticism is positively associated with marijuana use, and consistently so for both sexes, but neither alienation nor self-esteem demonstrates any relationship at all.

Overall, as far as the link between personality and marijuana involvement is concerned, there is evidence for the conclusions that personality characteristics play a modest but significant role, and that the pattern of relations is similar for both males and females. Before turning to the perceived environment, it is of interest to examine the remaining data in Table 10.2. Another problem-behavior measure has

been presented to illustrate the generality of the linkage between personality and problem behavior, and a measure of conventional behavior has been presented for discriminant validity. The measure of deviant behavior in the past year focuses on what might be called “conventional deviance,” that is, lying, stealing, and aggression. None of the items has any reference at all to drug use, alcohol, sex, or protest. The pattern of findings is similar to that for the marijuana measure: The strongest relations are with the personal control measures (tolerance of deviance, now the most proximal to this criterion, has the largest correlation); the motivational-instigation measures, especially independence-achievement value discrepancy, are the next strongest; the personal belief measures are least related (interestingly, social criticism is substantially less associated with this criterion measure than it was with marijuana use). The pattern of relations is, once again, generally similar for both sexes. This introduction of another problem-behavior criterion measure makes it clear that the linkage between personality and marijuana use is not behavior specific, and this is a very important contribution to the explanatory effort.

The correlations in Table 10.2 with the frequency of church attendance in the past year add to our conviction about the adequacy of the measures and the theoretical formulation. The key personality measures relate to this measure of conventional behavior in a direction opposite to their relation to the two problem-behavior measures, as would be expected theoretically.

In Table 10.3, the high school data are presented for the measures of the Perceived Environment System in relation to the same three behavioral criteria. There is consistent and even substantial support for the hypothesized environment-behavior linkage (represented by the arrow, in Fig. 10.1, between box B and box C). With respect to the marijuana involvement criterion, the expected prepotency of the proximal environment is apparent, with the two measures that refer to the peer reference group—friends approval for and friends models of problem behavior—having correlations of considerable magnitude for both sexes. The measures in the distal structure are also of interest; the more a supportive relation with parents is perceived, the less the involvement with marijuana. The measures of perceived compatibility or agreement between parents and friends and of the relative influence of these two different reference groups are particularly revealing: the less the compatibility and the greater the relative influence of friends, the greater the involvement with marijuana. Both of these measures suggest, other things being equal, that the developmental move out of the family context and into the peer context, either into incompatible peer expectations or into greater peer influence, is associated with an increase in behavior that departs from the norms of adult society, in this case, marijuana use.

The data for the deviant behavior and the church attendance measures play the same role they did in the preceding table. Relationships of the perceived environment measures to deviant behavior are comparable to their relationships with marijuana use, although not as strong, and are again similar for both sexes. With regard to church attendance, the expected opposite relations are apparent, especially in the proximal structure.

Table 10.4 Mean Scores of Nonusers and Users of Marijuana on Personality System Measures in the High School Study, Year IV (1972)

Personality System Measures	Males		Females	
	Nonusers (N = 117)	Users ^a (N = 68)	Nonusers (N = 148)	Users ^a (N = 95)
<i>Motivational-instigation structure</i>				
Value on academic achievement	68.2	58.4***	67.6	53.7***
Value on independence	72.7	74.1	76.0	78.8*
Value on affection	66.4	59.0**	71.2	65.4**
Independence-achievement value discrepancy	94.5	105.6***	98.4	115.1***
Expectation for academic achievement	60.5	54.2*	59.2	51.0**
Expectation for independence	70.3	70.7	73.1	77.4**
Expectation for affection	58.3	54.3	60.5	59.9
<i>Personal belief structure</i>				
Social criticism	27.8	31.8***	29.7	32.7***
Alienation	34.6	36.1	35.3	36.6
Self-esteem	29.7	30.1	30.0	30.3
Internal-external control	61.7	58.4**	62.3	61.6
<i>Personal control structure</i>				
Tolerance of deviance	162.7	133.7***	176.9	151.8***
Religiosity	15.1	11.0***	17.4	12.5***
Drinking disjunctions	31.6	34.0	27.8	31.6*
Drug disjunctions	17.7	27.0***	15.5	28.4***
Sex disjunctions	18.9	21.1*	13.2	18.3***

^aAsterisks refer to the level of significance of the difference between the nonuser and the user mean scores by one-way analysis of variance, two-tail test

* $p < .05$

** $p < .01$

*** $p < .001$

The cross-sectional data thus far presented have been correlational and focused on a particular measure of marijuana involvement. That measure, marijuana behavior involvement, has been used throughout our research and in a national-sample survey of high school youth as well. As noted earlier, the measure includes items referring to getting high or stoned and to safeguarding a supply, as well as to frequency of use; in these respects, therefore, it differs from the use, versus nonuse, measure employed in most other research. The measure of marijuana behavior involvement has shown excellent Guttman-scale properties in both the present study and the national-sample study. Nevertheless, to make clear that the findings are stable and are not dependent on the particularities of a measure or statistic, another kind of analysis is presented in Tables 10.4 and 10.5. Here the participants in the high school study are divided by use status, *users* being those reporting at least more than once use of marijuana.

Table 10.5 Mean Scores of Nonusers and Users of Marijuana on Measures of Perceived Environment System: in the High School Study, Year IV (1972)

Perceived Environment System measures	Males		Females	
	Nonusers (N = 117)	Users ^a (N = 68)	Nonusers (N = 148)	Users ^a (N = 95)
<i>Distal structure</i>				
Parental support	7.7	6.5***	7.8	7.1**
Parental controls	6.4	5.6**	6.0	5.5
Friends support	6.7	6.6	7.6	8.0
Friends controls	6.4	5.3**	6.7	5.7***
Parent-friends compatibility	8.5	7.3**	9.0	7.2***
Parent-friends influence	3.2	3.7**	3.4	3.9*
<i>Proximal structure</i>				
Parent approval problem behavior	10.4	12.4***	10.3	11.8***
Friends approval problem behavior	10.0	12.6***	9.8	13.1***
Friends model problem behavior	9.6	12.4***	10.0	13.2***

^aAsterisks refer to the level of significance of the difference between the nonuser and the user mean scores by one-way analysis of variance, two-tail test

* $p < .05$

** $p < .01$

*** $p < .001$

Mean differences between nonusers and users on the various theoretical measures are evaluated by analysis of variance. An examination of the personality data in Table 10.4 and of the perceived environment data in Table 10.5 makes clear both their consistency with the correlational data on the somewhat different marijuana involvement measure presented earlier and their similarity for both sexes.

The final concern of the cross-sectional strategy is one that follows from the fact that the theoretical framework illustrated in Fig. 10.1 is based upon a multivariate logic. The logic of each of the systems rests upon the joint operation of its component structures and variables, and the logic of the framework as a whole rests upon the joint contribution of the separate systems. To pursue these implications, we have relied upon multiple regression analyses carried out in what we have termed a *uniform multivariate analysis procedure*. This procedure involves a standard set of 14 multiple regressions run against each criterion measure for each sample in each study, both for a key data year and for a replication year. The 14 regressions are organized in sequential, cumulative sets to make possible an examination of the multivariate account achieved by each set of variables independently and prior to its inclusion with other sets of variables. In addition, not all the variables in the framework are used in the various sets and, as sets are cumulated, only certain variables of key theoretical interest are carried along, while others are dropped. Thus, the aims of the uniform multivariate analysis procedure are (1) to maintain the focus on the theoretical concerns by restricting the number of variables used and by examin-

Table 10.6 Multiple Correlations of Theoretical Structures and Systems with Marijuana Behavior Involvement in the High School Study, Year IV (1972), and College Study, Year IV (1973)

	High school study		College study	
	Male (<i>N</i> = 188)	Female (<i>N</i> = 244)	Male (<i>N</i> = 92)	Female (<i>N</i> = 113)
1. Motivational-instigation	.31	.39	^g	.25 ^h
2. Personal belief	.35	.36	.40	.42
3. Personal control	.45	.44	.41	.36
4. Personality System ^a	.52 (.49) ^f	.54 (.45)	.40 (.48)	.43 (.51)
5. Distal structure	.42	.37	.22	.35
6. Proximal structure	.66	.66	.56	.64
7. Perceived Environment System ^b	.65 (.59)	.64 (.61)	.54 (.44)	.60 (.70)
8. Field pattern ^c	.65 (.60)	.68 (.59)	.57 (.55)	.61 (.70)
9. Aggregate set ^d	.70	.70	.69	.69
10. Functions discrepancy	.59	.64	.45	.56
11. Behavior	.60	.61	.49	.43
12. Functions-behavior	.72	.71	.56	.59
13. Socioeconomic background	^g	.16	^g	^g
14. Overall set ^e	.76 (.71)	.77 (.70)	.67 (.70)	.68 (.77)

Note: All runs are stepwise regressions with an *F*-to-enter of 2.0 and an *F*-to-delete of 1.0. The names for the runs refer to the theoretical structures and systems shown in Fig. 10.1

^aRun 4, Personality System, is a selection of the five theoretically most important variables from the nine variables in Runs 1, 2, and 3

^bRun 7, Perceived Environment System, is a selection of the four theoretically most important variables from Runs 5 and 6

^cRun 8, Field pattern, is a selection of six variables from those in Runs 4 and 7

^dRun 9, Aggregate set, includes all 16 of the variables used in Runs 1, 2, 3, 5, and 6, and thus it serves to maximize the R^2 as against the theoretically focused R^2 yielded by Run 8

^eRun 14, Overall set, adds selected behavior and functions and demographic measures to the variables included in Run 8 and reflects the contribution of more of the domains in the larger conceptual framework shown in Fig. 10.1

^f*R*s in parentheses are the comparable multiple correlations from the replication analyses of the Year III data in the high school and Year II data in the college

^gNone of the variables in the set entered significantly

^hThis multiple correlation does not reach an *F* value that is significant at the .05 level or better; all correlations without this symbol are significant at the .05 level or better

ing the theoretical structures separately and (2) to appraise the magnitude of the variance in the criterion measures that can be accounted for by the joint influence of the components in the framework. Greater detail about the procedure and the specific variables used appears in R. Jessor and S. L. Jessor (1977, pp. 127–142). For present purposes, we rely on the information provided in Table 10.6.

The data in Table 10.6 are multiple correlations for the 14 separate runs against the marijuana behavior involvement scale. The table shows the replications of the multiple regressions across the two sexes and in both the high school study and the

college study for their Year IV data. In parentheses are the comparable multiple correlations from the replications on the Year III data. From this array of replications, it is possible to get a sense of the stability and generality of the findings as well as some conviction about the general amount of variance for which the different sets of variables and the overall framework can account.

There is a great deal of information in Table 10.6, only a portion of which can be addressed in this context. Consider the males in the high school study for example. The Personality System run, which includes five variables, achieves an $R = .52$. This is an increase over the highest bivariate correlation of its best component, namely, the .41 correlation of tolerance of deviance with marijuana involvement. The run for the Perceived Environment System for the males yields an $R = .65$, which is higher than the .60 bivariate correlation of its strongest component, friends models for problem behavior. The field pattern, combining personality and environment, does not, in this case, yield a larger R than the environment alone. The overall set, a combination of 14 selected personality, perceived environment, behavioral, and socioeconomic-background variables (out of the 24 that are used in the procedure), yields a multiple R of .76, indicating that a substantial amount of variance in the marijuana involvement criterion—over 50%—is accounted for by the problem behavior framework.

The consistency of the major multiple R s is noteworthy across sexes, across data years, and even across the two studies. For example, the eight separate multiple R s for the overall set are all fairly close together. They all generate R^2 s that account for about 50% of the criterion variance. Cross-sectional support for the utility of the framework, in relation to marijuana involvement, appears strong; but further strengthening comes from two additional considerations. First, when the uniform multivariate analysis procedure is applied, within the high school study, to the six sex-by-grade cohorts (rather than to the combined males and the combined females as in Table 10.6), the R s for the overall set against the marijuana criterion are .81, .79, and .81 for 10th-, 11th-, and 12th-grade males, respectively, and .79, .85, and .74 for the 10th-, 11th-, and 12th-grade females, respectively. Thus, the utility of the theory is apparent also at the specific cohort level. Second, when a different marijuana criterion is considered—a direct measure of frequency of use of marijuana in the past 6 months—the multiple R s for the overall set are .63, .52, .63, and .48 for high school males, high school females, college males, and college females, respectively. Although considerably lower, these R s are still significant and substantial, and they reflect a degree of robustness of the framework over alternative criterion measures in the drug use domain. It is of further interest in this regard to report the multivariate data from a recent national-sample survey of junior-senior high school youth that included many of our predictor measures. For a sample of over 6,000 males and over 6,000 females, the multivariate run equivalent to our overall set yielded multiple correlations against marijuana behavior involvement of .74 and .75, respectively (see Chase & Jessor, R., 1977).

The data in this section make a strong case for the cross-sectional utility of Problem Behavior Theory in relation to involvement with marijuana use. With these considerations serving as groundwork, it is now possible to turn to the first of three specifically longitudinal strategies for inference.

Description of Change as Part of a Longitudinal Strategy

The paucity of descriptive knowledge about the social-psychological growth of adolescents seriously limits efforts at understanding the nature of problem behavior. In our own work, considerable attention has been given to establishing how the variables in the theory change over time, to describing their trajectories, and to plotting “growth curves” of personality, environmental, and behavioral attributes during this developmental period. Establishing the fact that change takes place and the shape of its course, while important in its own right, has the additional advantage of providing a strategy, albeit an indirect one, for testing the developmental adequacy of Problem Behavior Theory. That strategy rests upon the theoretical expectation that there should be a *consonance* between the developmental changes occurring in the personality and the perceived environment measures—the “predictors”—on the one hand, and the behavior measures—the “criteria”—on the other. Such a developmental consonance, the congruence of theoretically parallel change, would constitute initial support for the relevance of the explanatory variables to behavioral development.

The implementation of this strategy can be accomplished by presenting, in graphic form, the changes on the measures of a few selected variables over the time span of the research. In Fig. 10.2, the scores on the measure of value on academic achievement over the four annual testings are presented for the six sex-by-grade cohorts in the high school study. The most striking aspect of the six trajectories is their decline over the years; all the declines are statistically significant as indicated both by one-way analyses of variance across time and by matched-sample *t* tests of the difference, for each cohort, between its Year I and its Year IV mean score (the only exception is the ninth-grade female cohort, which declines significantly to 1971 but then increases). The consistency of these curves suggests a developmental lessening of the importance attached to academic achievement during the adolescent years. Given our theoretical interpretation of value on academic achievement as conventionally oriented motivation, this developmental trend is in a direction away from conventionality; it implies, instead, a higher problem-behavior proneness with development during adolescence.

The same data can be plotted against age to yield an age-related picture of the developmental changes in value on academic achievement in the various cohorts, over the age span of 13 to 18 in the high school study. This has been done in Fig. 10.3, and the college study data have also been added to include the entire age range covered by our research. Looked at with a smoothing eye, there is a best-fitting line that suggests a clear developmental decline in value on academic achievement through the adolescent period from 13 to 18, with a possible leveling out near the end. Although the college sample is not really comparable to the high school samples, it is of interest to see that the college males and females start out not very different from where the high school cohorts finish, and they continue the leveling out suggested by the latter.

Plotting the data for value on independence would show a significant increase for the cohorts over time. Because higher value on independence is, theoretically, a

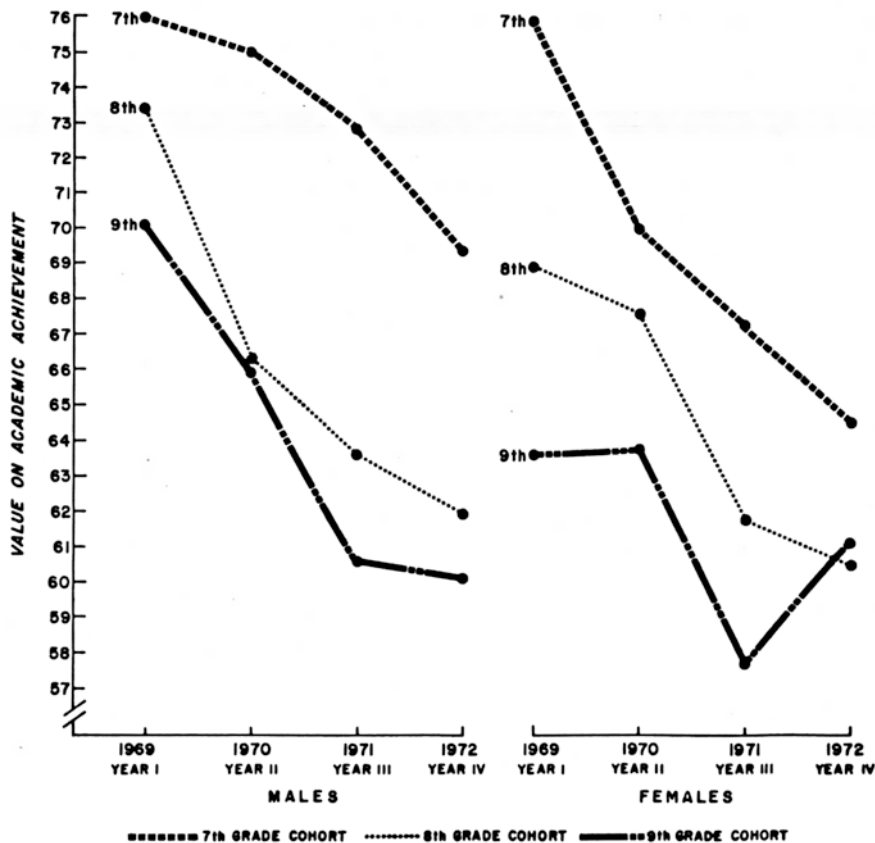


Fig. 10.2 Personality development during adolescence in the High School Study

problem-prone motivational orientation, these changes are also in the direction of an increased likelihood of problem behavior with adolescent development. Thus, the decline in value on academic achievement and the increase in value on independence are consonant in their implications for problem behavior. The developmental changes in altitudinal tolerance of deviance (a variable in the personal control structure) show a consistent decline in intolerance for both sexes. This increased acceptance of transgression is also theoretically consonant with the directions of the two previously discussed personality attributes.

Turning to the perceived environment, we have argued elsewhere (Jessor, R., & Jessor, S. L., 1973b) that it makes sense to conceive of growth curves for attributes of the perceived environment in the same way as for attributes of personality or ability. A similar point has been made by Nesselrode and Baltes (1974) in relation to their concept of *environmental ontogeny*. We have selected one attribute from the

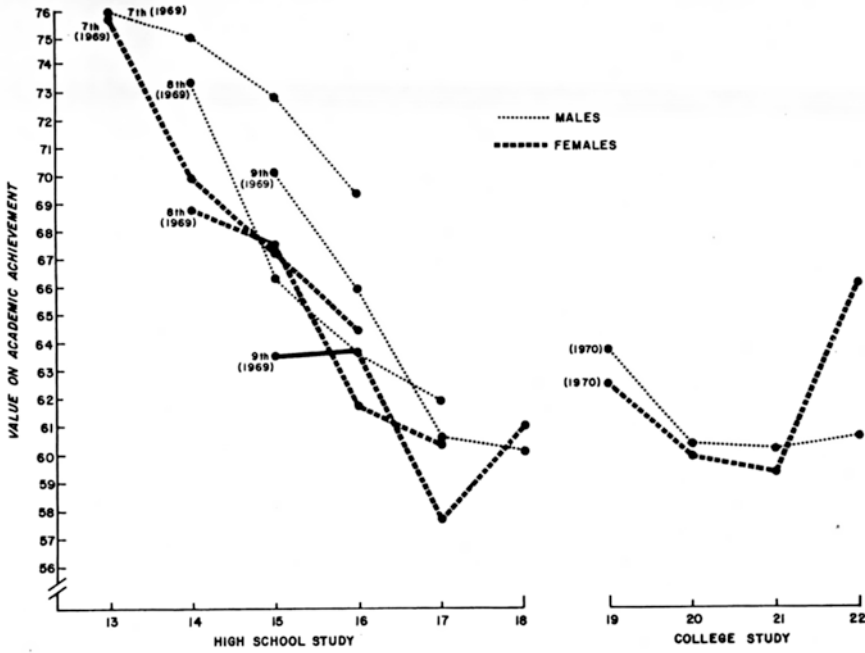


Fig. 10.3 Personality development in relation to age

proximal structure to illustrate development in the perceived environment. In Fig. 10.4, the data on perceived friends models for drinking are plotted for the combined high school males and the combined high school females. A highly significant increase in the perceived prevalence of drinking among friends is evident in the curves for both sexes over the four measurements. This measure and others suggest that, ontogenetically, the proximal environment becomes more approving of problem behavior and provides more models for it over time. Such environmental changes are, theoretically, in the direction of greater proneness toward problem behavior. These environmental trends are, therefore, fully consonant with those discussed earlier for personality.

In order to examine whether these trends are actually consonant with the expected increase in problem behavior during adolescence, we have plotted the marijuana behavior involvement scores for each cohort over the three years in which it was measured. Fig. 10.5 clearly shows that a significant increase in marijuana involvement does occur for all cohorts. The same data are plotted against age in Fig. 10.6, and the college study data are also included. Once again, an age-related developmental trend toward increased involvement with marijuana seems very apparent. These developmental increases in marijuana use are entirely consonant, theoretically, with the developmental changes noted above in the personality and perceived

Fig. 10.4 Perceived environment development during adolescence in the High School Study

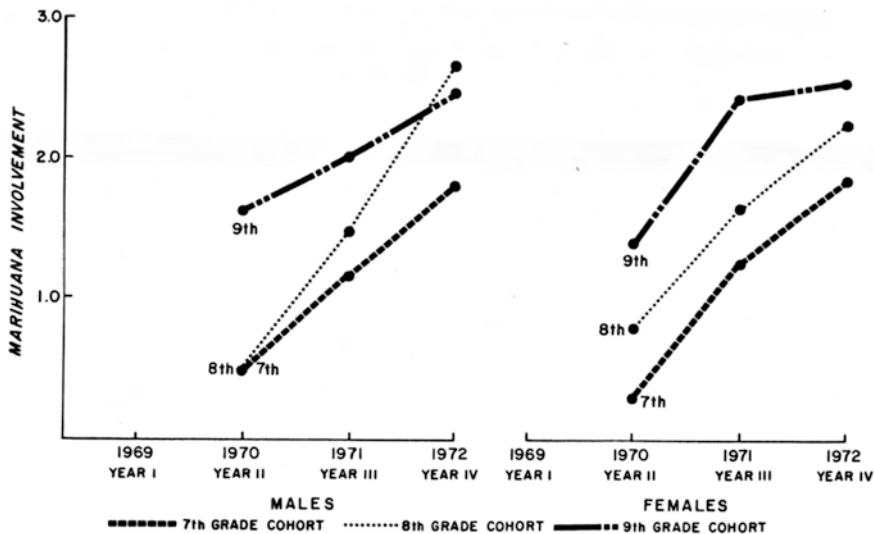
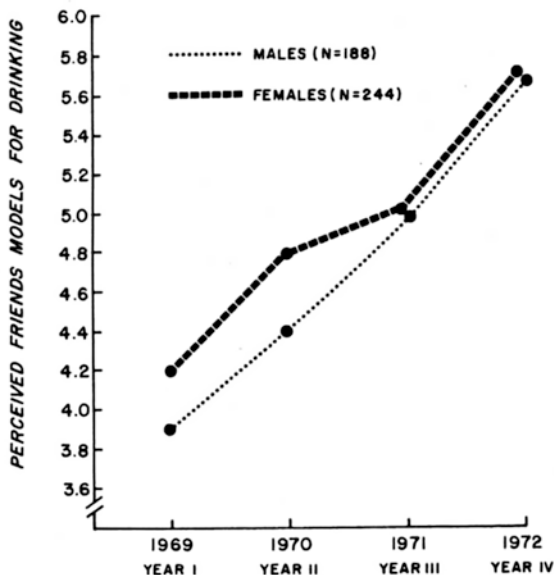


Fig. 10.5 Behavior development during adolescence in the High School Study

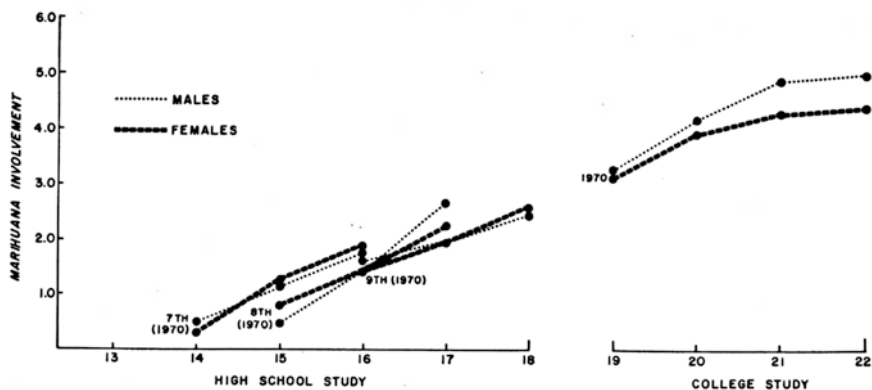


Fig. 10.6 Behavior development during adolescence in relation to age

environment predictors. The marijuana-use changes are themselves supported by other behavioral trends not illustrated here, for example, a significant developmental increase in deviant behavior and a significant developmental decline in church attendance.

There are two issues relevant to the interpretation of these changes that are discussed in detail in our book (Jessor, R., & Jessor, S. L., 1977) but which can only be noted here. First, there is the question of the adequacy of the measures for representing developmental change. Stability coefficients were computed for all measures over the three 1-year intervals and over the one 3-year interval; in general, temporal stability is satisfactory for a time interval of the length of a year, especially where scales have more than a few items. Second, there is the question of whether the changes simply reflect a repeated testing effect. In the absence of an untested control group, we have to seek to minimize this alternative inference on other grounds. Of interest here is the fact that Nesselroade and Baltes (1974), in a recent related study, did employ such a control; and they conclude for their data that “by and large, the longitudinal gradients of personality dimensions are not contaminated by...testing...effect” (p. 38). Further, the actual content of the developmental changes they observed are, in several instances, comparable to those reported here, for example, a decrement in superego strength and in achievement and an increase in independence.

Description of change as part of a longitudinal strategy for inference appears to permit the following conclusion: There is an evident developmental consonance between the changes observed in the personality and perceived environment systems on the one hand, and in the behavior system on the other. These theoretically parallel changes would seem to provide support, although indirect, for the developmental utility of Problem Behavior Theory. At the same time, and more specifically, they call attention to the variables that are likely to be relevant to changes in marijuana involvement.

Forecasting of Onset as Part of a Longitudinal Strategy

In the preceding strategy, it was possible to establish that changes do occur over time on the variables in the framework and to establish the direction of those changes, but it was not possible to establish a time lag between any of the changes. It is toward the latter objective that the present strategy is directed. Forecasting is a procedure that does incorporate a time lag, inasmuch as a temporally subsequent event is predicted on the basis of temporally antecedent information. A particularly compelling implementation of such a procedure would seem to be the forecasting of the initial appearance of an event or, in our terms, the onset of a new behavior. In the present context, we consider the onset of marijuana use.

The approach pursued was to establish three groups of students on the basis of their status as users or nonusers of marijuana in Years III and IV of the high school study. One group consisted of nonusers in Year III who remained nonusers in Year IV, that is, a no-onset group; a second group consisted of nonusers in Year III who became users by the Year IV testing, that is, an onset group; and a third group consisted of those who were users already in Year III, that is, a group that had experienced onset previously. By comparing the first two groups on their data in Year III when both were nonusers, it is possible to ascertain whether they differ in what we have defined as "transition proneness," namely a temporally antecedent pattern signaling a readiness to engage in transition-marking behavior. In evaluating differential transition proneness in the two groups, a reference standard is provided by the group that had begun use prior to Year III. The high school study data relevant to this analysis are presented in Table 10.7.

There is clear support in Table 10.7 for the predictive utility of the theoretical concept of transition proneness, and in that regard, these findings replicate an earlier analysis made of the Years I-II onset and described in R. Jessor, S. L. Jessor, & Finney (1973). The results are stronger and more consistent for the females than for the males, though support is present for both sexes. Those females who were nonusers in Year III, but who began marijuana use by Year IV, differ from the nonusers in Year III who remained nonusers by Year IV on a variety of theoretical attributes measured in Year III. They had significantly lower value on academic achievement; higher value on independence; higher value on independence relative to value on achievement; higher expectations for independence; higher alienation; greater tolerance of deviance; greater positive, relative to negative, functions for drinking, drugs, and sex; less parental support; less parent-friends compatibility; greater friends, relative to parents, influence; greater friends approval of and friends models for problem behavior; and greater general deviant behavior. Several other measures, for example, expectations for academic achievement and religiosity, while not significantly different, yield mean scores that are also in the theoretically expected direction. The pattern is pervasive and consistent. The Year-III mean scores of the group that will initiate in the subsequent year are, in almost every case, intermediate between the mean of the group that will not initiate and the mean of the group that had previously initiated. For the high school females, then, this analysis indicates

Table 10.7 Year III (1971) Mean Scores on Personality, Perceived Environment, and Behavior System Measures for Marijuana Nonusers Who Remain Nonusers by Year IV, for Marijuana Nonusers Who Begin Use by Year IV, and for Users in Both Years, in the High School Study

Measure	Males (N = 188)				Females (N = 244)				F	Onset <i>t</i>	U3-U4 (N = 73)	F		
	NU3-NU4 (N = 115)	NU3-U4 (N = 24)	U3-U4 (N = 44)	Onset <i>t</i>	NU3-NU4 (N = 147)	NU3-U4 (N = 22)	U3-U4 (N = 73)	Onset <i>t</i>						
Personality System														
<i>Motivational-institution structure</i>														
Value on academic achievement	69.8	68.2	57.2	0.4	69.1	57.2	52.3	2.3*	7.6***	69.1	57.2	52.3	2.3*	19.4***
Value on independence	72.0	69.9	76.1	0.7	73.4	77.8	75.4	-1.8†	2.3†	73.4	77.8	75.4	-1.8†	1.3
Value on affection	65.1	64.3	59.2	0.2	71.0	67.3	63.4	0.9	1.8	71.0	67.3	63.4	0.9	5.2***
Independence achievement value discrepancy	92.1	91.7	108.9	0.1	94.2	110.5	113.1	-3.0**	13.4***	94.2	110.5	113.1	-3.0**	25.9***
Expectation for academic achievement	58.8	56.9	50.6	0.5	59.4	54.5	47.3	0.9	2.8†	59.4	54.5	47.3	0.9	10.2***
Expectation for independence	66.3	62.4	68.4	1.4	68.8	74.9	71.0	-2.3*	1.6	68.8	74.9	71.0	-2.3*	2.4†
Expectation for affection	56.1	57.9	53.6	-0.6	60.6	60.4	58.1	0.0	0.7	60.6	60.4	58.1	0.0	0.7
<i>Personal belief structure</i>														
Social criticism	28.6	29.0	32.8	-0.4	30.3	30.4	32.7	-0.1	11.9***	30.3	30.4	32.7	-0.1	6.3**
Alienation	35.6	36.1	36.8	-0.5	35.1	38.4	36.2	-2.2*	0.7	35.1	38.4	36.2	-2.2*	3.1*
Self-esteem	29.6	29.1	29.7	0.7	29.4	30.7	29.6	-1.6	0.2	29.4	30.7	29.6	-1.6	1.3
<i>Personal control structure</i>														
Tolerance of deviance	168.2	152.3	130.2	2.0†	179.1	155.1	148.9	2.5*	18.5***	179.1	155.1	148.9	2.5*	16.3***
Religiosity	13.1	12.1	9.9	0.9	14.4	12.3	10.9	1.7	9.2***	14.4	12.3	10.9	1.7	17.3***
Drinking disjunctions	29.8	33.2	34.6	-1.6	27.7	32.4	33.1	-1.7†	4.0*	27.7	32.4	33.1	-1.7†	6.4**
Drug disjunctions	15.6	21.7	27.8	-2.8**	15.5	23.6	28.6	-4.2***	28.4***	15.5	23.6	28.6	-4.2***	55.1***

(continued)

Table 10.7 (continued)

Sex disjunctions	17.4	17.7	22.2	-0.2	8.2***	11.9	17.1	16.5	-4.6***	12.6***
Perceived Environment System										
<i>Distal structure</i>										
Parental support	7.5	6.9	6.6	1.7†	4.7*	7.6	6.7	6.7	1.7†	4.6*
Parental controls	6.3	6.5	5.6	-0.7	3.0†	6.1	6.1	5.9	0.1	0.3
Friends support	6.1	6.4	6.5	-0.9	1.4	7.4	7.5	7.9	-0.2	1.8
Friends controls	5.8	5.8	5.4	0.0	2.0	6.3	5.9	5.5	1.3	6.7**
Parent-friends compatibility	8.4	8.0	6.8	0.8	7.9***	9.1	7.4	6.5	3.0**	28.2***
Parent-friends influence	3.1	3.2	4.0	-0.5	12.6***	3.3	4.2	4.2	-3.2**	17.8***
<i>Proximal structure</i>										
Parent approval problem behavior	10.7	10.9	11.9	-0.4	4.2*	10.3	10.0	11.5	0.6	4.7**
Friends approval problem behavior	10.0	12.2	12.8	-4.7***	29.3***	9.8	11.7	12.8	-3.9***	38.0***
Friends models problem behavior	9.5	10.7	12.3	-3.6***	46.5***	10.2	11.1	12.9	-2.8**	56.9***
Behavior System										
General deviant behavior	35.6	40.1	45.8	-3.1**	37.6***	34.0	39.4	42.8	-3.1**	42.4***
Church attendance, past year	27.3	20.8	11.9	1.3	6.2**	32.3	33.8	14.8	-0.2	10.4***
Grade-point average	3.0	3.0	2.8	-0.5	1.8	3.1	2.8	2.7	1.5	11.0***

Note: All *t* tests are two tailed
 †*p* < .10
 **p* < .05
 ***p* < .01
 ****p* < .001

the existence of a temporally prior pattern of attributes that constitutes a readiness to engage in transition-marking behavior, in this case the use of marijuana, and that signals a higher likelihood of its onset. The content of the pattern is similar to the content that emerged from the cross-sectional analyses of the differences between marijuana users and nonusers reported earlier in Tables 10.4 and 10.5.

The results for the high school males, while considerably weaker than they were for the previously reported Years I-II analysis, do indicate transition-proneness differences in the personal-control structure and, especially, in the proximal structure of the perceived environment. Similar analyses for the onset of other behaviors, such as beginning to drink and engaging in sexual intercourse, also provide strong evidence that measures antedating onset are predictive of its prospective occurrence among high school youth. When multiple regression analyses were run for the overall set of predictors in Year III against the dichotomous criterion of onset, versus no onset, of marijuana use by Year IV, the R s for females and males were .41 and .33, respectively. Though not accounting for very much of the variance, they are nevertheless significant.

Time of Onset and Course of Development as Part of a Longitudinal Strategy

The final strategy we discuss briefly, for it has been reported previously for both the onset of drinking (Jessor, R., & Jessor, S. L., 1975) and the onset of marijuana use (Jessor, R., 1976) among high school youth. The aim of the strategy is to show a further connection between changes in the theoretical attributes and the occurrence of problem behavior, in this case, marijuana use. More specifically, the strategy seeks to demonstrate that the course of social-psychological development during adolescence varies systematically, depending on whether and on when marijuana use begins. For this purpose, four groups of students were constituted: (1) *nonusers* ($N = 258$; 113 males and 145 females)—those students who reported no use of marijuana over the study years; (2) *initiates 1971–1972* ($N = 45$; 24 males and 21 females)—those relatively late-onset students who began use of marijuana in the final year of the study; (3) *initiates 1970–1971* ($N = 48$; 18 males and 30 females)—those relatively early-onset students who began use of marijuana a year earlier than the preceding group; and (4) *users* ($N = 69$; 26 males and 43 females)—those previous-onset students already using marijuana before the 1970 testing. Groups 1, 2, and 3 were all nonusers at the 1970 testing; Groups 2, 3, and 4 were all current users in 1972. When the developmental curves for the theoretical attributes are plotted for the four groups separately, it is possible to see the relation between time of onset of marijuana use and the course of social-psychological development.

In Fig. 10.7, the curves for the development of attitudinal tolerance of deviance over the four testing years in the high school study are presented (the higher the score, the greater the intolerance). The course of development of this attribute of

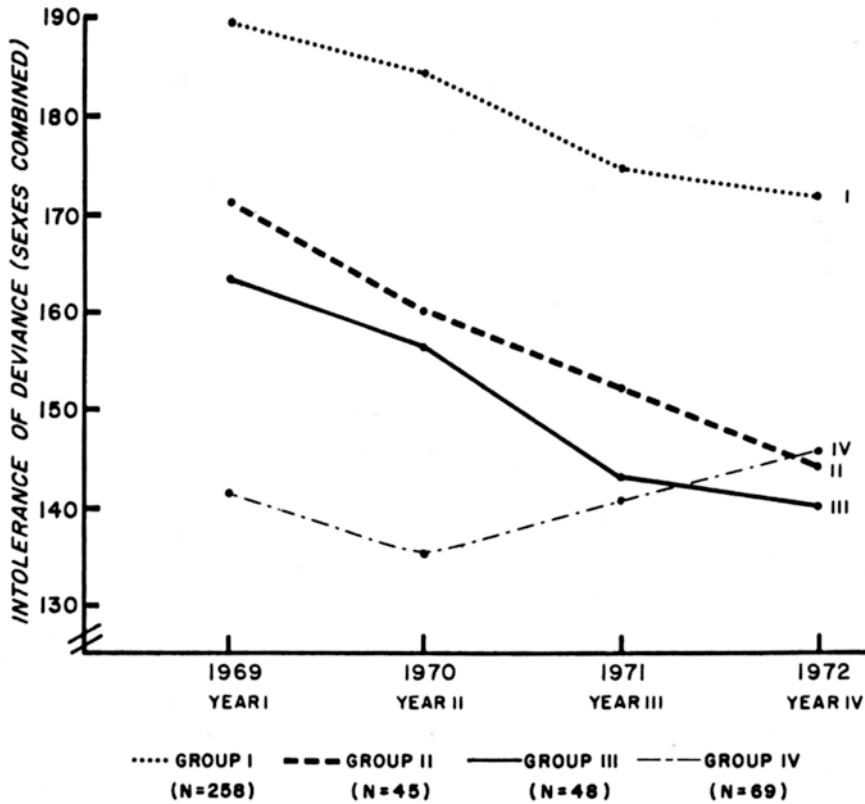


Fig. 10.7 Development of attitude toward deviance and the onset of marijuana use

the personal control structure varies as a function of whether and when marijuana onset took place. The nonusers were most intolerant in 1969 and remained most intolerant throughout; though declining in intolerance significantly over the years, they nevertheless were still less tolerant in 1972 than any of the other groups had been in 1969. The users were most tolerant of deviance in 1969, and they show no significant change on this measure over the years. The two groups that make the transition from nonuse to use are intermediate in tolerance of deviance at the outset, and both become significantly more tolerant by the end. What is especially interesting is that the two initiate groups, significantly more intolerant of deviance than the users in 1969, converge upon the users so that, by 1972, there is no difference between the means of the three groups, and all three means are significantly different from the mean of the nonusers in that year.

What this figure and others not shown here (see Jessor, R., 1976; Jessor, R., & Jessor, S. L., 1975, 1977) illustrate is a systematic relation between marijuana use

and social-psychological development. The curves represent interindividual differences in intraindividual developmental change as a function of time of onset of marijuana use. Unlike the logic of theoretically parallel change dealt with in an earlier section, the present developmental curves are tied directly to variation in behavior. Temporal priority here remains uncertain, however, although in many of the figures there is evidence of anticipatory psychological change in the year preceding the onset of marijuana use.

Discussion

It is apparent that a general strategy for longitudinal research may have a variety of components. We have emphasized six that have played a role in our own work, only three of which are uniquely dependent upon time-extended data, and there are others that will be mentioned in a moment. The rationale for this proliferation rests upon the point made earlier, that the compellingness of inference is largely a function of the convergence of multiple lines of evidence. In this chapter, we have introduced both cross-sectional and longitudinal lines of evidence—three kinds of the latter: descriptive, predictive, and associative. The convergence among these alternative analytic methods has been notable, providing considerable support for the relevance of Problem Behavior Theory as an explanatory framework for variation in marijuana use. The convergence is strengthened by the replications carried out across various samples at different times as well as by the fact that the measures employed were derived from the theory being tested.

It is only fair to say, however, that the causal texture of the relationships we have been dealing with remains very much a matter of presumption. None of our strategies, not even the prediction of onset where a time lag was involved, can do more than document an association and the temporal order of the events or processes involved. That the subsequent events were “produced” by those that were antecedent still eludes direct demonstration, and even if demonstrated, the possibility of the reverse direction in other samples at other times cannot be ruled out. For social-psychological concerns, such as those dealt with here, this latter point is of special importance. Given the nature of the processes involved, it would be strange indeed if causal influence could not in fact operate in different directions in different instances, for example, becoming more tolerant of deviance influencing the exploration of marijuana in one case, and the exploration of marijuana influencing a more tolerant attitude toward deviance in another. It may be that the preoccupation with univocal directionality of cause is an unwarranted legacy from experimental method in the physical sciences. In behavioral science, it may be preferable to adopt a network model of causal influence, with the possibility of traversing from one point to another by a variety of pathways and in alternative directions. In such a perspective, the critical question becomes the relevance of the network.

In establishing the relevance of a network, we have dealt with data obtained from several different procedures. More might have been mentioned. For example, an additional longitudinal strategy we employed focused on the socialization process that links parent with adolescent child. Although the actual data from parent and child were collected at the same time, the focus of the parent interview was on an earlier time than the measure of the child's behavior, and thus a longitudinal time interval was "constituted" between the two sets of data (see Jessor, S. L., & Jessor, R., 1974). A further strategy one of our colleagues has begun to explore with our data is the procedure of cross-lagged panel correlation. Because this is a developing strategy of interest, we present from Finney's work the cross-lagged panel correlations for the relation between attitudinal tolerance of deviance (a variable of the personal control structure in the Personality System) and marijuana behavior involvement. Because Kenny (1975) has suggested that a cross-lagged difference should ideally replicate across different time lags and different groups of subjects, the data in Fig. 10.8 are three-wave data for the high school males and females separately. The data suggest that the causal direction is from personality variable to behavior, from tolerance of deviance to marijuana involvement (results not supported, incidentally, at the college level). They provide one more indication of the relevance of the variables in the problem-behavior framework to marijuana involvement, that is, one more convergent strategy.

The emphasis on inference, whether to causality or to relevance, ought not to divert our attention from the importance of the sheerly descriptive information yielded by the time-extended observations. The data suggest important developmental regularities through the adolescent period in personality, the perceived environment, and behavior—regularities that reflect a developmental move away from conventionality. These regularities may, of course, be restricted to these samples or to this period of history; no claim is being made for them as developmental invariants. On the other hand, the trends observed are not at all inconsonant with descriptions of adolescence that transcend the most recent period of time. The general point we wish to stress is the value of longitudinal study for purposes of describing the natural course of psychosocial growth and development per se.

In the content of our findings, there is quite impressive coherence, whether considering the cross-sectional differences between marijuana users and nonusers, or the longitudinal predictive differences between those likely to begin use in the near future and those not, or the developmental convergence of new users with the characteristics of those already using. If a single summarizing dimension underlying the differences in personality were sought, it might be termed *conventionality-unconventionality*. The adolescent less likely to engage in marijuana use is one who values and expects to attain academic achievement, who is not much concerned with independence, who treats society as unproblematic rather than as an object for criticism, who maintains a religious involvement and a more uncompromising attitude toward normative transgression, and who sees little attraction in problem behavior relative to its negative consequences. The adolescent more likely to be involved with marijuana shows an opposite pattern: a concern with personal autonomy, a lack of interest in the goals of

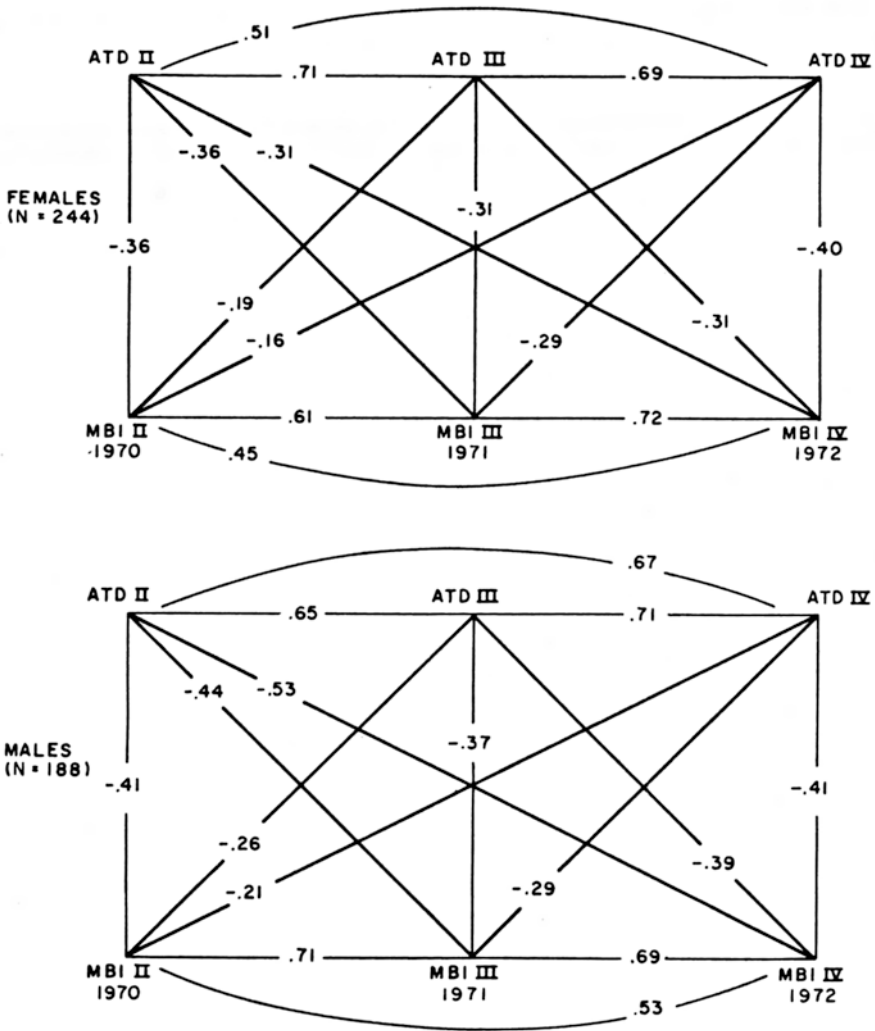


Fig. 10.8 Cross-lagged panel correlations for altitudinal tolerance of deviance (ATD) and marijuana behavior involvement (MBI) for Years II, III, and IV in the High School Study

conventional institutions like church and school, a jaundiced view of the larger society, and a more tolerant view of transgression.

In the environment, the youth likely to be involved with marijuana perceives less parental support, less compatibility between parents' and friends' expectations, greater influence of friends relative to parents, and greater friends support of and models for drug use. These variables reflect both the importance of whether the

reference orientation of a youth is toward parents or peers and the models and reinforcements available in the peer context (see also Kandel, 1973; Sadava, 1971). With respect to behavior, the adolescent likely to use marijuana is one likely to be more involved in other problem behaviors as well and to be less involved in conventional behavior than his or her non-drug-using counterpart.

The distinctions listed in the preceding paragraphs are not intended to be evaluative. As a matter of fact, it is important to emphasize that the characteristics associated with use of marijuana in these samples of normal youth tend to be attributes associated with greater developmental maturity, for example, greater value on independence, greater tolerance of transgression, greater orientation to peers than parents.

The findings have been generally similar for both males and females, a fact worthy of emphasis. The similarity between high school and college youth, however, is attenuated, particularly in the Personality System and in the distal structure of the Perceived Environment System, suggesting that development is not homogeneous throughout the early-to-late stages of adolescence and youth. For college youth, among which the prevalence rate of drug use is relatively high, the important factors in marijuana use appear to be the immediate peer context. Personality factors, important for the adolescent at the high school level, play a far less important role among older youth. Of course, all of the generalizations we are making need to be restricted to our samples and not applied casually to the larger population from which they were drawn.

Overall then, Problem Behavior Theory has emerged as a useful explanatory framework both for marijuana use and for problem behavior more generally. The various research strategies reported in the chapter have yielded convergent support for the social-psychological formulations. They have documented their ability to account, in our samples, for a sizable portion of the variance in youthful drug use. While this convergence does strengthen our conviction about the relevance of the theoretical network, it still is not enough to sustain a claim for directly demonstrated causal influence. Such a causal claim, rather than following from strong tacit conviction, would seem to require a certain measure of hubris.

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Chapter 11

Psychosocial Research on Marijuana Use: An Early Review

Richard Jessor

Introduction

It was not much more than a decade or so ago that marijuana use in the United States was confined to the inner city ghetto, to blacks, or to jazz musicians. Within the span of a relatively few years, usage has become widespread and, perhaps more important for the future, public attitudes toward marijuana have become more accepting. Even the legal institutions have demonstrated an increasing tolerance through statutory accommodation in 10 States and a relaxation of the enforcement of existing statutes in other locales. As much as 5 years ago, some observers were already interpreting these trends as irreversible: "... one thing is unmistakably clear: marijuana use is now a fact of American life" (Brotman & Suffet, 1973, p. 1106); "... marijuana use will probably become a cultural norm within a few years for persons under 30" (Hochman & Brill, 1973, p. 609). How quickly such change may actually have occurred is indicated by Akers' (1977) recent description of the American scene, a description that would have elicited sharp disbelief even as recently as the late 1960s: "Marijuana is smoked in an offhand, casual way ... Before, during, or after sports events, dates, public gatherings, parties, music festivals, class or work will do; there is no special place, time, or occasion for marijuana smoking. The acceptable places and occasions are as varied as those for drinking alcohol" (p. 112).

Such a description does not apply, of course, to all segments of the American population or to all parts of the country. But it suggests that what we have been witnessing with regard to marijuana use may well be a rather unusual instance of

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cultural change, noteworthy for its rapidity and for its parallel with other changes, for example in sexual attitudes and behavior, that have been underway simultaneously. Whether the change will be an enduring one and whether the use of marijuana will, as with alcohol, become fully institutionalized in American society is still a matter of considerable speculation and debate. But there is little in the research evidence currently available to suggest that it will not.

An unusual aspect of the recent American experience with marijuana is that, almost constantly from its inception, it has been under research scrutiny. While surveys have played perhaps the central role in monitoring the scope and contour of marijuana use, and in establishing the pattern of factors associated with that use, an enormous range of studies of all kinds has accumulated. Various aspects of the literature have already been appraised in the reports of the National Commission on Marijuana and Drug Abuse (1972a, b, 1973a, b) and in those of the Canadian Commission of Inquiry into the Non-Medical Use of Drugs (1972, 1973). Excellent reviews of the research on drug use and abuse, each devoting considerable attention to marijuana, have appeared in more recent years (Braucht et al., 1973; McGlothlin, 1975; Sadava, 1975; Gorsuch & Butler, 1976; Petersen, 1977; Kandel, 1978a). Our aim in this review is to touch briefly on some of the main findings of the most recent research, that published within the preceding 5-year period. Our focus will be selective and illustrative rather than exhaustive, and it will be confined primarily to the psychosocial research domain.

The last 5 years have seen important indications of the coming of age of psychosocial research on marijuana. Despite problems that continue to plague the field, for example, the noncomparability of measures of use across different studies, an overview of the literature since the late 1960s reveals a number of salutary trends. There has been a shift from reliance on easily available, ready-to-hand, but largely adventitious samples to carefully drawn, national probability samples representative of important segments of the population; for example, Abelson et al. (1977) for youth and adults in households, Johnston et al. (1977) for seniors in high school, and O'Donnell et al. (1976) for young men between 20 and 30. The first two of these surveys are in place as annual monitoring efforts that enable the estimation of population parameters and the tracking of change in the incidence and prevalence of marijuana use on a national level. There has also been a trend toward a more textured and differentiated assessment of marijuana use behavior; instead of the earlier focus on whether or not there has ever been any use at all of marijuana, more recent studies have shown concern for a variety of dimensions of use including frequency, recency, amount per occasion, and the simultaneous use of other drugs.

Increasingly, the research has tended to encompass measures of a larger network of psychosocial explanatory variables in contrast to the earlier preoccupation with demography and with epidemiological mapping. Along with this trend toward enlargement of the measurement framework, there has been more attention paid to distal variables—variables that are less obvious or that are linked to marijuana use by theory—and a less exclusive interest in proximal variables, those that are more obviously connected with marijuana use, such as positive attitudes toward drug use or the prevalence of drug use among one's friends. Another trend that has become apparent is the inclusion of measures of behavior other than marijuana use in studies of the latter. This trend goes beyond an interest in assessing other kinds of drug-using

behavior, or investigating the possible effects that marijuana may have on other behaviors, such as academic performance, or crime and delinquency. Rather, it has been an attempt to understand marijuana use as part of a larger pattern of behavioral adaptation to life situations and to explore its commonalities with other forms of socially structured action.

Two other trends apparent in the marijuana research literature of recent years need mention. One of these has been the remarkable increase in studies that extend over time and that rely upon panel or longitudinal or developmental design (Johnston, 1973; Kandel, 1975; Sadava, 1973a; Smith & Fogg, 1978; Mellinger et al., 1976; Jessor & Jessor, 1977; Johnston et al., 1978a, 1978b). An entire volume is devoted exclusively to longitudinal studies of drug use and includes contributions from a number of the major recent investigations (Kandel, 1978b). The enlargement in explanatory capability that is achieved by longitudinal design, including the possibility of establishing temporal order and sequence, makes this trend one of exceptional significance.

The final direction that is obvious to even a casual observer of recent developments in psychosocial research on marijuana is the shift toward more complex and sophisticated research procedures. This trend includes more careful selection of research participants with appropriately matched control groups, such as was done in the elegant and already classic study of Vietnam veterans by Lee Robins (1974); the reliance on independent sources of information as in Kandel's (1974a) use of participant-parent-friend triads, and in Smith and Fogg's (1978) employment of peer ratings; the use of cohort-sequential design to permit the appearance of cohort effects in longitudinal studies (Jessor & Jessor, 1977); and the employment of multivariate analytic procedures such as multiple regression and path analysis to deal with complex networks of variables. The empirical sophistication of the more recent studies is attested to by the fact that many of them report that very substantial portions of the variance in marijuana use—50 percent is not unusual—can be accounted for by multivariate analyses of their data.

These observations, while heartening, are not meant to convey an unrealistic sense of either knowledge or accomplishment in psychosocial research on marijuana. Refractory problems abound, and explaining 50 percent of the variance in marijuana behavior means, after all, that fully 50 percent remains unexplained. The point to be made is that these various trends, insofar as they come to characterize the ongoing research enterprise as a whole, hold promise for greater understanding in the future.

Commentary on the research of the past 5 years is organized under six different headings. The first section deals briefly with the current epidemiology of marijuana use, its extent and its distribution, and the direction of change in prevalence that has characterized the recent past. The second, third, and fourth sections focus respectively on social environmental, personality, and behavioral factors associated with marijuana use; these three areas constitute the main component systems in the psychosocial domain. The fifth section deals with developmental research on marijuana use. The final section considers some implications of the current findings for further research and for a possible initiative in the direction of the prevention of marijuana abuse.

Epidemiology of Marijuana Use

Nationwide surveys of the general population, or of targeted subgroups within it, have yielded an unusual amount of information about the prevalence and distribution of marijuana use in this country. Josephson (1974) has summarized the findings from some of the earlier surveys, especially those bearing on the adolescent age group, and McGlothlin (1977) has recently reviewed the major epidemiological studies through 1976. From the perspective of early 1978, it is clear that marijuana is the most widely used of the illicit drugs, that a substantial proportion of the population—within certain age groups, it is a sizable majority—has had some experience with marijuana, and that marijuana use is continuing to increase in prevalence and in intensity, despite earlier forecasts that a leveling off was to be expected (see, for example, National Commission on Marijuana and Drug Abuse [1973a, p. 78]).

The most important sources of recent epidemiological information are the annual household surveys of the general population aged 12 and older sponsored by the National Institute on Drug Abuse and carried out by the Response Analysis Corporation of Princeton, New Jersey and the Social Research Group of George Washington University (see Abelson & Atkinson, 1975; Abelson & Fishburne, 1976; and Abelson et al., 1977 for the most recent in the series); the national surveys of high school seniors beginning with the class of 1975 and including the classes of 1976 and 1977 carried out by the Monitoring the Future project at the University of Michigan (Johnston et al., 1977); and the nationwide survey of young men, aged 20 to 30 in 1974, drawn from the Selective Service registrations to be representative of young men in the continental United States (O'Donnell et al., 1976). Other studies of epidemiological interest are the longitudinal surveys of a national sample of high school males in the class of 1969—the Youth in Transition project—followed up most recently in 1974 (Johnston, 1973, 1975), and the annual surveys of junior and senior high school students in San Mateo County, California, a local area of interest because of comparatively high rates of drug use and the availability of a decade of repeated surveys (Blackford, 1977).

In the most recent national survey of the general population (Abelson et al., 1977), lifetime prevalence (whether marijuana has ever been used, even once) is substantial among older adolescents and young adults, and markedly patterned by age:

Age	Percent Ever Used
12–13	8
14–15	29
16–17	47
18–21	59
22–25	62
26–34	44
35+	7

Six out of 10 in the age range from 18 to 25 have had some experience with marijuana by 1977, and that figure holds fairly well for both males (66 percent) and

females (55 percent). While the lifetime prevalence rate falls off on both sides of this time period, nearly half of those who are 16 to 17 years old and nearly half of those who are 26 to 34 years old have used marijuana at least once. Such data make clear the pervasiveness with which this illicit behavior has occurred, at some time, in a large segment of the American population. However, it should be emphasized that most of those who have had experience with marijuana have had only limited experience, and for many of them that experience is not current. For example, in contrast to the 60 percent of young adults aged 18 to 25 who have ever used marijuana, only about 28 percent of that age group used it in the month prior to the survey.

Beyond age, prevalence of marijuana use, both lifetime and current, shows variation in relation to sex (males higher than females), to census region (Northeast and West higher, South lower), to population density (large metropolitan areas higher), to education (college higher), and, in the younger age range, race (white higher). This variation does not hold across all age categories, and it is not comparable in salience to that associated with age per se.

Perhaps of most significance is the contribution of the 1977 survey to an understanding of whether prevalence has now stabilized or continues the increasing trend of the past decade. In comparison with the findings of the 1976 survey, the most recent one does reveal a significant increase for the 12- to 17-year age group in both lifetime prevalence and current use, and for the 18- to 25-year and the 26- to 34-year age groups in lifetime prevalence. Even where the changes over the year interval were not significant, the overall pattern for most breakdowns was one of increases and, when viewed against the results of the entire series of earlier surveys beginning in 1971, the trend toward increased prevalence of marijuana use is clearly continuing and is engaging broader segments of the population.

In the O'Donnell et al. (1976) nationwide survey of young men 20 to 30 interviewed in 1974–75, the age-relatedness of prevalence of marijuana use was also very apparent. While overall lifetime prevalence was 55 percent, the percentages for the younger age groups were in the 60s, whereas those for the older age groups were in the 40s; age 24 yielded the highest rate—66 percent with some experience with marijuana.

With respect to the sample of more than 17,000 high school seniors in the class of 1977, the findings of the latest survey from the Monitoring the Future project (Johnston et al., 1977) are illuminating. Lifetime prevalence in the sample, has reached 56 percent, a majority of this 18-year-old, in-school group having had at least one experience with marijuana by 1977. Current prevalence (use in the past month) has reached 35 percent in this sample, involving 1 of every 3 high school seniors. Of special interest in the findings is the fact that 9.1 percent of the survey sample, 1 out of 11, report *daily or nearly daily* use of marijuana, a rate that is now higher than that reported for the daily use of alcohol (the latter was 6.1 percent in the class of 1977). Lifetime prevalence of marijuana use is higher among males (62 percent) than females (51 percent), especially when higher frequency of use is considered, among the noncollege bound (60 percent) than the college bound (52 percent), highest in the Northeast (63 percent) and lowest in the South (51 percent), and highest in the very large cities (63 percent).

Buttressing the magnitude of these figures is the evidence that prevalence in the class of 1977, *both lifetime and current*, has significantly increased over that for the class of 1976 and, in turn, that of 1975, and the increases tend to characterize all of the subgroups previously listed. As in the 1977 national household survey discussed earlier, these data also indicate a continuation of the trend toward increasing prevalence of use for the specific age group represented by the high school senior sample.

Another indication of an increase in prevalence comes from the San Mateo survey (Blackford, 1977). The 1977 data are reported for *annual* prevalence (use in the preceding year); that rate was 64.5 percent for 12th grade males (up from 61.1 percent in 1976) and 61.4 percent for 12th grade females (up from 56 percent in 1976). (For purposes of comparison, *annual* prevalence in the 1977 Monitoring the Future survey was 53 percent for the 12th grade males and 42 percent for 12th grade females.) The San Mateo increases over the past year are of particular significance since many expected that this high rate area had already reached saturation and was stabilizing at a level that might be a ceiling for marijuana prevalence.

Finally, the 1974 follow-up of the class of 1969 cohort in the Youth in Transition study shows quite clearly that the lifetime prevalence levels reached in high school do continue to increase with increasing age of the cohort after high school (Johnston, 1975). Lifetime prevalence for the class of 1969 was 20 percent in their senior year, rose to 35 percent by a year later, and reached 62 percent by the 1974 follow-up when the cohort was 23 years old. Thus, there is no evidence for a prevalence plateau after graduation from high school.

The perspective that emerges from this series of nationwide surveys is that some experience with marijuana has, by 1977, become statistically normative among older adolescents and young adults, and that about a third of those in this age range have used marijuana in the past month. Lifetime prevalence is increasing in the next older age group as the younger cohorts age into it (the rate for those aged 26 to 34 more than doubled from 1972, when it was 20 percent, to 1977, when it was 44 percent; see Abelson et al. [1977]); the trend toward higher prevalence has continued to generate significant annual increases in all of the most recent surveys; initiation into marijuana use is taking place earlier (Johnston et al., 1977); and daily use—a measure reflecting more than fortuitous involvement with marijuana—has increased in recent years. The continuing increase in marijuana use, incidentally, appears not to be specific to the United States; according to Smart (1977), its use is still increasing in Canada as well (see also Smart & Fejer, 1975).

The implications of these epidemiological developments are significantly sharpened by two other considerations. First, important changes have simultaneously been occurring in many of the factors that are immediately relevant to the likelihood of marijuana use, factors such as knowing someone who has used marijuana, having the opportunity to use marijuana, beliefs about the harmfulness and risk associated with marijuana use, and attitudes about whether marijuana use should be legalized or decriminalized. According to the findings from both the 1977 national survey (reported in Miller et al., 1978) and the 1977 Monitoring the Future survey (Johnston et al., 1977), all of these factors have changed over recent years in the direction of

greater exposure to and availability of marijuana, less perceived risk of use, less disapproval for use, and less support for legal prohibition of use. More recently, the annual American Council on Education survey of 300,000 entering freshmen to colleges and universities in the United States in the fall of 1977 found, for the first time, that a majority (53 percent) of freshmen supported legalization of marijuana (Astin et al., 1978). These convergent changes in what has been called “the social climate” of marijuana use (Miller et al., 1978) strongly suggest that involvement with marijuana is likely to continue to increase in the future.

The second consideration has to do with the recognition that national survey findings, despite the exceptional quality of those reviewed here, have certain limitations. Household surveys do not capture those not living in households, and school surveys do not capture dropouts; in both cases, the groups that are missed probably have higher rates of marijuana use than those who are included, and the survey findings are, to some degree, likely to be underestimates of population prevalence. Perhaps of more significance, nationwide surveys may not adequately reflect the fact that particular social or geographic locations may be of more than average influence on cultural change; thus, locations where marijuana use may be very high—for example, in a liberal arts college in a large metropolitan university—or where its use is an accepted part of “the scene”—for example, the Bay Area—may have more impact on future trends in the acculturation of our society to marijuana than is apparent when those locations are averaged in with other sampling units.

The data that have emerged from the latest epidemiological surveys, taken together with the trends that are evident across the recent series of such surveys, suggest that marijuana has to some extent become embedded in American culture (see also Ray, 1978). Its institutionalization appears to be reflected not only in the broad pattern of its availability and use, but also in the supportive social definitions that are increasingly shared about its nature and its function. If, indeed, this has become the case, then it would seem apposite for national concern about marijuana to shift from the question of its use to the problem of its abuse.

Marijuana Use and the Social Environment

As we have already noted in the preceding section, variation in marijuana use is less sharply patterned than it was in the past by attributes of the sociodemographic environment; where such attributes still emerge as significantly related, the trends over time suggest that their role is a diminishing one. This is true for urbanicity or population density (Johnston et al., 1977) and for race and socioeconomic status (Miller et al., 1978). It is also true for sex; although national rates remain higher for males than females, the difference is not of the magnitude that might have been expected for such an illicit behavior, and, in several recent studies, the sex difference in lifetime prevalence has all but disappeared (Wechsler & McFadden, 1976; Akers et al., 1977; Jessor & Jessor, 1977). The decline in distinctiveness of population density or urban residence as relevant environmental attributes is paralleled by a declining

distinctiveness of other characteristically use-prone settings such as college campuses or military life. O'Donnell et al. (1976), for example, describe the effects of military service on drug use as "invisible" in their cohorts of men between 20 and 30, and this applies to effects on marijuana use as well. At the level of the demographic environment, then, there has been a trend toward homogenization as far as variation in marijuana use is concerned. Put in other terms, demographic environmental attributes account for only a small, and increasingly a smaller, portion of the variance in marijuana use.

By contrast, the environmental factors that have emerged repeatedly as salient in relation to the prevalence and intensity of marijuana use are those that refer to the environment of social interaction. The key role played by friendship patterns and interpersonal relations in providing access to and availability of marijuana, models for using it, and social support for such use have been affirmed in a host of studies. One investigator has concluded that, in explaining adolescent marijuana use, "marijuana use by one's friend ... may be the critical variable" (Kandel, 1974b, p. 208). This emphasis on friends or peers as the most important social agent, and on their actual use of marijuana as the most important contextual variable, while supported by the research, ought not to result in ignoring other agents or other aspects of the social interaction situation. The most general point to be made from the research is that marijuana use varies directly with attributes of the context of social interaction—with social models, with social reinforcements, and with social controls, both general and marijuana-specific.

The importance of the use of marijuana by one's friends is readily seen in the data from the national survey of young men 20–30 (O'Donnell et al. 1976). Among users of marijuana in the survey year (1974–75), fully 98 percent report that at least "a few" of their friends are current users; among never users of marijuana, the comparable figure is only 56 percent. Not only is own use versus nonuse related to use by friends, but intensity of own use varies directly with prevalence of use among one's friends. Again referring to the O'Donnell et al. (1976) data, the percent who report "more than a few friends now using marijuana" are: nonusers (18); experimental users (41); light users (69); moderate users (76); and heavy users (94). The heavier the involvement with marijuana, the more likely that one is embedded in a friendship network in which marijuana use is a characteristic pattern of behavior; see also Johnson (1973).

Although the earlier interpretations of the importance of friends or peers used the evidence to sustain the notion of a drug subculture with its own values and norms (Suchman, 1968), or of a student subculture (Thomas et al., 1975), the tenability of such a perspective is increasingly eroded by the spread of marijuana use to broader and broader segments of the population. Under such circumstances, there seems little need for recourse to a subculture concept; indeed, the role that peers play in relation to marijuana use appears to be no different than the role they play in relation to various other domains—values, sexual behavior, styles of dress—in which their socialization impact is considerable. Dispensing with the subculture notion enables the assimilation of peer influence on marijuana use into the larger function of peer

socialization as a whole; (for an empirical questioning of the notion of a drug subculture among adolescents, see Huba et al. [1978]).

In an interesting study of peer influence on marijuana use among a representative sample of public secondary students in New York State, Kandel (1973, 1974a, b) collected independent data from the best school friend and from the parents of a subsample of her respondents. Peer drug use emerged as a far more important influence on the respondent's use of marijuana than parental use of drugs. With the availability of independent data from parents and friends, Kandel was able to compare the relation of *perceived* parental drug use with *parent-reported* drug use, and the relation of *perceived* peer drug use with *peer-reported* drug use. In both cases, the relation to the respondent's own use was attenuated when independent data rather than perceived data were used. This is an important finding since most studies rely upon perceived data. Nevertheless, it should be emphasized that the nature of the relationships is maintained even though attenuated, and it should also be noted that the question of the differential *validity* of the two kinds of data is not resolved in the study.

More recently, the Jessors have explored the influence of environmental factors on variation in marijuana use in their longitudinal study of high school and college youth (Jessor & Jessor, 1973, 1977, 1978). Consonant with the earlier discussion, they found almost no relation between attributes of the sociodemographic environment, including the Hollingshead index of socioeconomic status, and marijuana use. Employing, instead, the concept of the "perceived environment" (Jessor & Jessor, 1973), they distinguish variables that are conceptually *proximal* to marijuana use (such as models and approval for its use which directly implicate its occurrence), and variables that are conceptually *distal* to marijuana use (such as general peer support, or parental controls, or relative parent-versus-peer influence which can have only indirect implications for marijuana use). The usefulness of the proximal-distal distinction is that it calls attention to less immediately obvious aspects of the social environment than whether or not one's friends use marijuana, and it yields, thereby, a more textured analysis of environmental influence. As expected, proximal variables such as friends' models for marijuana use were consistently the most powerful, yielding correlations in the .60s with marijuana involvement; distal variables such as the exercise of interpersonal controls by friends were considerably less powerful, yielding correlations in the .30s, but still highly significant. Taken together as a system, the perceived environmental variables accounted for about 40 percent of the variance in involvement with marijuana in both the high school and college studies (Jessor & Jessor, 1977). These findings about the salient role of the environment are fully replicated in a nationwide survey of 13,000 secondary school youth (Chase & Jessor, 1977).

The role of friends in providing direct social reinforcement or punishment for marijuana use, knowledge about and normative definitions of use, as well as models for use, was investigated in a recent effort to test another version of social learning theory (Akers et al., 1977). Carried out under the aegis of the Boys Town Center in Nebraska, it involved about 3,000 secondary students in 8 Midwestern communities. Again, differential association with using or nonusing friends was found to be

the most powerful variable, but the study offers a more differentiated analysis of the variables through which the influence of friends is exerted. Despite its demonstrably lesser influence, the role of parents may not be entirely dismissed when marijuana use among adolescents and youth is considered. Already noted has been Kandel's (1974b) finding about the influence of parental use of psychoactive drugs on the adolescent's use of marijuana. Other aspects of parental influence, beyond whether they themselves use drugs, have also been investigated. Variation in marijuana use has been linked to the degree of parental strictness and controls, to parental affection and support, and to parental conventionality or traditionality in ideological outlook—the greater each of these parental attributes, the less the marijuana involvement by the adolescent (Jessor & Jessor, 1974; Brook et al., 1978; Prendergast, 1974). Of interest is the evidence that the role of parental support and controls—at least as perceived—diminishes in its importance for marijuana use from the younger aged, high school period to the older aged period when youth are in college (Jessor & Jessor, 1977).

The restriction of this section to peer and parent influence in the environment of social interaction reflects the almost exclusive concern of researchers with just these two agents of socialization, support, and control. Almost no attention has been paid to the church or school as institutions of socialization, or to symbolic agents such as the television media. What little research there is, however, suggests that involvement with all three of these latter sources of influence may serve to control against involvement with marijuana use; (see Jessor & Jessor, 1977, chapter 11).

The prepotent role of the social interaction context—the prevalence of models among one's friends, of attitudes of approval or at least lack of disapproval, and of access to the drug and to the opportunity to use it—is empirically well established by the research of recent years. But the significance of this generalization should be tempered on at least two grounds. First, every study showing the importance of friends' usage of marijuana showed, nevertheless, that some proportion of those with friends or acquaintances who are users *themselves do not use*. How does one account for this? The fact that not everyone behaves the same way in the same context of interaction raises the need for other kinds of explanatory factors, factors that refer to individual differences, differences not in social context variables but in personality. Second, all of the trend data suggest that the future will bring higher base rates of use and of knowledge of users. At some point soon, there is likely to be a homogenization of the social interaction environment as far as marijuana use is concerned; that is, most people will have at least some friends who use, will know other people who use, and will perceive little social disapproval for use. Yet it is quite predictable that even in such a homogeneously use-prone environment, some proportion of people will nevertheless refrain from use (at least that is the lesson from alcohol). To account for those who refrain will require, again, recourse to factors that are not those of the shared social environment but those that reflect individual differences in personality. Research on the latter is the concern of the following section.

Marijuana Use and Personality

Recent research has established coherent and systematic linkages between aspects of personality and variation in marijuana use. Despite quite different levels of analysis, theoretical orientations, populations, and measuring instruments, there is a notable degree of consistency in what has been found about the personality correlates of use versus nonuse or of degree of involvement with marijuana. And the pattern of findings tends to be relatively invariant over sex, ethnic status, and other demographic attributes. In the studies that have been reviewed, personality refers to that set of relatively enduring psychological attributes that characterize a person and constitute the dimensions of individual differences, including values, attitudes, needs, beliefs, expectations, moral orientations, and other such essentially socio-cognitive variables. Personality in this body of research reflects more the sociocognitive level of analysis than it does the underlying dynamics of the traditional psychoanalytic perspective. Important to emphasize, also, is that these attributes of personality are neutral with respect to the issue of adjustment-maladjustment or the question of psychopathology; the relevance of the latter will be addressed subsequently as an empirical issue rather than as one that is necessarily inherent in any general concern with personality. Finally, many of the personality attributes that have been established as correlates of involvement with marijuana have also been shown to be antecedents or precursors of such involvement. This is a finding of central significance in strengthening conviction about the systematic tie between personality and marijuana use behavior.

Perhaps the largest generalization that is warranted by the research on personality is that users of marijuana differ from nonusers on a cluster of attributes reflecting nonconventionality, nontraditionality, or nonconformity. This emphasis was, of course, foreshadowed in the early paper on the “hang-loose ethic” by Suchman (1968). Involvement with marijuana has been associated with a variety of components of such a cluster: with more critical beliefs about the norms and values of the large society and with a sense of disaffection with or alienation from it (Knight et al., 1974; Groves, 1974; Hochman & Brill, 1973; Weckowicz & Janssen, 1973; Jessor et al., 1973); with less religiosity (Rohrbaugh & Jessor, 1975); and with a more tolerant attitude toward deviance, morality, and transgression (O’Donnell et al. 1976; Brook et al., 1977a, b; Jessor & Jessor, 1978). Related to the same cluster are the findings about the greater rebelliousness (Smith & Fogg, 1978), ascendancy (Gulas & King, 1976), and value on and expectation for independence or autonomy (Sadava, 1973b; O’Malley, 1975; Jessor et al., 1973) of users or future users in contrast to nonusers. Conventionality-unconventionality is reflected further in the greater emphasis by nonusers on achievement and achievement striving-conventional goals of our society (Holroyd & Kahn, 1974; Sadava, 1973b; Mellinger et al., 1975; Chase & Jessor, 1977; Jessor et al., 1973) and on responsibility (Gulas & King, 1976). Nonusers also score higher on the Marlowe-Crowne Social Desirability Scale, an index of social conformity (Brook et al., 1977a, b). These findings are consonant across early reports (Hogan et al., 1970) and also more recent

studies (Johnston, 1974; Kandel et al., 1978) which emphasize the notions of conformity to adult or societal expectations and conventionality as distinguishing non-users from users or heavier users.

A second generalization about personality differences associated with variation in marijuana use is that users tend to be more open to experience, more aesthetically oriented, more interested in creativity, play, novelty, or spontaneity (Groves, 1974; Stokes, 1974; Segal, 1975; Naditch, 1975; Weckowicz & Janssen, 1973; Shibuya, 1974; Mellinger et al., 1975; Holroyd & Kahn, 1974). These attributes are not unrelated to the preceding cluster of conventionality, but what is emphasized more is a cognitive style of receptivity to uncertainty and change as against an emphasis on familiarity and inflexibility. Since marijuana is often sought specifically to initiate change in mood or outlook, this linkage with a general interest in sensation- or experience-seeking (Segal, 1975; Kohn & Annis, 1978) is a logical one.

A third generalization, perhaps, is that marijuana use was associated not only with lower value on achievement but with lower expectations of being able to gain achievement satisfaction. These findings make relevant the possibility that marijuana use can be a response to frustration, to the perception of blocked access to valued goals, and to the anticipation of failure; it may be implicated as a way of coping with such feelings or as representing a choice to pursue alternative goals than those for which little success is anticipated (Carman, 1974; Braucht, 1974; Jessor et al., 1973).

Other attributes of personality have also received considerable attention, but the empirical consensus on these remains equivocal (see the excellent compendium edited by Lettieri (1975) for a number of articles dealing with various personality measures). One of these is the internal-external control (I-E) or locus of control variable. Plumb et al. (1975) have published an extensive review of the mixed outcomes of the relevant I-E studies. Some investigators report that marijuana use is associated with higher internal control (Brook et al., 1977a, b; Sadava, 1973b). Other investigators (Jessor & Jessor, 1977) find the I-E variable yields little distinction between high school and college users and nonusers, but where there is a significant relationship—for high school males only—it is in the opposite direction, marijuana involvement being associated with higher externality (for similar results, see also Naditch [1975]). Another attribute that has been studied intensively but also with inconsistent results is self-esteem. Kaplan (1975) has related a lowering of self-esteem to subsequent involvement with marijuana use, and Norem-Hebeisen (1975) reports some cross-sectional discriminability of her self-esteem measures, but others have been unable to link variation in self-esteem to marijuana use or subsequent onset of use (O'Malley, 1975; Kandel et al., 1978; Jessor & Jessor, 1977).

Kandel (1978a) has correctly called attention to the fact that affective and mood states as personality attributes have been given scant attention in approaches focused on the sociocognitive level of analysis of personality. Her own work has suggested depressive mood as a modest predictor of subsequent marijuana use (Paton et al., 1977). With regard to another affect-related attribute—extroversion as measured by the Eysenck Personality Inventory—Wells and Stacey (1976) found it unrelated to drug use among young people in Scotland, and Smart and Fejer (1973) found adult

marijuana users scoring in the normal range on extroversion, though higher than nonusers. Another possibly relevant attribute in this domain is field dependence-independence, but it also fails to distinguish in relation to marijuana (Weckowicz & Janssen, 1973).

Although the foregoing summary has sought to integrate the various findings, all of them have emerged from studies that have emphasized differences between users and nonusers *in magnitude* of an attribute or a set of attributes. An unusually interesting study has asked a different kind of question: Is the *organization* of personality attributes different between user and nonuser groups? Huba et al. (1977) studied the organization of 15 needs, drawn from Henry Murray's personality theory, in over 1,000 college students at two universities. They found good factorial stability for the needs, for both sexes, in both drug and nondrug groups, and were able to establish that personality organization is qualitatively the same in users of marijuana or other drugs as in nonusers of these substances. This attention to the organizational structure of personality motivation is especially salutary because it suggests that while users differ *quantitatively* from nonusers (as they do in this study, also), they are qualitatively similar to nonusers in organization and functioning.

A concern with personality has been central to the work of the Jessors in their longitudinal study of high school and college cohorts. Their personality and marijuana findings have been presented in a recent book (Jessor & Jessor, 1977), and represent an effort to deal with personality as a *system* of motivations, instigations, beliefs, and personal controls. In relation to a criterion of degree of involvement with marijuana, the personal control variables are shown to be most strongly related; higher involvement is associated with lower religiosity and greater tolerance of deviant behavior among both high school and college males and females. At the high school level, higher involvement with marijuana is also associated with lower value on academic achievement, lower expectations of attaining that goal, and with higher value on independence and on independence relative to achievement. It is significant that none of these latter associations holds at the college level. Finally, the higher the involvement with marijuana, the greater the critical attitude toward the society and its institutions for both sexes in both high school and college. To assess the role of personality as a system, multiple correlations were run against the marijuana use criterion; they show that between 20 and 25 percent of the variance in marijuana involvement can be accounted for by the joint role of the set of personality measures—a substantial and significant amount (although less than that accounted for by the perceived environment system). In an application of the same framework to a national sample of 13,000 high school youth, personality system variables again accounted for about 20 percent of the variance in marijuana involvement for both sexes (Chase & Jessor, 1977).

A recurrent issue when personality is dealt with is whether or not maladjustment or psychopathology is implicated in the use of marijuana. The findings in the foregoing studies are generally neutral with regard to psychopathology, stressing, instead, variation in attitudes, values, beliefs, and other such sociocognitive aspects of personality. But a large number of studies have been specifically concerned with answering the maladjustment-psychopathology question, and the empirical outcome

seems quite clear. With only a few exceptions (Wells & Stacey, 1976; Smart & Fejer, 1973), the preponderant conclusion is that there is no association between marijuana use and maladjustment or psychopathology (Naditch, 1975; Mellinger et al., 1975; O'Malley, 1975; Stokes, 1974; Goldstein & Sappington, 1977; Costa, 1977; Hochman & Brill, 1973; Cross & Davis, 1972; Weckowicz & Janssen, 1973; McAree et al., 1972; Richek et al., 1975). In some instances, a very heavy marijuana user group will appear to have more extreme indication of psychopathology (e.g., Cross & Davis, 1972), but such a group is inevitably involved with multiple drug use or with the use of harder drugs in addition to marijuana, and this state of affairs confounds the inference about marijuana use alone. Where only marijuana is involved (but including alcohol and tobacco, of course), the explanation of variation in marijuana use gains nothing from recourse to psychiatric or psychopathological explanatory concepts according to the preponderance of the recent research literature.

The empirical relationships between personality and marijuana use have contributed to understanding of several critical questions: why certain persons in a particular social context, say students at a given college, have had experience with marijuana while others in the very same setting have not; why certain persons in a particular setting may use marijuana in an experimental or occasional way while others may become more heavily involved with it; and, as we will see more directly in the later section on psychosocial development, why some persons, say in the very same high school class, begin use of marijuana early while others begin later. Questions about variation in marijuana use where the social environment is constant or controlled find logical answers in the kinds of personality or individual difference variation represented in the research just described.

Although this position about the role of personality variation is a general and even logical one, it is of interest to consider whether the *specific* attributes that have been linked with marijuana use are, in some sense, time-bound or historically parochial. For example, as marijuana use becomes increasingly pervasive and normative, is its use likely any longer to be linked with unconventionally? As it becomes decriminalized, is its use likely any longer to serve as an expression of sociopolitical criticism and repudiation of the established society? It should be obvious that the particular personality factors likely to be associated with any pattern of behavior depend upon the social meanings and definitions of that behavior; as the social definitions change—for example, as marijuana shifts to a normatively employed recreational drug—the personality factors should also be expected to change. Three likely exceptions to this kind of anticipation about the future are worth noting, however. First, marijuana use, like other problem behaviors, is age-graded; that is, it is seen as less acceptable for younger than for older youth. Thus, it is likely that early onset of use will continue to be associated with a general pattern of personality nonconventionality. Second, no matter how normative marijuana use becomes, some segment of the population will refrain from experience with it and, for this segment, strong personal controls having to do with religiosity or intolerant attitudes toward transgression will likely continue to be characteristic. And finally, while this cluster of personal controls may no longer be relevant to whether most people use marijuana or not, it may continue to be relevant in regard to the intensity

of its use. The possibility that personal controls may have a key role in preventing marijuana *abuse* makes the relevance of personality a lively and continuing concern in future social policy about marijuana.

Marijuana Use and Behavior

A third major psychosocial domain with which marijuana use has been linked is the domain of social behavior. The most ubiquitous generalization that can be made is that marijuana use, far from being an isolated behavior, is generally part of a larger behavioral pattern involving the use of other drugs and engaging in a variety of other unconventional or nonconforming actions such as delinquency, sexual experience, political activism, and attenuated academic performance. An understanding of marijuana use as an integral element in a network of social behavior has large implications for social policy, both at the level of control and at the level of prevention or health promotion.

The linkage of marijuana use to the use of other drugs, both licit and illicit, is well established in nearly all studies that assess a variety of drugs. Further, the greater the involvement with marijuana or the frequency of its use, the greater the experience with other drugs (Goode, 1974a, b; Johnson, 1973; Johnston, 1975; Kandel, 1978a; O'Donnell et al., 1976; Rouse & Ewing, 1973). The positive correlations obtained among the various drugs is quite compelling evidence against the notion of drug substitution—that use of a given drug, say marijuana, would imply less use of another drug, say alcohol. Johnston (1975), for example, reports that the proportion of regular marijuana users in the Youth in Transition cohort who used alcohol on at least a weekly basis rose from 56 percent to 81 percent between 1970 and 1974, reflecting an increasing association in use of these drugs.

Recognition of the association between marijuana and other drug use has led to considerable interest in the order with which experience with different drugs takes place and to a concern with sequential developmental stages of initiation into the use of different drugs. O'Donnell et al. (1976) report that among their male cohorts between ages 20 and 30, alcohol was antecedent to the use of all the other drugs including marijuana. But for men who used marijuana and any of the other drugs (cocaine, opiates, heroin, sedatives, stimulants, or psychedelics), use of marijuana usually occurred first. Kandel's research has also focused on this question (1975, 1978a; Kandel et al., 1978); her longitudinal surveys of New York State high school students suggest four "stages" in the progression from no drug use to the use of illicit drugs "harder" than marijuana: use of beer and/or wine; cigarettes or hard liquor; marijuana; and other illicit drugs. Of interest is her emphasis on the role of experience with the licit drugs as a necessary intermediate between the stage of no experience with drugs and the use of marijuana; whereas 27 percent of students who used tobacco and alcohol began initial use of marijuana by the follow-up period 6 months later, of those who had not used any licit drug, only 2 percent began (Kandel, 1975).

Both in terms of order of onset and of prevalence of use, marijuana emerges as a “boundary” drug between the licit drugs, like tobacco and alcohol, and the other illicit drugs. This key position of marijuana in a developmental sequence has raised the question of whether it serves as a “stepping stone” to the use of other illicit drugs. That use of marijuana is associated with a higher rate of experience with other illicit drugs has already been noted; what the stepping stone notion implies is that experience with marijuana has inexorable implications for progressing to other illicit drugs. Although this issue cannot be simply dismissed (see O’Donnell et al., 1976; Whitehead & Cabral, 1975), and although it is likely that engaging in the use of an illicit drug such as marijuana can stimulate the exploration of other illicit drugs, several considerations militate against assigning a “causal” role to marijuana use. First, the proportion of the population that has ever used marijuana is far greater than the proportion with experience with any of the other illicit drugs; thus, there is no inexorable progression. Second, as the data from the Monitoring the Future surveys show (Johnston, Bachman, & O’Malley, 1978a), there has been an appreciable rise in marijuana use among youth in recent years without any concomitant increase in the proportion using other illicit substances. Third, it is logical to consider that the same factors that determined the use of marijuana may also influence the use of other illicit drugs, rather than the influence on those other drugs necessarily stemming from marijuana use itself. And finally, assigning cause to an antecedent permits an infinite regress in which it could be argued, for example, that since alcohol preceded marijuana, it is the more fundamental cause of other illicit drug use (see also Goldstein et al., [1975]).

The linkage of marijuana use to other drug use behavior is probably best seen as one aspect of a larger set of linkages between marijuana use and other kinds of behavior reflecting nonconventionality or deviance or what has been called “problem behavior” (Jessor & Jessor, 1977). Marijuana use in teenagers has been shown to be strongly associated with frequency of drunkenness (Wechsler & Thum, 1973; Wechsler, 1976; Jessor et al., 1973; Chase & Jessor, 1977); with sexual intercourse experience (Goode, 1972a; Jessor & Jessor, 1975); with delinquent or general deviant behavior (Johnston, O’Malley, & Eveland, 1978b; Carpenter et al., 1976; Elliott & Ageton, 1976a; Gold & Reimer, 1975; Jessor et al., 1973; Chase & Jessor, 1977); with activist protest (Jessor et al., 1973); and negatively associated with conventional behavior such as church attendance (Jessor et al., 1973; Chase & Jessor, 1977). For example, in the 1972 year of the Jessors’ study of high school youth, 44 percent of the males who had used marijuana were nonvirgins while only 17 percent of the males who had not used marijuana were nonvirgins; the corresponding figures for the females were 67 percent and 20 percent, respectively (Jessor & Jessor, 1977). Among the young adults in the O’Donnell et al. (1976) study, users of marijuana were considerably more likely to report having committed criminal acts than nonusers, a finding similar to that for teenagers.

What these studies all sustain, without exception, is the covariation between marijuana use and other behaviors reflecting unconventionality. There appears to be a syndrome of unconventional or nonconforming behaviors in which marijuana use is a component part. These associations with other behaviors provide part of the

social meaning of marijuana use; at the same time, they help reduce the possibility of arbitrariness in any decision to engage in the use of marijuana.

The emphasis in the preceding paragraph has been upon association, and no inferences have been drawn about the causal influence of marijuana on the set of related behaviors. The possibility that marijuana does play a causal role in relation to other behavior has been raised frequently in at least two areas—the area of crime and delinquency, and the area that has come to be called “the amotivational syndrome.” Both of these deserve comment. The literature on the question of whether marijuana use leads to crime or delinquency has been reviewed repeatedly (Goode, 1972b, 1974a, b, 1975; Elliott & Ageton, 1976b). Abel’s review (1977) found no evidence for a causal relation between marijuana and aggression or violence. The National Commission on Marijuana and Drug Use (1973a) concluded that marijuana neither instigated nor increased the level of crime and that the relation between marijuana use and crime or delinquency depended upon social, cultural, and psychological variables. Several studies involving youth find evidence that delinquency *precedes* involvement in drugs (Jacoby et al., 1973; Friedman & Friedman, 1973; Jessor, R., 1976; Johnston, O’Malley, & Eveland, 1978b). The longitudinal study of the Youth in Transition cohort provides an unusually compelling analysis of the relation of illicit drug use to delinquency in a nationwide sample of young men in high school. A five-category index of illicit drug use was related to measures of delinquency at each of five points in time. The longitudinal data enable the authors to show that the differences in delinquency among the nonusers and the various drug-user groups *existed before drug usage*; thus, they cannot be attributed to drug use. Their conclusion about the association between drug use and delinquency is that since both are deviant behaviors they are both likely to be adopted by individuals who are deviance prone, and deviance proneness is expressed through different behaviors at different ages—delinquency earlier, drug use later (Johnston, O’Malley, & Eveland, 1978b). This conclusion is consonant with the conclusions of Elliott and Ageton (1976b) who present a very perceptive analysis of the recent studies on the relationship of drug use and crime among adolescents. In rejecting the notion that marijuana use has a causal influence on delinquency, they argue that both delinquency and marijuana use are manifestations of the same phenomenon—involvement in deviance or problem behavior—and are associated with each other by virtue of a common relationship to social, psychological, and economic etiological variables. This seems a reasonable summary of the state of current research knowledge in this area.

The relationship of marijuana use to the so-called amotivational syndrome—apathy, poor school performance, career indecision—entails the same logical issues as the marijuana-crime relationship. Empirically, some cross-sectional relationship has been found between marijuana use and various indicators of the amotivational syndrome (Brill & Christie, 1974; Annis & Watson, 1975; Smith & Fogg, 1978; Mellinger et al., 1976, 1978; Jessor et al., 1973), although other studies have not (Marin et al., 1974; Johnston, 1973). Once again, longitudinal studies indicate that lowered academic performance, school dropout, and career indecision may antedate drug use. In a series of very interesting papers, Mellinger and his collaborators have explored the relation of marijuana use to grades, career indecision, and dropping out

among a cohort of male freshmen followed over time at the University of California, Berkeley (Mellinger et al., 1976, 1978). They found no convincing evidence that use of marijuana had adverse consequences in these areas. Instead, as in the case of the marijuana-crime relationship, dropping out of school, career indecision, and grades, as well as the use of marijuana, appear to reflect common background factors and social values.

In relation, then, either to crime or the amotivational syndrome, no causal role has been established for the use of marijuana. The linkage of marijuana to these areas of behavior, as to other areas such as sexual experience, alcohol use, or activist protest, seems best explained as part of a behavioral syndrome of nonconformity related to a common set of social and psychological factors that represent proneness to deviance or problem behavior.

Marijuana Use and Psychosocial Development

Research on marijuana and psychosocial development has been especially illuminating because of its reliance on longitudinal design. Not only has longitudinal design enabled the disentangling of temporal order in issues such as those addressed in the preceding section, but it has also revealed that marijuana use—just as alcohol use or sexual experience—is an integral aspect of youthful development in contemporary American society. A comprehensive review of convergences in recent longitudinal studies of marijuana use and other illicit drugs has been prepared by Kandel (1978a); she has also edited a volume in which several of the studies are described by the investigators responsible for them (Kandel, 1978b).

A number of investigators have documented through time-extended studies that initiation or onset of marijuana use in samples of youthful nonusers is a predictable phenomenon based on social, psychological, and behavioral characteristics that are antecedent in time to its occurrence. The 5-year longitudinal study of elementary and secondary school students by Smith is a good illustration of this kind of research (Smith & Fogg, 1974, 1978, 1979). Relying on both self-report and peer rating measures focused largely in the areas of personal competence and social responsibility, these investigators were able to demonstrate, over a 4-year interval, significant prediction of onset versus no onset of marijuana use (Smith & Fogg, 1974), of variation in time of onset (early versus late) of marijuana use (Smith & Fogg, 1978), and of variation in extent of later use of marijuana (Smith & Fogg, 1979). A key predictor in their analyses has been a factor analytically derived rebelliousness scale, a measure that refers to the nonconventionality of personality discussed earlier in this paper. An interesting series of papers has also emerged from Sadava's 1-year longitudinal study of nearly 400 Canadian college students (Sadava, 1973a; Sadava & Forsyth, 1976, 1977). Again, significant multivariate prediction of onset of use (and of other status changes such as discontinuation of use) has been demonstrated; these investigators rely on a field-theoretical approach that combines antecedent personality and environmental measures, as well as change scores on those measures over the time interval, as their predictors.

In terms of the content of the antecedent measures, there is strong convergence across these studies and others (Johnston, 1975; Kandel et al., 1978; Jessor & Jessor, 1978). The antecedent factors that are predictive of onset, time of onset, and extent of use are essentially the same ones that were reviewed in the earlier sections of this chapter as social environmental, personality, and behavioral correlates of marijuana use. Those nonusers who are more likely to initiate marijuana use, to initiate it earlier, and to become more heavily involved are already less conventional in personality attributes such as religiosity or tolerance of deviance, are more critical of adult society, have more friends who use marijuana and approve its use, and are more involved in other problem behaviors such as delinquency or excessive alcohol use.

This general pattern has been termed “transition proneness” by the Jessors (Jessor & Jessor, 1977), a proneness toward developmental change that involves engaging in those age-graded behaviors that mark transitions in status from child to adolescent or from teenager to adult. Marijuana use is considered such an age-graded, transition-marking behavior, just as is the case for initiating alcohol use or becoming a nonvirgin, and this pattern of transition-prone attributes has been shown to predict onset of these other behaviors as well as the initiation of marijuana use. In this respect, the Jessors have sought to emphasize the developmental role that marijuana use plays and its commonality with other developmentally significant behaviors.

Two other aspects of the relationship of marijuana use to psychosocial development should be mentioned. First, the onset of marijuana use has been shown to be associated with systematic *changes* on the psychosocial variables that were predictive of that onset. Jessor et al. (1973) reported that residual gain scores over a year’s interval showed greater change on the predictor variables when marijuana onset occurred than when it did not (see also Sadava & Forsyth, 1976, 1977). Thus, change in marijuana behavior may be seen as part of a larger pattern of simultaneous developmental change. Second, it has also been shown, for high school youth at least, that time of onset of marijuana use over a 3-year interval is systematically related to the shape of the longitudinal trajectories or growth curves of a variety of the psychosocial predictor variables (Jessor, R., 1976; Jessor & Jessor, 1977, 1978).

Taken together, all of these longitudinal studies make clear that initiation into the use of marijuana, far from being an arbitrary event, is an integral part of psychosocial development among youth. Its onset can be forecast, and it can be shown that when onset does occur, its implications reverberate through the larger network of changes in personality and social interaction that are characteristic of growing up in contemporary American society.

Some Concluding Remarks

It seems safe to predict that marijuana use will continue to increase in prevalence in American society, not only among youth but in other age groups in the population as well. Its increasingly shared definition as a recreational drug, and the decreasing

proportion of the population that disapproves of its use and that perceives any risk associated with its use, signal its likely institutionalization as part of ordinary social life. It is this anticipation that makes it even more important that research on marijuana be expanded; maximum knowledge about marijuana should be the context in which individual choice is exercised and personal decisions are reached about using it and about how to use it.

That use of marijuana is not without negative effects, for example, the impairment of driving skills, is already clear (Jones, 1977), and further research on both acute and chronic effects, especially of heavy use and of use in relation to other drugs, is important. The possibilities for studies of the effects of long-term use of marijuana in this country are increasing as cohorts that began use in the 1960s now have members with more than a decade of continuous experience with the drug.

Greater understanding would come also from research on the positive or beneficial outcomes of using marijuana. Although significant portions of the frequent marijuana users in a national sample of high school seniors acknowledged problems associated with its use—interfering with the ability to think clearly, causing one to have less energy, hurting performance in school or on the job (Johnston, 1977)—the general finding is that users tend to evaluate their experience as positive, pleasant, and beneficial (Goldstein, 1975; Weinstein, 1976; Orcutt & Biggs, 1975; Fisher & Steckler, 1974). Among the cohorts of men between 20 and 30, marijuana was the only drug for which more users reported the effect on their lives as good or very good than reported it as bad or very bad (O'Donnell et al., 1976). Since positive functions of use or reasons for use constitute a powerful proximal influence on actual use, further knowledge about the perceived benefits of using marijuana would seem important in understanding how continued use is sustained and how experimental use is initiated.

More research on the ethnography of marijuana use would also be useful. For example, Zimmerman and Wieder (1977) describe a particularly high-use context and point out that, in contrast to most occasions of alcohol use, a smoking occasion has no definite boundaries in time, and there appear to be no social sanctions controlling the amount of marijuana an individual may properly consume. Greater understanding of the informal rules, regulatory norms, and contextual expectations in which the use of marijuana is embedded would have relevance for efforts to develop alternative patterns of use more insulated against excessive or abusive practices.

The discontinuation of marijuana use is another topic of special research interest. In the 1977 national household survey, about half of the 26- to 34-year olds who had ever used marijuana reported no use in the past year (Miller et al., 1978). Whether this reflects the assumption of adult roles and the move out of a context of social support for use (Henley & Adams, 1973; Brown et al., 1974), or whether it reflects the fact that the involvement and experience with marijuana was only minimal and experimental in the first place (Hudiburg & Joe, 1976), it would seem crucial to establish systematic knowledge about factors conducive to the cessation of use of marijuana. These same factors may also be relevant to insulating against progression from occasional use to excessive use among those who do not discontinue. Longitudinal studies of adult development, with a focus on adult roles in relation to

work, family, and childrearing and on adult social support for drug use, should illuminate the circumstances under which discontinuation is likely in that part of the life span.

The final research area that would seem to deserve special attention is that of the role of personal controls in relation to marijuana use. Personal control variables—whether religiosity, moral standards, or attitudes about transgression—were shown to be powerful in regulating whether marijuana use occurred at all, how early, and with what degree of involvement. As marijuana use becomes more widespread and normative, personal controls should come to play the key role in determining whether use remains moderate and regulated or becomes heavy and associated with other illicit drugs. A greater understanding of the nature and role of personal controls, and of their institutional, familial, and interpersonal sources, could conceivably contribute to the shaping of more effective prevention efforts against marijuana abuse.

Despite the importance of continued research on marijuana, it is clear that the kind of knowledge to be gained—as is true of the knowledge already in hand—will not yield univocal implications for social policy in relation to marijuana. Thus, one moves from research to social policy recommendations only with restraint. Nevertheless, in light of the research that has been reviewed and in light of the continuing increase in prevalence of marijuana use, it seems to be counterproductive to maintain its status as an illicit drug. The real problem with regard to marijuana has by now been transformed: Concern with its use should give way to concern with its abuse. But its continuing illicit status constitutes an almost insuperable barrier to educational and intervention efforts aimed at promoting moderate use and at forestalling abusive practices. Unlike the situation in the alcohol field, efforts to promulgate norms and expectations about socially acceptable marijuana practices are precluded, norms about appropriate time, place, and amount, and about inappropriate associated activities such as driving, and the simultaneous use of other drugs. The decriminalization of marijuana would open up opportunities for concerted societal efforts in this direction. Although decriminalization could itself bring a further increase in the use of marijuana, it does not necessarily follow, as Johnston, Bachman, and O'Malley (1978a) cogently point out, that the use of other illicit drugs will also increase. They call attention to the fact that the use of other illicit drugs has remained steady among high school seniors at the same time that marijuana use has increased significantly. A similar observation can be made with the data from the annual San Mateo surveys (Blackford, 1977). Action to cleave marijuana from the other illicit drugs would seem to be a timely item on society's agenda; it would permit a salutary shift from an unsuccessful policy of prohibition to a policy of regulation that might have greater relevance for the minimization of marijuana abuse.

Policy initiatives in regard to marijuana—even the modest one suggested here—are obviously not easy to undertake given the politicization of the drug field as a whole. Recognition that the policies of the past were not based upon adequate empirical knowledge and therefore could not have been entirely appropriate would seem to be essential to creating a climate for change. Hopefully, this chapter has contributed an increment in that direction.

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Chapter 12

Understanding Marijuana Use in a National Sample of Adolescents

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The concern of the present report is with the personality, social, and behavioral correlates of involvement with marijuana in a survey of a nationwide sample of junior and senior high school youth. Our aims are threefold: first, to use the national data to test the explanatory usefulness of a social-psychological theory of youthful problem behavior (Jessor & Jessor, 1977) in accounting for variation in involvement with marijuana; second, to examine the generality of the account across different sex, age, and ethnic groups; and third, to compare the psychosocial correlates of marijuana use with the psychosocial correlates of problem drinking that were found in an earlier analysis of the same nationwide data set (Donovan & Jessor, 1978).

Although much previous research has shown that there are psychosocial and behavioral differences between adolescents who have used marijuana and those who have not, and also between adolescents who use marijuana heavily and those whose use is more limited, most of the research has been atheoretical, limited to only a few psychosocial measures, or based upon small or selected samples (Braucht, Brakarsh, Follingstad, et al., 1973; Gorsuch & Butler, 1976; Jessor, 1979; Kandel, 1975, 1978; Sadava, 1975). In the present research, variation in marijuana use is approached from a more comprehensive social-psychological perspective, that of “Problem Behavior Theory” (Jessor & Jessor, 1977, 1978; Jessor, R., 1976; Jessor, Jessor, & Finney, 1973). In this framework, marijuana use is considered as an instance of a larger class of “problem” behaviors, that is, behaviors that are likely to elicit negative sanctions from the larger society. Such behaviors—for example, early sexual experience, problem drinking and even drinking per se, and certain delinquent types of behavior, as well as illicit drug use—can also serve, in adolescence, to represent a

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claim on a more mature status or to mark a transition in psychosocial development. The occurrence of problem (or transition) behaviors is accounted for in Problem Behavior Theory by the interaction of three systems of variables—the personality system, the perceived environment system, and the behavior system.

Within each of these three systems it is possible to specify the degree of *prone-ness* to problem behavior or the likelihood of occurrence of problem behavior for a given adolescent. Problem-behavior proneness in the personality system refers to attitudes, values, beliefs, and expectations that constitute instigations to engage in problem behavior or attenuated controls against such behavior. For example, high value on independence relative to value on academic achievement, and low expectations for achieving academic goals are both conceptualized as instigations to problem behavior; a tolerant attitude toward deviant or socially-disapproved behavior, and low religiosity are conceptualized as attenuated personal controls in the personality system according to Problem Behavior Theory.¹

In the environment system, problem-behavior proneness refers to perceptions of low supports and controls from significant others, and of approval for and models for engaging in problem behavior. Greater influence from friends than parents, low consensus between parents and friends in their expectations, and greater perceived approval, pressure, and models for drug and alcohol use are variables in the perceived environment system that increase the likelihood of occurrence of problem behavior. In the behavior system, finally, problem-behavior proneness refers to the degree of involvement in other problem behaviors, on the one hand, and in conventional behaviors such as church attendance and school performance, on the other. The greater the degree of problem-behavior proneness that is present in the personality, the perceived environment, and the behavior systems, the greater the expected involvement in problem behavior, including the use of marijuana.

Problem Behavior Theory was employed as part of the conceptual framework for the 1974 National Study of Adolescent Drinking Behavior, Attitudes, and Correlates carried out by the Research Triangle Institute under contract with the National Institute on Alcohol Abuse and Alcoholism (Rachal, Williams, Brehm, et al., 1975; Rachal, Hubbard, Williams, et al., 1976). Previous analyses of these national sample data showed that the variables in the theory provide an illuminating account of adolescent problem drinking (Donovan & Jessor, 1978). The present study extends those analyses to a concern with variation in marijuana use in a nationwide sample of American adolescents.

Method

The 1974 National Study provided nationwide baseline data on the prevalence and correlates of adolescent drinking, problem drinking, and drug use. Since details of the sampling design and field procedures employed in the collection of these data are available in an extensive report by Rachal, et al. (1975), only brief descriptions need be given here.

¹ See Jessor and Jessor, 1977, for a more elaborate discussion of the rationale underlying the variables in each system.

Participants

A two-stage, stratified random sample was drawn from the population of adolescents in grades 7 through 12 in the 48 contiguous states and the District of Columbia. The primary sampling frame consisted of all counties within these states stratified by census region, county population, and ethnic status. Within each of the 50 counties (or groups of counties) subsequently selected, a secondary sampling frame consisting of junior and senior high school homerooms stratified by grade level (grades 7–8, 9–10, 11–12) was established, and a sample of 643 homerooms was drawn (90 per cent of those contacted). All of the students in these homerooms (16,181) were asked to participate in the study, and 13,122 (81 per cent) of them completed questionnaires. This student participation rate of 81 per cent multiplied by the homeroom participation rate of 90 per cent yielded an overall response rate of 72.7 per cent (Rachal, Williams, Brehm, et al., 1975).

The obtained sample is 48 per cent male and 52 per cent female, and its self-reported ethnic distribution is as follows: Caucasian (Anglo), 69 per cent; Spanish American, 12 per cent; Black, 7 per cent; Native American, 6 per cent; Asian American, 2 per cent; and Other (or no answer), 4 per cent. A wide distribution of socioeconomic status, school grade-level, and geographic area of the country was also obtained.²

Procedure

Data were collected during school hours over a four-week period in the spring of 1974 using a 35-page self-administered questionnaire. The questionnaire consisted primarily of closed-format questions and required about 45 minutes to complete.

To maintain confidentiality, no names were written on the questionnaires and the respondent was asked to place the completed questionnaire in an envelope and to seal it. Confidentiality was guaranteed through the use of an elaborate system of identification numbers.

Measurement of the Psychosocial Variables of Problem Behavior Theory

Only a subset of the variables from the larger framework of Problem Behavior Theory could be included in the questionnaire used in the National Study. Five personality system variables were assessed: value on independence relative to the value on

² Respondents were distributed across school grades as follows: 7th, 19 per cent; 8th, 18 per cent; 9th, 18 per cent; 10th, 14 per cent; 11th, 17 per cent; and 12th, 14 per cent. In terms of census regions, 20 per cent were from the Northeast, 19 per cent were from the North Central, 28 per cent were from the South, and 32 per cent were from the West. Parental distribution on the NORC occupational categories was as follows: Semiskilled, 22 per cent; Farmer, 5 per cent; Skilled, 21 per cent; Office-Sales, 16 per cent; Managerial, 18 per cent; and Professional, 19 per cent.

academic achievement; expectations for academic achievement; attitudinal tolerance of deviance; religiosity; and positive-relative-to-negative functions of (or reasons for) drinking. Seven perceived environment system variables were assessed: compatibility between parents' and friends' expectations; relative parent versus friends' influence; family approval of drinking; friends' approval for drinking; friends as models for drinking; friends' pressure for marijuana use; and friends as models for marijuana use. The first two of these are considered *distal* aspects of the perceived environment since they are conceptually remote from the specific behaviors being predicted. The latter five are considered *proximal* aspects of the perceived environment because they directly implicate specific behaviors—in the present case either drinking or marijuana use—and actually refer to them in the measures. Only the perceived environment system includes measures proximal to marijuana use; personality measures proximal to marijuana use were not included in this study. On the basis of this difference alone, it is to be expected that the perceived environment system will correlate more highly than the personality system with the use of marijuana.

Five behavior system variables were assessed: frequency of general deviant (delinquent-type) behavior; frequency of drunkenness in the past year; psychedelic-amphetamine-barbiturate use; frequency of church attendance in the past year; and school performance as measured by grade-point average.

The majority of these variables were measured by multiple-item scales derived from Problem Behavior Theory and abbreviated from versions originally developed to test the theory in a longitudinal study of adolescent psychosocial development (Jessor & Jessor, 1977). The present scales are described in detail elsewhere (Donovan & Jessor, 1978). Psychometric properties of the scales are more than adequate: Cronbach *alpha* estimates of reliability (Cronbach, 1951) ranged from .78 to .88 for the personality system measures and from .62 to .90 for the (generally shorter) measures of the perceived environment system.

Measurement of Involvement with Marijuana

The present analyses are based on the 10,405 adolescents (4,845 males and 5,560 females) whose answers to the questions on drinking and drug use behavior were logically consistent *and* who answered all four of the questions that assessed involvement with marijuana.³ This subsample, constituting 79 per cent of the overall

³A group of 808 adolescents were excluded because they had incomplete data on the four questions used to classify adolescents on involvement with marijuana. An additional 1,909 adolescents were excluded because internal checks of their data uncovered logical inconsistencies in their answers either to the questions on drinking behavior or to the questions on drug use behavior. Logically inconsistent answers may indicate non-truthful, random, or unreliable responding. The resulting group of 10,405 respondents contains abstainers as well as drinkers, unlike the sample in the earlier report on problem drinking (Donovan & Jessor, 1978) which focused solely on the drinkers.

national sample, has been shown elsewhere to be representative of the total sample on several sociodemographic dimensions.⁴

Near the end of the questionnaire, respondents were asked a series of questions regarding their experience with various illicit drugs. Four questions were employed to serve as an index of degree of involvement with marijuana. The questions had been used in previous research (Jessor & Jessor, 1977; Jessor, R., 1976; Jessor, Jessor, & Finney, 1973; Sadava, 1970, 1972):

- “Have you ever tried marijuana (pot, grass, Mary Jane, weed, reefers, hash)?”
- “Have you ever been high or stoned on marijuana to the point where you were pretty sure that you had experienced the drug effect?”
- “Do you or someone very close to you usually keep a supply of marijuana so that it’s available when you want to use it?” and
- “Do you use marijuana a couple of times a week or more when it’s available?”

The four questions were designed to form a unidimensional, cumulative scale of increasing involvement with marijuana. A respondent who answered affirmatively to the second, third, or fourth questions was expected to have answered all the preceding questions affirmatively. Scalogram analysis (Guttman, 1950) demonstrated that these items do indeed form a satisfactory Guttman scale: the reproducibility coefficient was .94; the minimum marginal reproducibility was .80; and the coefficient of scalability (Menzel, 1953) was .68. Over 86 per cent of the respondents gave responses conforming to the requirements of a cumulative scale.⁵ Other psychometric characteristics of the scale were also satisfactory: the *alpha* reliability was .84, and the homogeneity ratio (Scott, 1960) was .57. In the correlational and regression analyses which follow, this measure of involvement with marijuana is treated as an interval-level variable that reflects an underlying, continuous dimension.

Results

Findings on three major topics are presented in this section. First, each measure of the psychosocial and behavioral variables is correlated with the measure of involvement with marijuana in order to determine if they relate in the direction expected

⁴Chase JA and Jessor R: A Social-Psychological Analysis of Marijuana Involvement among a National Sample of Adolescents. Adolescent Drinking Behavior Project. Report No. 3, Institute of Behavioral Science, University of Colorado, 1977. (Note: Report no longer available, and its main findings are included in the present paper.)

⁵Nearly all (89 per cent) of the noncumulative response patterns were due to the third item. In most of these cases, adolescents who had responded negatively to the other three items responded positively to this one. Since the item includes the phrase “someone very close to you,” the pattern suggests that it was the close friends who kept a supply of the drug. If this specific pattern of responses is rescored to reflect the *opportunity* to use marijuana, a level that would be intermediate between no use of marijuana and actual use of the drug, the reproducibility coefficient becomes .98 and the coefficient of scalability becomes .91 in the new Guttman scale (Guttman, 1950).

from the logic of Problem Behavior Theory. Second, multiple regression analyses predicting involvement with marijuana are presented in order to appraise the *combined* explanatory power of the measures of Problem Behavior Theory. And third, the psychosocial correlates of involvement with marijuana are compared to the psychosocial correlates of problem drinking reported earlier (Donovan & Jessor, 1978).

Psychosocial Correlates of Adolescent Involvement with Marijuana

Pearson correlation coefficients between the measures of 17 personality, perceived environment, and behavior system variables and the measure of involvement with marijuana are presented in Table 12.1. Every one of these psychosocial variables is significantly correlated with marijuana involvement. In all cases, the correlations are in the direction expected from Problem Behavior Theory, and they are similar for both males and females.

Adolescents whose scores reflect greater theoretical proneness for problem behavior tend to be more involved in the use of marijuana than are adolescents whose personality, social, and behavioral scores indicate lower problem-behavior proneness. Higher instigations for problem behavior, lower personal controls against problem behavior, greater orientation toward friends than toward parents, greater perceived support and models for drinking and drug use, greater involvement in other forms of problem behavior, and lesser involvement in conventional behavior are all associated with greater involvement in the use of marijuana. Some of the correlations, especially those for measures of the proximal environment such as perceived pressure and perceived models for marijuana use, reach substantial magnitudes.

When these analyses are replicated within each of ten subsamples differing in sex and ethnic background (Anglo, Spanish American, Black, Native American, and Asian American males and females), over 80 per cent of the correlations of the psychosocial measures with the measure of involvement with marijuana are statistically significant at the .05 level or beyond (two-tailed test). Thus, there is a substantial degree of cross-sex as well as trans-ethnic generality to the relationships shown in Table 12.1. For the most part, also, the correlation coefficients for males and females of the same ethnic background are of similar magnitude. Of the 17 personality, perceived environment, and behavior system variables, 13 exhibit considerable generality across all five ethnic groups. The four exceptions—expectations for academic recognition, parent-friends compatibility, parent-friends influence, and family approval of teenage drinking—generally correlate significantly for only one sex or the other in the minority ethnic subsamples.

Of the four sociodemographic measures shown at the bottom of Table 12.1, only age shows a modest relationship, for both sexes, with marijuana use. As would be expected, the older adolescents tend to have greater involvement with marijuana

Table 12.1 Pearson Correlations of the Psychosocial Measures with the Measure of Involvement with Marijuana

Psychosocial Measures	Males (<i>n</i> = 4845)	Females (<i>n</i> = 5560)
<i>Personality System</i>		
<i>Personal Instigations</i>		
Independence-Achievement Value Discrepancy	.25**	.27**
Expectations for Academic Achievement	-.13**	-.11**
<i>Personal Controls</i>		
Intolerance of Deviance	-.38**	-.40**
Religiosity	-.31**	-.34**
Drinking Functions Disjunction	.24**	.24**
<i>Perceived Environment System</i>		
<i>Distal Environment</i>		
Parent-Friends Compatibility	-.18**	-.19**
Parent-Friends Influence	.21**	.22**
<i>Proximal Environment</i>		
Family Approval of Drinking	.15**	.17**
Friends' Approval of Drinking	.27**	.29**
Friends as Models for Drinking	.43**	.46**
Friends' Pressure for Marijuana Use	.54**	.53**
Friends as Models for Marijuana Use	.67**	.66**
<i>Behavior System</i>		
<i>Problem Behavior</i>		
General Deviant Behavior	.45**	.51**
Times Drunk in Past Year	.61**	.65**
Psychedelic-Amphetamine-Barbiturate Use	.64**	.64**
<i>Conventional Behavior</i>		
Church Attendance Frequency	-.20**	-.23**
School Performance	-.16**	-.14**
<i>Demographic Variables</i>		
Age in Months	.28**	.21**
Father's Education	.01	.05*
Mother's Education	-.00	.05**
Family Socioeconomic Status	.02	.05**

p* < .01 (two-tail test)*p* < .001 (two-tail test)

than the younger adolescents. However, it is clear that this relationship between age and marijuana involvement does not account for the psychosocial correlations in the rest of the Table. To demonstrate this, partial correlations were computed between each of the psychosocial measures and marijuana use while statistically holding age constant; the resulting partial correlations are not very different from the simple

correlations presented in Table 12.1. Age of the adolescents therefore has little effect on the relationship of problem-behavior proneness to involvement with marijuana within this junior-senior high school sample.

A final point should be made about the data in Table 12.1. The correlations of the behavior system measures with marijuana use suggest that the use of marijuana may be part of a syndrome of problem behavior in adolescence rather than an isolated action. As can be seen, there are substantial positive correlations with the other problem-behavior measures (general deviant behavior, frequency of drunkenness in the past year, and use of other illicit drugs) and significant negative correlations with the measures of conventional behavior (church attendance and school performance).

The Multivariate Account of Involvement with Marijuana

The significant correlations at the bivariate level provide the warrant for appraising the combined role of the theoretical variables in accounting for variation in adolescent involvement with marijuana. Multiple regression analysis was used, with four sets of predictor variables employed in sequence. The first set of predictors includes the five personality measures that represent the multivariate contribution of the personality system. The second set is composed of the seven measures that represent the role played by the perceived environment system. The third predictor set consists of the 12 measures from both the personality and the perceived environment systems and represents their joint influence. And finally, the fourth set of predictors, the Total Set, is composed of 16 variables that represent the combined contribution of the three major conceptual domains of Problem Behavior Theory (personality, the perceived environment, and behavior).

Table 12.2 presents the multiple correlation coefficients (R s) resulting from the stepwise regressions for each of the four sets of measures on the measure of involvement with marijuana. The multiple correlations are presented separately for males and females, and also for the ten sex-by-ethnic subsamples. The squared multiple correlations (R^2 s) are also given in the table in order to indicate the proportion of the variance in involvement with marijuana that is accounted for by each set of predictor variables.

Taken together as systems, the variables of Problem Behavior Theory account for significant and substantial portions of the variation in adolescent marijuana use. As shown in Section D of Table 12.2, the Total Set of 16 psychosocial predictors representing the overall framework of the theory yields multiple correlations of .752 for males and .760 for females. The Total Set therefore accounts for more than one-half of the variance in marijuana use for the Total Sample males ($R^2 = .566$) and the Total Sample females ($R^2 = .577$). The results for the ten sex-by-ethnic subsamples are very similar to these.

Section A of Table 12.2 shows the results of the regression analyses for the set of personality system predictors. In combination, the five personality measures account for about 19 per cent of the variation in marijuana use in the Total Samples (R^2 s of

Table 12.2 Multiple Correlations of the Psychosocial Measures with the Measure of Marijuana Involvement

Predicting Involvement with Marijuana	Males				Females			
	Multiple R	% of Variance (R^2)	Adjusted R^2	Overall F -ratio	Multiple R	% of Variance (R^2)	Adjusted R^2	Overall F -ratio
<i>A. Personality System Predictors</i>								
Total Sample	.437	19.1	19.1	229.1	.453	20.5	20.4	286.7
Anglos	.440	19.4	19.3	168.4	.472	22.2	22.1	227.0
Spanish Americans	.474	22.4	21.7	28.6	.355	12.6	11.9	17.4
Blacks	.419	17.6	16.3	13.4	.377	14.2	13.3	14.8
Native Americans	.341	11.6	10.1	7.6	.406	16.5	15.1	12.0
Asian Americans	.531	28.2	23.6	6.1	.303	9.2	3.9	1.7 ^{ns}
<i>B. Perceived Environment System Predictors</i>								
Total Sample	.692	47.9	47.8	634.5	.680	46.3	46.2	682.8
Anglos	.693	48.0	47.9	539.1	.694	48.2	48.1	526.6
Spanish Americans	.697	48.6	47.8	66.5	.635	40.4	39.7	58.1
Blacks	.593	35.1	33.3	19.3	.597	35.6	34.3	28.0
Native Americans	.762	58.0	57.0	56.6	.682	46.5	45.3	37.5
Asian Americans	.790	62.5	59.0	17.8	.628	39.4	34.4	7.8
<i>C. Personality and Perceived Environment System Predictors</i>								
Total Sample	.702	49.3	49.2	391.8	.692	47.9	47.7	424.1
Anglos	.701	49.1	48.9	281.2	.703	49.5	49.3	352.7
Spanish Americans	.721	51.9	50.7	43.9	.647	41.8	40.6	35.7
Blacks	.641	41.1	38.4	15.5	.619	38.4	36.3	18.2
Native Americans	.779	60.6	59.0	36.2	.708	50.2	48.2	24.9
Asian Americans	.821	67.3	61.7	12.0	.636	40.4	32.2	4.9
<i>D. Total Set of Predictors^a</i>								
Total Sample	.752	56.6	56.4	419.1	.760	57.7	57.6	472.5
Anglos	.751	56.4	56.2	301.7	.768	58.9	58.8	378.8
Spanish Americans	.768	59.0	57.6	43.5	.753	56.6	55.5	48.3
Blacks	.723	52.2	49.0	16.4	.717	51.4	49.3	24.5
Native Americans	.801	64.1	62.2	33.2	.758	57.4	55.1	24.7
Asian Americans	.849	72.1	65.4	10.7	.726	52.7	44.1	6.1

(continued)

Table 12.2 (continued)

Note: Multiple R s are multiple correlation coefficients resulting from stepwise multiple regressions using all predictor variables in each set with a tolerance level of .001 to predict marijuana involvement. Percent of variance is the square of the Multiple R , expressed as the percentage of the variance in marijuana involvement that is accounted for by the set of predictors. The adjusted R^2 values provide less biased estimates of the R^2 s in the population. All of the overall F -ratios save one are statistically significant at the .001 level or beyond. Subsample sizes are as follows: 4,845 Total Sample males and 5,560 females; 3,511 Anglo males and 3,977 females; 501 Spanish American males and 609 females; 257 Black males and 363 females; 295 Native American males and 310 females; and 83 Asian American males and 92 females

*Psychedelics-amphetamines-barbiturate use was not included as a predictor in this set

.191 and .205 for males and females, respectively). For the five male subsamples differing in ethnic background, the squared multiple correlations are fairly similar to this, while several of the R^2 s for the female subsamples are somewhat lower. These R^2 s probably underestimate the potential explanatory power of the personality system for marijuana use because, as noted earlier, personality variables proximal to drug use were not assessed in the national study.

In the stepwise regression method employed here, the five personality measures were selected by the program for use in the equation in the order reflecting their differential predictive power: first, attitudinal tolerance of deviance, then religiosity, independence-achievement value discrepancy, drinking functions disjunction, and finally, expectations for academic recognition (the latter had a non-significant F -to-enter). This same order of entry of the predictors held for both the Total Sample males and females. Tolerance of deviance also was first to enter in all of the subsamples, and religiosity entered second in eight of the ten subsamples. These two personal control variables account for almost all of the variance in marijuana involvement that is explained by the personality system.

The perceived environment system predictors (see Section B of Table 12.2) accounted for about twice as much of the variation in marijuana use as did the personality predictor set. The seven perceived environment measures, taken together, yield multiple R s of .692 and .680 for the Total Sample males and females, and the respective R^2 s are .479 and .463. The perceived environment predictors accounted for similar proportions of the variance in involvement with marijuana in the sex-by-ethnic subsamples. Despite the fact that nearly all the predictors had significant F -to-enter, most of this predictive power is attributable to a single variable—friends as models for marijuana use. This measure enters first in all ten subsamples, and friends' pressure for marijuana use enters second in eight of the subsamples (but not for the Asian American males or females). The two environment variables that are proximal to marijuana use thus account for most of the predictive power of the perceived environment set.

The 12 predictor measures representing the combined influence of the personality system and the perceived environment system account for only slightly more (1–3 per cent) of the variation in involvement with marijuana than is accounted for

by the perceived environment set alone (see Section C of Table 12.2). Multiple correlations of .702 and .692, and R^2 s of .493 and .479, were obtained for the Total Sample males and females, respectively.⁶

For both the Total Sample males and females, the predictors entered the regression equation in the following order: friends as models for marijuana use, attitudinal tolerance of deviance, friends' pressure for marijuana use, and religiosity, followed by the less important predictors in no consistent order. For all of the sex-by-ethnic subsamples, friends as models for marijuana use was the first predictor to enter the equations; friends' pressure for marijuana use was either the second predictor to enter, or third, following either tolerance of deviance or religiosity in most of these subsamples. Thus, of the four most important predictors, two represent the perceived environment system and two represent the personality system—an outcome supporting the general approach of Problem Behavior Theory.

The Total Set of 16 predictors accounts for more than one-half of the variance in marijuana use for the Total Sample males and females (R^2 s = .566 and .577, respectively; see Section D of Table 12.2), and there is relatively little variation in the size of the R^2 s from one to another of the sex-by-ethnic subsamples. For both the Total Sample males and females, the three most important predictor variables, in order, were: friends as models for marijuana use, times drunk in the past year, and involvement in general deviant behavior. For six of the ten subsamples, friends as models for marijuana use is most important, followed by times drunk in the past year; the reverse order holds for the other four subsamples. The personality predictors were generally less important predictors than the perceived environment measures and the behavior system measures when all were considered jointly.

It was not a main concern of this study to demonstrate an independent contribution of each predictor system to the explanation of variance in the criterion, and, of course, the theoretical independence of the variable sets is quite a different matter than the independence of particular measures. Nevertheless, we can demonstrate that personality makes an independent contribution to the explanation of marijuana use beyond that provided by the perceived environment. In order to do this, we balanced the two systems by excluding the two proximal measures from the perceived environment set, namely, friends as models for marijuana use, and friends' pressure for marijuana use. The reduced set of five perceived environment predictors now yields R^2 s of .218 and .239 for the Total Sample males and females, respectively. Adding the five personality predictors to this set increases the R^2 s to .268 and .293, respectively. These increments of approximately 5 per cent are statistically significant and represent the independent contribution of the personality measures.

⁶That the personality predictors, when combined with the perceived environment predictors, do not add more to the explanation of marijuana involvement in this instance would seem to be due to two reasons: first, none of the personality variables assessed here is proximal to marijuana use while two of the perceived environment variables are; second, psychosocial proneness to problem behavior in the two systems is correlated as might be expected.

Comparing the Psychosocial Correlates of Marijuana Use with Those of Problem Drinking

The correlations presented earlier in Table 12.1 suggested that there may be a syndrome of problem behavior in adolescence, the occurrence of one being associated with the occurrence of others. Such a conclusion is strengthened by the fact that the pattern of relations of the psychosocial measures to marijuana use in Table 12.1 is very similar to the pattern of relations of those same measures to adolescent problem drinking (Donovan & Jessor, 1978). For the purposes of the present study, correlation coefficients were computed, on the same sample of 10,405 adolescents, between the psychosocial measures and Times Drunk in the Past Year, a measure of problem drinking.⁷ Of the 16 coefficients that can be compared directly, ten differ in magnitude by only .04 or less, and this is true for both males and females. Thus, marijuana involvement and problem drinking not only tend to co-vary, but they also appear to be the outcome of the same theoretical pattern of problem-behavior proneness.

An examination of the six measures that correlate differently with drunkenness than they do with marijuana use is especially illuminating in this connection. Three of the measures (positive-relative-to-negative drinking functions, friends' approval for drinking, and friends as models for drinking) all correlate significantly higher ($p < .001$ for the *difference between* correlations) with the problem drinking measure (times drunk in the past year) than they do with the measure of involvement with marijuana. The other three measures (friends' pressure for marijuana use, friends as models for marijuana use, and experience with illicit drugs other than marijuana) all correlate significantly higher with marijuana use than they do with the drunkenness measure.⁸ Thus, despite the significant correlations of all these measures with *both* criterion variables, it is clear that the drinking-specific measures relate more strongly to problem drinking while the drug-specific measures relate more strongly to involvement with marijuana.

These findings about the behavior-specific psychosocial measures suggest that adolescents who have used marijuana but who are not problem drinkers should differ on these measures from adolescent problem drinkers who have not used marijuana or other illicit drugs,⁹ even though they may be similar on the other measures

⁷It should be clear that this sample differs from that in the earlier report by Donovan and Jessor (1978) since it includes both drinkers and abstainers.

⁸The correlations between times drunk in the past year and each of these six variables are as follows for the males and females, respectively: drinking functions disjunctions (.36 and .34), friends' approval for drinking (.35 and .37), friends as models for drinking (.56 and .57), friends' pressure for marijuana use (.46 and .47), friends as models for marijuana use (.53 and .55), and psychedelics-amphetamines-barbiturates use (.45 and .46).

⁹Adolescents were considered problem drinkers if they had been drunk six or more times in the past year *or* if they had experienced negative consequences due to drinking at least twice in the past year in three or more of five different areas (trouble with teachers, criticism from dates, difficulties with friends, trouble with the police, and driving while under the influence of alcohol). The modal

of problem-behavior proneness. Given the large size of the nationwide sample, it was possible—despite the general co-variation of these problem behaviors noted above—to locate a sufficient number of adolescents who were involved in one but not the other of these two problem behavior areas.¹⁰ Table 12.3 presents the means on all the psychosocial variables for these two groups of adolescents, for both males and females.

Adolescents who have used marijuana (but who are not problem drinkers) are quite similar in mean scores on the majority of the personality, perceived environment, and behavioral variables to problem drinking adolescents who have not used any illicit drugs. The only statistically significant differences between the two groups that are consistent for both of the sexes occur on the behavior-specific measures that were mentioned above. The problem drinkers place greater importance on the positive-relative-to-the-negative functions of drinking than do the marijuana users, and they perceive greater friends' approval for drinking and friends as models for drinking than do the latter (family approval of drinking does not differentiate). In contrast, the marijuana users perceive greater pressure from their friends to use marijuana and perceive more models for marijuana use among their friends than do the problem drinkers. In summary, despite similarity on most measures of problem-behavior proneness, there are substantial and consistent differences between the groups on those psychosocial measures that relate most directly to the particular problem behaviors in which they are differentially involved.

Discussion

These analyses of a nationwide sample of American adolescents indicate that marijuana use is systematically related to the network of psychosocial variables specified in Problem Behavior Theory (Jessor & Jessor, 1977). Measures of personality, the perceived environment, and behavior correlate significantly with marijuana use and, taken together, they are able to explain over 50 per cent of the variance in adolescent involvement with marijuana. The results are strengthened by their replication across different sex and ethnic groups, and also by their consonance with the findings from a more intensive, longitudinal study in a local sample (Jessor & Jessor, 1977). The latter yielded multiple correlations of .76 for males and .77 for females, almost identical in magnitude to the .75 and .76 attained in the present research.

frequency of times drunk in the past year for the problem drinkers who have not used marijuana or other illicit drugs was about "once a month." This is in contrast to the frequency of drunkenness of the marijuana users who were not problem drinkers or users of other illicit drugs; their modal response was between "once" and "two or three times" in the past year.

¹⁰Marijuana users who are not problem drinkers and who have not used any other illicit drugs constitute 38.1 per cent of the 2,744 marijuana users in the sample. Problem drinkers who have used no illicit drugs constitute 25.0 per cent of the 1,878 problem drinkers in the sample. It is of interest to note that less than 2 per cent of the marijuana users in the sample do not drink.

Table 12.3 Mean Scores of Problem Drinkers (Who Do Not Use Illicit Drugs) and of Marijuana Users (Who Are Not Problem Drinkers) on the Psychosocial Measures

Psychosocial measures	Males			Females		
	1 Problem Drinkers (n = 315)	2 Marijuana Users (n = 461)	t_1 vs t_2	1 Problem Drinkers (n = 154)	2 Marijuana Users (n = 585)	t_1 vs t_2
Personality System						
<i>Personal Instigations</i>						
Independence-Achievement Value Discrepancy	22.10	21.74	0.9	21.82	21.72	0.2
Expectations for Academic Achievement	16.42	16.96	-1.7	16.41	16.92	-1.3
<i>Personal Controls</i>						
Intolerance of Deviance	36.53	36.52	0.0	37.86	38.83	-2.0*
Religiosity	12.45	11.96	1.7	13.67	13.00	2.1*
Drinking Functions Disjunction	23.41	20.94	5.3***	22.76	18.75	7.1***
Perceived Environment System						
<i>Distal Environment</i>						
Parent-Friends Compatibility	8.77	8.89	-0.6	8.53	8.74	-0.8
Parent-Friends Influence	3.19	3.24	-0.6	3.59	3.46	1.2
<i>Proximal Environment</i>						
Family Approval of Drinking	4.02	4.05	-0.3	4.15	4.13	0.1
Friends' Approval of Drinking	3.81	3.64	2.9**	3.95	3.66	4.2***
Friends as Models for Drinking	15.55	14.55	4.5***	16.41	14.74	6.6***
Friends' Pressure for Marijuana Use	2.51	3.44	-9.5***	2.67	3.42	-6.2***
Friends as Models for Marijuana Use	7.54	10.19	-13.8***	8.39	10.78	-11.9***
Behavior System						
<i>Problem Behavior</i>						
General Deviant Behavior	20.38	19.78	1.6	18.98	18.80	0.5

(continued)

Table 12.3 (continued)

Psychosocial measures	Males			Females		
	1 Problem Drinkers (n = 315)	2 Marijuana Users (n = 461)	t_1 vs t_2	1 Problem Drinkers (n = 154)	2 Marijuana Users (n = 585)	t_1 vs t_2
<i>Conventional Behavior</i>						
Church Attendance Frequency	4.11	4.10	0.0	4.72	4.22	2.8**
School Performance	4.23	4.37	-1.3	4.71	4.77	-0.4

* $p < .05$ (two-tailed t test)

** $p < .01$

*** $p < .001$

Proneness to marijuana use appears to consist of a rather coherent and integrated pattern of psychosocial attributes: *in the personality system*, greater value on independence than on academic achievement, lower expectations for academic achievement, greater tolerance of deviance, and less religiosity; *in the perceived environment system*, less compatibility between the adolescent’s two major reference groups—parents and friends, less influence of parents relative to friends, and greater approval for and models for marijuana use and other problem behaviors; and *in the behavior system*, greater actual involvement in other problem behaviors and less participation in conventional activities. What gives coherence to this pattern of attributes is that all of them imply unconventionality, an orientation that is evidenced in attitudes and values, in social interactions and reference group membership, and in behavior. A review of recent psychosocial research on marijuana use (Jessor, 1979) reveals that there is quite consistent support in the literature for one or another of these attributes as correlates of youthful involvement with marijuana (Brook, Lukoff, & Whiteman, 1977; Johnston, 1973, 1974; Kandel, 1973, 1974; Sadava, 1973; Sadava and Forsyth, 1977; Smith & Fogg, 1978).

As employed in Problem Behavior Theory, the concept of *proneness* is simply a way of organizing and summarizing the theoretical propensity for engaging in problem behavior. Proneness can be specified within each system and across all of the systems—personality, the perceived environment, and behavior. The various attributes in each system may therefore be seen as risk factors, and problem-behavior proneness as a composite of the psychosocial risk for that class of behavior. It follows, then, that whatever the *particular* problem behavior of concern, the pattern of psychosocial risk should be similar, namely, a pattern of unconventionality in each of the three theoretical systems. This, indeed, is what has been found in the present study: the pattern of psychosocial proneness that effectively accounts for variation in involvement with marijuana is essentially the same pattern that distinguishes problem drinking from the non-problem use of alcohol. A similar pattern was also shown earlier to account for variation in self-reported, antisocial behavior (aggression, lying, stealing, vandalism) in the same national sample (Donovan, 1977) and

for variation in sexual experience (virginity-nonvirginity) in a longitudinal study of a local sample of adolescents (Jessor & Jessor, 1975).

Establishing a common pattern of psychosocial risk factors for adolescent problem behavior carries with it two further implications each of which has received empirical support. The first of these is that there should be some degree of covariation *among* problem behaviors, that is, engaging in any problem behavior should be associated with engaging in others as well. There is strong empirical support for this generalization in the present study as shown by the behavior system correlations in Table 12.1. There is similar support in a variety of other studies as well (Jessor, 1978, 1979; Kandel, 1978).

The second implication of establishing a common pattern of psychosocial risk is that involvement in a *specific or particular* problem behavior cannot depend on general proneness alone but must also be influenced by risk factors that are specific to that behavior. In the present study, attributes of the proximal environment were conceptualized in behavior-specific terms, e.g., friends as models for drinking and friends as models for marijuana use. Although each of the behavior-specific attributes turns out to be significantly associated with *both* problem drinking and marijuana involvement, their behavioral specificity is shown by the fact that their correlations are significantly higher for the behavior to which they specifically refer. Given the large sample in the present study, it was possible to explore this point further by locating groups that engaged in only one of these two problem behaviors and not the other. Although the psychosocial risk pattern of the two groups was generally similar, as expected, it nevertheless differed significantly on precisely the relevant behavior-specific risk factors. These findings are important because they seem to suggest that, where there is general proneness to problem behavior, what may determine the specific behavior engaged in may be the specific exposure to it, the specific support for it, or the specific models for it. In short, those risk factors that are represented in the proximal perceived environment may conceivably *channel* a general psychosocial proneness to problem behavior into the specific problem behaviors that are actually engaged in. Longitudinal research would, of course, be needed to establish the validity of these speculations.

In relation to the concept of proneness to problem behavior, it is worth emphasizing that the present results demonstrate the explanatory usefulness of all three of the theoretical systems. Although proneness in the personality system accounted for less than one-half of the variance in marijuana involvement accounted for by proneness in the perceived environment system (see Table 12.2), nevertheless the personality system contribution was always significant, and personality attributes were always among the first two or three predictors to enter the regression equation when both systems of variables were combined. As has been pointed out elsewhere, findings such as these do not necessarily suggest that environment is more important than personality in relation to problem behavior. Rather, the difference seems to be due to the fact that the measures of the perceived environment are more proximal to the particular behaviors—in fact, they actually refer to them—than are the measures of personality. That the latter relate significantly to problem behavior

despite their being distal from it is especially supportive of the theoretical framework that specified the linkage. What the present findings do indicate is the usefulness of examining both personality and environment in any explanation of adolescent problem behavior.

The observed relationship between marijuana involvement and problem drinking among American adolescents is an association that is worth particular public health attention. Our findings show not only that there is a substantial correlation between marijuana involvement and times drunk in the past year ($r = .61$ for males and $.65$ for females), but they show also that these two behaviors have similar psychosocial correlates. A recent review of the literature on adolescent problem drinking (Braucht, 1980) is consonant with this emphasis. Primary prevention, intervention, or health promotion approaches directed at adolescents need to consider the relation between these behaviors—their possible syndrome character—rather than trying to deal with them as if they were isolated, or unique, or separate kinds of action.

The conclusions that have been drawn from this study are constrained by several limitations that need mention. First, since they are based on an in-school sample of youth, the findings do not apply to those who have dropped out or who were not attending school, a segment that tends to be less conventional than those in school. Second, all of the data depend on self-reports to questionnaires, and no external, independent information could be invoked for validation purposes. Third, only a subset of variables from Problem Behavior Theory could be included in the questionnaire, so the data can represent only a partial test of its appropriateness. Fourth, there were indications that some of the measures were not effective in several of the sex-by-ethnic subsamples, and the reasons for this limitation are not explainable with the present data set.

Despite these limitations, the findings are internally consistent, they replicate across sex, age, and ethnic group boundaries, they parallel findings in related studies, and they are consonant with Problem Behavior Theory. That theory, in avoiding reliance on notions of pathology or maladjustment, has instead dealt with marijuana use in relation to a network of variables that constitute psychosocial risk for problem behavior in adolescence. These variables have been shown in the present study to be important correlates of marijuana use; in other studies (Jessor & Jessor, 1977, 1978) the same variables have also been shown to be temporal *antecedents* of marijuana use. Problem Behavior Theory thus appears to be a useful frame of reference from which to approach adolescent problem behavior, including drug and alcohol use, and the findings appear to have significant implications for public health policy.

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Chapter 13

Accounting for Marijuana Use in Adolescence and Young Adulthood

Richard Jessor, John E. Donovan, and Frances M. Costa

Introduction

Although the urgency of the drug problem in American society demands constant attention and close monitoring, it was not all that long ago that one of us reviewed the psychosocial research on marijuana use for the officially sponsored *Handbook on Drug Abuse* (see Jessor, R., 1979). A year later, in 1980, another comprehensive review of that same literature was published by Kandel (1980). With a few exceptions, the generalizations and inferences drawn from the extant body of empirical work were consonant in both reviews, testifying to a rather remarkable robustness of the psychosocial findings in this field.

Rather than summarize material that is already available, it seems more useful to organize this chapter around the general question of whether—and in what ways—things may have changed as we have come to the middle of the decade of the 80s. Answering that question will require some backward glances and some comparison of the earlier findings with those that are more recent. It will be apparent, however, that we can look through only a tiny window on this question, partly because the necessary data for a comprehensive and detailed comparison are just not available, and partly because such a task is too large for the present report.

In comparing the 70s with more recent times, we need to ask several different kinds of questions about marijuana use. First, and an obligatory initial consideration, is the question of whether the use of marijuana (and, of ancillary concern, the use of cocaine) has changed. To answer this question necessitates a brief look at

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epidemiological information about the prevalence and distribution of marijuana use and cocaine use and about trends over the past decade or so. Changes in this domain that would be of interest, beyond those that may have taken place in the prevalence of use, would be those that may have occurred in the pattern of use, for example, with other illicit drugs and with alcohol.

A second question has to do with whether the use of marijuana is related to involvement in other problem behaviors in the way it has been before, or whether that nexus has been weakened with historical change and the passage of time. And the third—and, of course, the key—question is whether the psychosocial factors associated with the use of marijuana have changed from the 70s, now that marijuana use has become more or less institutionalized in American society.

In this paper the focus is on the general population and on samples drawn nationally, regionally or locally, rather than on clinical populations. The conclusions from such data may differ from what might be derived from clinical experience, but they do represent a vantage point with its own intrinsic validity. Hopefully, the general population and the clinical perspectives can supplement each other and, together, can expand our field of vision.

A final caveat is necessary before we turn to data. Change can be approached by comparing data from samples drawn at different times or by comparing data on the same persons over time. In this report we will be concerned with both; the availability of longitudinal studies of marijuana use makes possible the consideration of *developmental* change as well as the change that is associated with historical time.

Prevalence of Marijuana and Cocaine Use

It has been the good fortune of this field—reflecting the foresight and the beneficence of the National Institute on Drug Abuse (NIDA)—that the use of drugs in the American population has been under surveillance by a series of national surveys since the early 70s. There have been, since 1975, 11 annual, national surveys of high school seniors—this is the continuing project known as Monitoring the Future (Bachman & Johnston, 1978)—that provide comprehensive information on the use of a variety of drugs and on associated lifestyle factors in a very large sample of youth. Although not covering dropouts from school or younger-age adolescents, it has been a unique source of carefully developed information. As a supplement to this school-based, questionnaire survey, NIDA has also sponsored, since 1974, the National Household Survey on Drug Abuse (Miller et al., 1983), a home-based interview survey of the general population aged 12 and older. Both of these surveys are useful for our present purposes.

In Table 13.1, the prevalence of both marijuana use and cocaine use in the Class of 1985 can be seen (Johnston, O'Malley, & Bachman, 1986). With respect to marijuana, a majority of American high school seniors have tried it at some time, a quarter of them have used it in the past month, and one out of twenty used it on a daily basis in the past month. Table 13.2 presents the data on marijuana prevalence

Table 13.1 Percent Prevalence of Marijuana Use and Cocaine Use

% Prevalence	Marijuana			Cocaine		
	Males	Females	Total	Males	Females	Total
Lifetime (Ever Use)	56.6	51.5	54.2	19.7	14.8	17.3
Annual	43.1	37.8	40.6	14.8	11.2	13.1
Thirty Day	28.7	22.4	25.7	7.7	5.6	6.7
Daily Use/Thirty Days	6.9	2.8	4.9	—*	—*	0.4

Monitoring the Future: Class of 1985. $N \sim 16,000$

Source: Johnston, O'Malley & Bachman (1986)

*Data not available

Table 13.2 Percent Prevalence of Marijuana Use

% Prevalence	Age		
	12–17 ($N = 1,581$)	18–25 ($N = 1,283$)	26+ ($N = 2,760$)
Lifetime	27	64	23
Annual	21	40	11
Thirty Day	12	27	7

National Household Survey: 1982

Source: Miller et al. (1983)

from the National Household Survey. Here the age range is much wider, and it can be seen that, as of 1982, the date of the most recent survey, a quarter of the 12 to 17 year olds have tried marijuana, and the figure rises sharply to 64% of the 18 to 25 year olds. When the household sample is broken into smaller age groups more comparable to the age of the high school seniors in the *Monitoring the Future* survey, the prevalence of ever use for the 16 to 17 year olds is 46% and for the 18 to 21 year olds it is 64%; these percentages bracket the prevalence of marijuana use in the data from the comparable Class of 1982 which was 59%. Both surveys make clear, then, that at least some experience with marijuana use is statistically normative for late adolescents and young adults in the general population.

These findings are buttressed by a massive survey of 27,000 students in grades 7 to 12 in New York State carried out in 1983 (Welte & Barnes, 1985). As Table 13.3 shows, the prevalence of ever use of marijuana in the 17 to 20 year olds is 66%. It is also clear in the table that use is age-graded and that prevalence increases markedly with age from early to late adolescence. The relative absence of gender differences is also notable. Gender differences among adolescents and young adults in the National Household Survey are also small—age 12 to 17: males 28%, females 25%; age 18 to 25: males 68%, females 60%. The same is true for the data from the Class of 1985—males 57%, females 52%. Indeed, in general, demographic differences in regard to gender, race, or social class have not been large, although this does vary with the severity of the criterion measure, e.g., daily use does show a sizable difference between the sexes.

Table 13.3 Percent Ever Use of Marijuana by Age and Sex

	% Ever Use
<i>Age¹</i>	
11–13	18
14–16	49
17–20	66
<i>Sex</i>	
Males	47
Females	44

New York State School Survey: 1983. N = 27,335

¹Grades 7–12

Source: Welte & Barnes (1985)

Table 13.4 Percent Prevalence of Cocaine Use

% Prevalence	Age		
	12–17 (N = 1,581)	18–25 (N = 1,283)	26+ (N = 2,760)
Lifetime	7	28	9
Annual	4	19	4
Thirty Day	2	7	1

National Household Survey: 1982

Source: Miller et al. (1983)

Table 13.5 Lifetime Prevalence (Ever Use) of Marijuana and Cocaine by Young Adulthood

		Males %	Females %
Marijuana	Kandel (1980 data)*	77	68
	Jessor (1981 data)**		
	High School Study	78	73
	College Study	86	84
Cocaine	Kandel (1980 data)*	37	23
	Jessor (1981 data)**		
	High School Study	43	30
	College Study	42	33

*Kandel (1984)

**Jessor, Donovan, & Costa (1986)

With respect to cocaine, the data in Table 13.1 showed that 17% of high school seniors in 1985 had at least tried cocaine at some time. As Table 13.4 shows, the lifetime prevalence was 7% for the 12 to 17 year olds and 28% for the 18 to 25 year olds in the household survey of the general population in 1982. Thus, in both the late adolescent and young adult groups, experience with cocaine is substantial and significant.

Further prevalence findings on both marijuana and cocaine for a follow-up sample of young adults in New York State (Kandel, 1984) and for the sample of young adults originally drawn in Colorado (Jessor & Jessor, 1977) are shown in Table 13.5.

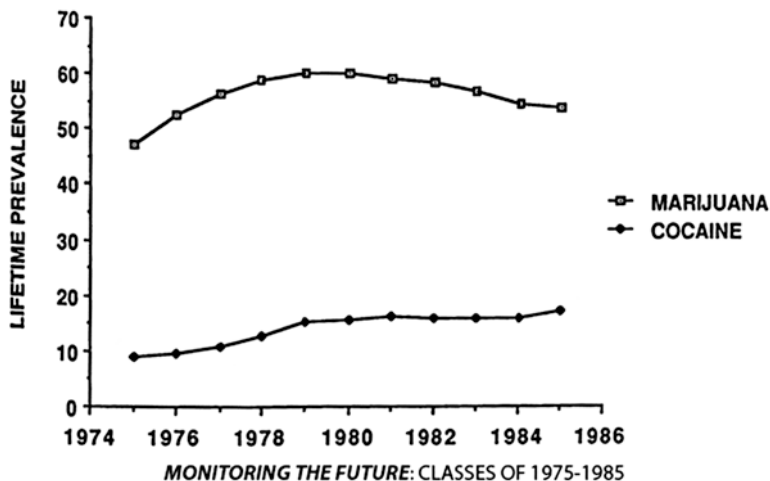


Fig. 13.1 Trends in Lifetime Prevalence (Ever Use) of Marijuana and Cocaine. Source: Johnston, O'Malley, & Bachman (1986)

These data indicate that, as of the early 80s, marijuana use has been experienced by more than three quarters of these samples of young adults by the time they have reached their middle or late twenties. With regard to cocaine, the prevalence, though considerably lower, is also substantial by young adulthood in both samples.

As we noted earlier, a critical epidemiological concern is whether the situation concerning use is changing. It is quite clear from both national surveys that change *has* occurred; this can readily be seen in Fig. 13.1. The Monitoring the Future trend shows a major increase in prevalence of marijuana use from 47% in the Class of 1975 until 1979 and 1980 when it peaked at 60%; then a turnaround and decline occurs that is sustained to 1985 by which time it has dropped to 54%. It should be pointed out that the prevalence of marijuana use in the Class of 1969 was 20% (data from the smaller longitudinal sample in the Youth in Transition study; Johnston, 1973); thus the rate of use may well have tripled in the single decade between 1969 and 1979. Decline in lifetime prevalence of marijuana use is also evident for adolescents and young adults in the National Household Survey, a decline of about 4% for each of those groups from 1979 to 1982. With regard to cocaine use, however, there is no evidence of a decline in Fig. 13.1; as a matter of fact, the generally increasing trend goes from 9% in the Class of 1975 to 17% in the Class of 1985, essentially a doubling of the rate over that decade.

In summary, several major facts are clear. First, for both drugs, there has been a major increase in prevalence since the early 70s. Even though evidencing a decline since 1979, marijuana use has become part of the lives of a majority of America's young people, and remains so today. Given such a large shift in prevalence over time, can the same factors be associated with it as was the case when it was the

behavior of a minority? Second, ever use of cocaine has continued to increase and, by young adulthood in the early 80s, may involve as much as a third or more of certain subgroups. Finally, prevalence differences related to gender, race, or social class are not large, and these demographic characteristics account for little of the variation in use.

The Relation of Marijuana Use to Other Behaviors

One of the salient generalizations that emerged from the research on adolescent drug use in the 70s was that involvement in marijuana use was associated not only with involvement with other drugs but also with involvement in *other problem behaviors* such as delinquency, precocious sexual behavior, and cigarette smoking. Indeed, in our own work, we have referred to these interrelations as a *syndrome* of problem behavior, a term intended to summarize the observed, intraindividual co-variation among a variety of topographically different behaviors.

An illustration of this co-variation, taken from the earlier phase of our own longitudinal study (Jessor & Jessor, 1977), is shown in Table 13.6. The 10th-, 11th-, and 12th-grade cohorts in the fourth year of our study in 1972 were divided according to ever-use versus never-use of marijuana and compared on three other problem behaviors and, for discriminant validity purposes, on one conventional behavior. The results are clear and important. There is a substantial association between having had experience with marijuana and the likelihood of being a problem drinker, of having had sexual experience, and of reporting a high frequency of delinquent behaviors. The prevalence differences are of a magnitude that is socially significant, a difference in rates of involvement of approximately three times for the first two behaviors and five times for the third behavior. As expected, the conventional behavior of church attendance shows a reversal in prevalence for the user versus nonuser groups.

Those data were collected in 1972; the question of interest is whether the syndrome of problem behavior, that is, the pattern of interrelatedness, still obtains among contemporary adolescents in 1986, given that the prevalence of marijuana use in the youthful population is much higher now than it was then. Preliminary analyses of recent data we have collected on a new sample of over 1600 junior-senior high school adolescents in Colorado (Donovan, Jessor, & Costa, 1986) reveal the very same patterning of co-variation between marijuana use and other problem

Table 13.6 Relation of Adolescent Marijuana Use to Other Behavior

	% Problem Drinker	% Nonvirgins	% Delinquent-type Behavior	% High Church Attendance
Marijuana Nonusers	18	18	8	40
Marijuana Users	56	61	43	20

High School Study: 1972

Table 13.7 Correlations among Selected Measures of Problem and Conventional Behavior in 1981 by Sex and Sample

Measure	High School Study—men/women ¹				
	1	2	3	4	5
<i>Problem Behavior</i>					
1. Times Drunk in the Past 6 Months	–	.20*	.38***	.22**	–.26**
2. Frequency of Marijuana Use in the Past Month	.53***	–	.51***	.15+	–.17*
3. Number of Other Illicit Drugs Used in the Past 6 Months	.52***	.55***	–	.29***	–.25**
4. General Deviant Behavior in the Past Year	.31**	.28**	.46***	–	–.14+
<i>Conventional Behavior</i>					
5. Church Attendance Frequency in the Past Year	–.33***	–.14	–.32**	–.13	–

Measure	College Study—men/women ²				
	1	2	3	4	5
<i>Problem Behavior</i>					
1. Times Drunk in the Past 6 Months	–	.16	.43***	.54***	–.15
2. Frequency of Marijuana Use in the Past Month	.35**	–	.24*	.07	–.08
3. Number of Other Illicit Drugs Used in the Past 6 Months	.39***	.55***	–	.29**	–.15
4. General Deviant Behavior in the Past Year	.15	.37***	.33**	–	–.10
<i>Conventional Behavior</i>					
5. Church Attendance Frequency in the Past Year	–.17	–.07	–.30**	–.06	–

+ $p \leq .10$; * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$ (two-tailed test)

¹Correlations based on data from 102 men and 141 women

²Correlations based on data from 84 men and 100 women

behaviors in 1986. In short, the interrelatedness seems to be invariant over this segment of historical time and over the marked increase in lifetime prevalence of marijuana use, at least in this sample of adolescents.

It is interesting to inquire, further, whether the interrelatedness is invariant not only over history and change in prevalence but over *development* from adolescence/ youth to young adulthood as well. Since we have followed-up our high school and college youth until 1981, when the former had reached the ages of 25, 26, and 27 and the latter had reached 30, it was possible to examine the pattern of interrelatedness in these samples in young adulthood, nine years later than the data shown in Table 13.6. Intercorrelations for the High School Study males and females separately are shown in Table 13.7. There is support for a continuing degree of co-variation between marijuana use (now the measure is frequency of use in the past month

Table 13.8 Marijuana, Alcohol, and Driving (1979 Young Adult Data)

	High School Study		College Study	
	Males	Females	Males	Females
% who have driven "when high or stoned" (2 or more times/past 6 months)*	74	53	70	46
% who have driven "when had a good bit to drink" (2 or more times/past 6 months)*	53	27	51	23

*Current users or drinkers only

rather than ever use) and other problem behaviors. There is also support from the correlations for the males and females in the College Study; those data are also shown in Table 13.7. When these correlation matrices were subjected to maximum likelihood factor analyses, a single, common underlying factor was found, providing further support for the notion of a syndrome of problem behavior in young adulthood (Donovan & Jessor, 1985).

Another facet of co-variation has to do with the interrelatedness of the use of illicit drugs themselves. In our Young Adult Follow-Up Study, the co-variation between involvement with marijuana and involvement with cocaine in young adulthood (assessed by a four-category measure of cocaine use and a four-category measure of marijuana use) is demonstrated by contingency coefficients between the two measures of .60, .53, .57, and .51 for the high school sample males and females and the college sample males and females, respectively. In the 1982 National Household Survey on Drug Abuse, Miller et al., report that "In every age group, the majority of those who have ever used cocaine say they have used marijuana on the same occasion that they took cocaine" (1983, p. 43). Thus, the observed co-variation among problem behaviors may sometimes reflect simultaneous engagement in them.

Finally, co-variation between drug use and the problem behavior of driving under the influence can be seen directly in the self-report data shown in Table 13.8. Nearly three quarters of the young adult males and about half of the young adult females who use marijuana report driving when high or stoned two or more times in the past six months; for alcohol, the proportions, while lower, are still substantial for both sexes.

What these data suggest, in summary, is that the use of marijuana is not an isolated behavior but is part of a larger constellation of behaviors that includes the use of other drugs, both licit and illicit, as well as a variety of other kinds of problem behavior. This syndrome has shown a degree of invariance across a sharp increase in prevalence, across historical time, and across individual development. These findings suggest that the relation between drugs and driving may well be a function, at least in part, of these *other* behaviors, and that "risky driving" may encompass considerably more than simply driving after the ingestion of drugs.

Psychosocial Correlates of Marijuana Use

The key question we have sought to examine in this report is whether the psychosocial correlates of marijuana use have changed or remained invariant between the 70s and the 80s. The correlates that were established in the 70s, as indicated earlier, have already been reviewed exhaustively (Jessor, R., 1979; Kandel, 1980). For present purposes, we address the question by reviewing some of our own earlier findings which represent the consensus of a wide variety of studies, and by reporting new findings from analyses of marijuana use and cocaine use in young adulthood by our former adolescent cohorts.

Table 13.9 shows the correlations of the psychosocial measures derived from Problem Behavior Theory (Jessor & Jessor, 1977) with marijuana involvement for males and females in both the High School Study and the College Study in 1972 and 1973, respectively. In Table 13.9, the measures of personality that relate to variation in marijuana use for the high school youth include lower value on academic achievement, higher value on independence relative to value on achievement, greater social criticism, greater tolerance of deviant behavior, and lower religiosity. For the most part, these same personality factors are related to marijuana use in the college cohort. Both distal and proximal aspects of the perceived environment can also be seen, in Table 13.9, to be related to variation in involvement with marijuana for both the high school and college cohorts: lower perceived controls by friends, lower compatibility between what parents expect and what peers expect, greater influence from friends than parents, and, most strongly, greater perceived approval of and models for marijuana use and other problem behaviors among friends.

When the key variables in each of these theoretical systems are taken together in multiple regression analyses, the account they provide of variation in marijuana use can be seen in Table 13.10. The Personality System measures generally account for about a quarter of the variance; the Perceived Environment generally accounts for somewhat more, about a third of the variance; and the Overall set accounts for about 50% of the variance in marijuana use in these samples in 1972/73 (see Jessor & Jessor, 1977, for details about these multiple regressions). The psychosocial pattern is one that reflects *greater unconventionality*—the dimension that seems to underlie both the personality and the perceived environment measures.

That these findings are not parochial or restricted to these particular samples in 1972 or 1973, can be seen in the data in Table 13.11. These results are from our analyses of data from two national sample surveys of senior high school adolescents (Jessor, Donovan, & Widmer, 1980) carried out in 1974 and 1978 by the Research Triangle Institute (Rachal et al., 1975, 1980). The survey questionnaire included abridged versions of many of the measures derived from our Problem Behavior Theory framework. Given the large sample size, all of the correlations are significant at the .05 level or better. It can be seen that, for both sexes, the same pattern of psychosocial correlates emerges as obtained for the Colorado high school and college students in 1972/73. What is even more remarkable is the near identity of the

Table 13.9 Pearson Correlations of Personality System and Perceived Environment System Measures with Marijuana Behavior Involvement, *High School Study, Year IV (1972)*, and *College Study, Year IV (1973)*

	High School Study		College Study	
	Males (N = 188)	Females (N = 244)	Males (N = 92)	Females (N = 113)
<i>Personality System Measures</i>				
<i>Motivational-Instigation Structure</i>				
Value on Academic Achievement	-.27***	-.31***	-.04	-.14
Value on Independence	.09	.19**	.09	.13
Independence-Achievement Value Discrepancy	.31***	.39***	.08	.20*
Expectation for Academic Achievement	-.16*	-.14*	-.09	-.13
Expectation for Independence	.06	.23***	.11	.03
<i>Personal Belief Structure</i>				
Social Criticism	.33***	.35***	.40***	.38***
Alienation	.08	.08	.04	.30**
Self-Esteem	.10	.08	-.10	-.17
Internal-External Control	-.17*	-.06	-.11	-.10
<i>Personal Control Structure</i>				
Intolerance of Deviance	-.41***	-.40***	-.03	-.26**
Religiosity	-.27***	-.31***	-.41***	-.29**
Drug Disjunctions	.58***	.64***	.42***	.54***
<i>Perceived Environment System Measures</i>				
<i>Distal Structure</i>				
Parental Controls	-.15*	-.07	.09	.02
Friends Controls	-.43***	-.35***	-.25*	-.33***
Parent-Friends Compatibility	-.31***	-.33***	-.16	-.35***
Parent-Friends Influence	.29***	.18**	.22*	.22*
<i>Proximal Structure</i>				
Parent Approval Problem Behavior	.34***	.28***	.28**	.30**
Friends' Approval Problem Behavior	.55***	.60***	.51***	.59***
Friends Model Problem Behavior	.60***	.61***	.49***	.55***

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$ (two-tailed test)

correlation values in these two entirely independent national samples drawn four years apart in time. Table 13.11 also shows, as we have seen before, the positive relation of other problem behaviors—in this case, drunkenness and delinquent behavior—to marijuana use, and the negative relation of a conventional behavior, church attendance. Also of interest in Table 13.11 is the absence of any relationship

Table 13.10 Multiple Correlations of Theoretical Systems with Marijuana Behavior Involvement in the High School Study and the College Study¹

Multivariate Run ²	High School Study		College Study	
	Males	Females	Males	Females
4: Personality System	.52	.54	.40	.43
	.49	.45	.48	.51
7: Perceived Environment System	.65	.64	.54	.60
	.59	.60	.44	.70
8: Field Pattern	.65	.68	.57	.61
	.60	.59	.55	.70
14: Overall Set	.76	.77	.67	.68
	.71	.70	.70	.77

¹For each run, the *Rs* in the first row are for the Year IV data and the *Rs* in the second row are for the replication on Year III data in the High School Study and Year II data in the College Study

²All runs are step-wise regressions with an *F*-to-enter of 2.0 and an *F*-to-delete of 1.0

of the sociodemographic measures, such as socioeconomic status, to marijuana use in these adolescent samples.

When the separate variables are combined in multiple regression analyses, the results again yield, as shown in Table 13.12, significant multiple correlations that account for about 50% of the variance in marijuana use in both surveys for both sexes.

Thus, in findings in our local Colorado sample in 1972/73 for senior high school youth aged 16 to 18 and college youth aged 22, and in findings from national samples of senior high school youth aged 16 to 18, in both 1974 and 1978, there has been a strong degree of consonance in the pattern of psychosocial correlates associated with the use of marijuana. That consonance extends even further to the year 1980 and to the data from the national sample of high school seniors in the Class of 1980, the Monitoring the Future study (Bachman, Johnston, & O'Malley, 1981). As Kandel notes in reviewing those findings, "The users in 1980 show the same pattern of disaffection from major institutions as the users in 1967....Despite the fact that over the last decade marijuana use itself has greatly increased in prevalence, the social-psychology of marijuana use is very much the same as it was 10 years ago" (1982, p. 336).

More recently still, Labouvie and McGee (1986) report on data collected from the adolescent cohorts in the Rutgers longitudinal study in 1982–83. Among their personality findings is one that parallels those reported above; namely, that earlier and heavier involvement with drugs is associated with higher scores on Autonomy and lower scores on Achievement. This is consonant with our own findings for value on independence and value on achievement in data going back to the beginning of the 70s.

Finally, we have analyzed our 1981 young adult data, when our high school participants had reached ages 25 to 27 and our college participants had reached 30, to see whether this psychosocial pattern—one that has remained fairly constant over time for different samples of adolescents—also remains constant over development for the same sample of adolescents now grown into young adults. The approach we

Table 13.11 Pearson Correlations of the Personality System Measures, Perceived Environment System Measures, Behavior System Measures, and Socio-demographic Measures with Marijuana Behavior Involvement for Males and Females in the 1974 and 1978 National Studies of Adolescent Drinking

	10–12 Males		10–12 Females	
	1978 (n = 1985)	1974 (n = 2353)	1978 (n = 2405)	1974 (n = 2706)
Psychosocial Measures				
Personality System Measures				
<i>Personal Instigations</i>				
Value on Achievement	-.16	-.14	-.20	-.20
Value on Independence	.16	.16	.10	.13
Independence-Achievement Value Discrepancy	.27	.25	.24	.26
Expectation for Academic Achievement	-.19	-.13	-.18	-.12
<i>Personal Controls</i>				
Intolerance of Deviance	-.39	-.38	-.43	-.41
Religiosity	-.30	-.31	-.34	-.35
Perceived Environment System Measures				
<i>Distal Structure</i>				
Parent-Friends Compatibility	-	-.21	-	-.21
Parent-Friends Influence	.19	.23	.24	.21
<i>Proximal Structure</i>				
Friends' Pressure for Marijuana Use	-	.51	-	.56
Friends Models for Marijuana Use	-	.72	-	.71
Behavior System Measures				
<i>Problem Behavior Structure</i>				
General Deviant Behavior	.47	.51	.54	.55
Times Drunk in Past Year	.66	.58	.69	.64
<i>Conventional Behavior Structure</i>				
Church Attendance Frequency	-.24	-.21	-.29	-.26
Socio-demographic Measures				
Age in Months	.07	.07	.02	.00
Father's Education	-.01	.03	.03	.09
Mother's Education	-.03	.01	.02	.10
Father's Occupational Group	.00	.04	.02	.06
Family Socioeconomic Status	.01	.03	.02	.07

Note: correlations of .05 are significant at $p \leq .001$ (two-tailed test)

took was to divide our young adult cohorts into four groups based on their experience with marijuana. The groups and their frequency of use in the past month are: Never Users (0 times); Infrequent Users (an average of less than once); Occasional Users (about 6 times); and Heavier Users (about 35 times for the young adults originally from the High School Study, and 25 times for those originally from the College

Table 13.12 Multiple Correlations Predicting Marijuana Behavior Involvement 1978 and 1974 National Studies

	10–12 Grade Males		10–12 Grade Females	
	1978 (<i>n</i> = 2176)	1974 (<i>n</i> = 2502)	1978 (<i>n</i> = 2550)	1974 (<i>n</i> = 2815)
Marijuana Involvement	Multiple <i>R</i>	Multiple <i>R</i>	Multiple <i>R</i>	Multiple <i>R</i>
Personality Set	.46	.45	.49	.48
Perceived Environment Set	.43	.46	.42	.50
Combined Set	.52	.53	.53	.56
Total Set	.70	.66	.74	.71

Study). One-way analyses of variance were then run for a variety of the psychosocial measures of Problem Behavior Theory across these four groups of young adults. The findings are shown in Table 13.13 for the High School Study males and females separately and, because of the small *Ns* in some of the user groups, for the College Study sexes combined.

It is apparent in Table 13.13, that there are significant *F*-ratios for a large number of the very same psychosocial variables we have been examining throughout this paper, and that, for most of them, the significance holds across all three samples of young adults. Thus, social criticism, attitudinal tolerance of deviance, religiosity, friends controls, perceived friends approval and models for problem behavior, and a variety of problem behaviors, as well as the conventional behavior of church attendance, are all still associated in the expected direction with marijuana use in young adulthood as of 1981. It is important to take note, however, that a number of the variables that were previously associated with marijuana use in adolescence no longer are associated in young adulthood. Although not shown in the table, these include value on achievement, expectations for achievement, and parent-friends compatibility, among others. Thus, the invariance holds for most but not all of the earlier psychosocial correlates of marijuana use.

That our young adult findings are not parochial or limited to this particular sample can be established by comparison with the findings reported by Kandel (1984) from her analyses of the young adult follow-up data on her own New York State cohorts. Her conclusion is worth quoting: "...in a random representative sample of young adults, marijuana involvement is associated with the same factors that had previously been reported for younger populations of junior high school, senior high school, and college students" (1984, p. 208).

A similar kind of analysis was carried out for variation in cocaine use in our young adult samples in 1981. Table 13.14 shows the one-way analyses of variance for four groups established on the basis of their use-nonuse of cocaine in the past six months: Never Users; Non-Current Users; Current Users, 1–5 times; and Current Users, 6 or more times. As can be seen, the psychosocial correlates of cocaine use are for the most part identical with those for marijuana use that were shown in the preceding table.

Table 13.13 Psychosocial Correlates of Marijuana Involvement in Young Adulthood

	High School Study		College Study
	Males (N = 154)	Females (N = 220)	Sexes Combined (N = 181)
<i>Personality System Measures</i>			
<i>Motivational-Instigation Structure</i>			
Value on Independence	**	*	NS
<i>Personal Belief Structure</i>			
Social Criticism	*	NS	***
Internal-External Locus of Control	*	NS	NS
Sex-Role Liberalism	*	***	*
<i>Personal Control Structure</i>			
Attitudinal Tolerance of Deviance	***	**	*
Moral Attitudes	***	***	***
Religiosity	**	***	***
<i>Perceived Environment System Measures</i>			
<i>Distal Structure</i>			
Friends Controls	***	*	+
Parents vs Friends Influence	NS	**	NS
<i>Proximal Structure</i>			
Friends' Approval of Problem Behavior	***	***	***
Friends Models for Problem Behavior	***	***	***
<i>Personality/Perceived Environment System</i>			
Total Conventionality Index	***	***	***
<i>Behavior System</i>			
<i>Problem Behavior Structure</i>			
Smoking Status	***	***	***
Daily Alcohol Intake	***	***	***
Frequency of 5 or More Drinks/Sitting	***	***	***
Times Drunk/Past 6 Months	***	***	***
Frequency of Driving under the Influence	***	***	***
General Deviant Behavior	***	**	**
Current Use of Other Illicit Drugs (Number)	***	***	***
<i>Conventional Behavior Structure</i>			
Church Attendance	***	***	**

High School Study (1981) and *College Study* (1981)

(One-way Analyses of Variance: Never User; Infrequent User; Occasional User; and Heavier User Groups)

+ $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$ for the *F*-ratios

Table 13.14 Psychosocial Correlates of Cocaine Involvement in Young Adulthood

	High School Study		College Study
	Males (<i>N</i> = 157)	Females (<i>N</i> = 221)	Sexes Combined (<i>N</i> = 184)
Personality System Measures			
<i>Motivational-Instigation Structure</i>			
Value on Independence	NS	NS	NS
<i>Personal Belief Structure</i>			
Social Criticism	*	*	**
Internal-External Locus of Control	NS	NS	+
Sex-Role Liberalism	NS	*	NS
<i>Personal Control Structure</i>			
Attitudinal Tolerance of Deviance	***	***	NS
Moral Attitudes	***	***	***
Religiosity	***	***	***
Perceived Environment System Measures			
<i>Distal Structure</i>			
Friends Controls	***	*	NS
Parents vs Friends Influence	NS	**	NS
<i>Proximal Structure</i>			
Friends' Approval of Problem Behavior	***	***	***
Friends Models for Problem Behavior	***	***	***
Personality/Perceived Environment System			
Total Conventionality Index	***	***	***
Behavior System			
<i>Problem Behavior Structure</i>			
Smoking Status	***	**	+
Daily Alcohol Intake	***	***	***
Frequency of 5 or More Drinks/Sitting	***	***	***
Times Drunk/Past 6 Months	***	***	***
Frequency of Driving under the Influence	***	***	***
General Deviant Behavior	***	***	*
Current Use of Other Illicit Drugs (Number)	***	***	***
<i>Conventional Behavior Structure</i>			
Church Attendance	***	**	**

High School Study (1981) and *College Study* (1981)

(One-way Analyses of Variance: Never User; Non Current User; Current User, 1 to 5 Times; Current User, 6 or more Times)

+ $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$ for the *F*-ratios

Conclusion

The primary aim of this paper has been to determine whether the pattern of psychosocial correlates of marijuana (and, secondarily, of cocaine) use have changed or remained essentially the same since an earlier review of the research literature (Jessor, 1979). In the interim, there has been a major and marked increase in the prevalence

of both marijuana use and cocaine use, and at least some experience with the former has become statistically normative in the late adolescent and young adult population in American society. Findings from studies carried out from the mid-70s to the early 80s, for both adolescents and young adults, were examined and compared with those reported for the early 70s and before. What emerges rather compellingly is that there is a relatively invariant pattern of psychosocial unconventionality that continues to be associated with variation in marijuana use. It includes: less attachment to the conventional institutions of church and school, lower expectations of doing well in school, greater criticism and a more jaundiced view of the larger society, greater tolerance of transgression, and less commitment to religion; less perceived control from friends, less compatibility between the expectations of friends and of parents, greater influence of friends than of parents, and greater friends' approval of and models for problem behavior; finally, greater involvement in *other* problem behaviors, such as problem drinking, delinquency, and precocious sexual behavior, and less involvement in conventional behavior, such as church attendance.

This pattern has been shown to be relatively invariant over time into the early 80s, as well as over development from adolescence into young adulthood. This invariance is all the more remarkable for the fact that it obtains despite a major increase in prevalence in which marijuana use has shifted from a minority to a majority experience in those age groups.

These findings, showing that marijuana use and cocaine use are embedded in a larger network of personal, social, and behavioral attributes, ought to have important implications for how we approach and try to understand the role of drug use in traffic safety. It may well be that we are seeing in risky driving not just "drug effects" but the consequences of a larger pattern of unconventional and risk-taking behavior of which drug use is but one component. If that is indeed the case, then the design of prevention and intervention programs for traffic safety ought to be quite different than they are at present.

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Part III
Health-Related Problem Behaviors: Early
Sexual Intercourse Experience

Chapter 14

The Transition to Sexual Intercourse Experience

Shirley L. Jessor and Richard Jessor

Despite the increasing prevalence of premarital sexual intercourse, its apparently earlier onset, and the general shift in sexual standards toward greater permissiveness (Bell & Chaskes, 1970; Christensen & Gregg, 1970; Croake & James, 1973; Kaats & Davis, 1970, 1972; Kantner & Zelnik, 1972; Katz, 1974; Reiss, 1967; Robinson, King, & Balswick, 1972), having sexual intercourse and making the transition from virginity to nonvirginity remains a life experience of considerable developmental salience for most youth. Both cultural norms and societal restraints, by reserving sexual experience for a later, more mature—if not marital—status, have the effect of attaching to its occurrence a variety of social-psychological meanings. Beyond the personal significance of having attained a more mature status, these may involve as well the sense of having established one's independence and autonomy, of being capable of interpersonal intimacy, of having gained peer-group respect, of being physically attractive, of having affirmed one's sexual identity, of having rejected social conventions, or of having engaged in personally and socially unacceptable behavior. Because the transition to nonvirginity may have such multiple and diverse personal meanings for youth, a psychological understanding of its occurrence and its consequences would seem to require a social-psychological approach to development. In such an approach, the transition would be considered from the vantage point of a network of theoretically relevant personality, social, and behavioral attributes.

Insofar as such attributes are relevant to becoming a nonvirgin, the role they may play involves an *antecedent* focus in which they can be conceptualized as more or less conducive to beginning sexual experience; theoretically, the attributes would be characterized as precursors that define a readiness for or a proneness toward the

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transition to nonvirginity. Since such a focus is predicated on the extension of time, its investigation requires a longitudinal or developmental research design.

The present paper is a report of a longitudinal study of the transition to nonvirginity in two samples of youth, one in high school and the other in college. The study was part of a larger research project on the socialization of problem behavior in youth in which extensive data were collected on the participants on an annual basis for four successive years. Both the high school and college samples included male and female participants, and the annual questionnaire measured a wide variety of personality and perceived environment variables and, in addition to sex, assessed behavior in the areas of drug use, drinking, political activism, general deviant behavior, school performance, and participation in church activities.

The theoretical framework of the research was the social psychology of problem behavior elaborated initially in the report of the Tri-Ethnic Project (R. Jessor, Graves, Hanson, & S. L. Jessor, 1968) and described further in more recent publications (R. Jessor, Collins, & S. L. Jessor, 1972; R. Jessor & S. L. Jessor, 1973a, 1973b, 1975; S. L. Jessor & R. Jessor, 1974; R. Jessor, S. L. Jessor, & Finney, 1973; Rohrbaugh & R. Jessor, 1975; Weigel & R. Jessor, 1973). The basic concepts of the approach have their origin in Rotter's social learning theory (Rotter, 1954; Rotter, Chance, & Phares, 1972). The aim of the theoretical framework has been to organize a network of variables and to specify the directions and patterns that constitute a deviance-proneness or proneness to engage in problem behavior. The application of such a social psychology of problem behavior to adolescent development derives its fundamental rationale from the interpretation of many of the important transitions that occur during adolescence *as behaviors that depart from the regulatory norms defining what is appropriate for that age or stage in life*.

Not only sexual intercourse but other behaviors that mark transitions during the course of development—beginning to drink, for example, or taking a full-time job—are normatively age-graded; that is, they are permitted or even prescribed at later developmental stages, while being discouraged or proscribed at earlier stages. Engaging in such behaviors at earlier stages constitutes a departure from regulatory norms, and it is precisely in this context that a social psychology of deviance or problem behavior has its logical applicability (cf. Reiss, 1970). When the developmental notion of “transition-proneness” is mapped onto the notion of “deviance-proneness,” the theoretical framework becomes relevant to accounting for the occurrence of behaviors marking transition toward a more mature status and for variation in the time (or age) of their occurrence.

Beyond the logic of this rationale, the relevance of the present framework lies also in the fact that it incorporates a large number of personality and social concepts, and many of them (e.g., value on independence or self-esteem) would be considered central to adolescent development from almost any theoretical perspective. Since the earlier-cited publications have discussed it in detail, only a brief description of the social psychology of problem behavior is presented here, and it is focused on the present concern with sexual intercourse and with becoming a nonvirgin.

The framework consists of three major systems: personality, the perceived environment, and behavior. Each system is composed of structures of variables that in

interaction determine the likelihood of occurrence of deviant or problem behavior as against conforming behavior. That likelihood of occurrence is described as deviance-proneness or, in the present context, as transition-proneness.

The personality system is made up of three structures: motivational-instigation, personal beliefs, and personal controls. In the motivational-instigation structure, transition-proneness would imply greater value on independence, lower value on achievement, and lower expectations for achievement. In the personal belief structure, transition-proneness would imply greater social criticism and alienation. And in the personal control structure, it would imply lower religiosity, higher tolerance of deviance, and more accepting attitudes toward specific problem behaviors such as sexual intercourse.

The perceived environment system is made up of a distal structure consisting of variables only indirectly linked to the specific behavior, and a proximal structure consisting of variables directly implicating the behavior (see R. Jessor, & S. L. Jessor, 1973a). Transition-proneness in the distal structure would imply lower compatibility between parental and peer expectations, lesser parental influence relative to peer influence, and lesser parental controls; in the proximal structure, it would imply greater friends' models and approval for sexual intercourse and for other possible transition-marking behaviors.

Finally, the behavior system is also made up of two structures, that of problem behavior and that of conforming or conventional behavior. In the problem behavior structure, transition-proneness implies greater involvement in behaviors constituting departures from regulatory norms, for example, marijuana use, problem drinking, political activism, and general deviance such as lying, stealing, and aggression; in the conforming behavior structure, it implies lesser involvement in behaviors that tend to implement conventional norms, such as academic achievement or church attendance.

In general terms, the hypotheses of this investigation are that (a) there are systematic differences between virgins and nonvirgins on measures of the variables in the theoretical framework; and (b) these differences obtain in some degree *prior* to the shift from virginity to nonvirginity and can serve to signal its onset. Since the applicability of Problem Behavior Theory to adolescent development should be greater at relatively earlier developmental stages, support for these hypotheses should be stronger among our high school participants than among those in college.

Method

Participants

The larger research project consists of two parallel but separate longitudinal studies, one of high school youth (1969–1972) and one of college youth (1970–1973). Both studies were conducted in the same small city in the Rocky Mountain region.

For the high school study, a random sample of 1,126 students, stratified by sex and grade, was originally designated from the enrollment at three junior high schools in the community. Each student was contacted by letter and asked to participate in a 4-year study of personality, social, and behavioral development in youth; parents of each student were also contacted by letter and asked for their signed permission. Of the designated sample, permissions were received for 668 students, and, of these, 589 (52% of the random sample) were tested in April 1969 and became the Year I cohort of the study. By the end of the Year IV testing (1972), 483 students were still in the study, representing 82% retention of the initial cohort. Of the 483 students, there were 432 who had been tested in each of the 4 years; this latter group is the core sample on which the high school data reported in this paper are based. In 1972, the core sample consisted of 186 boys (75 in tenth grade, 60 in eleventh grade, and 51 in twelfth grade) and 242 girls (96 in tenth grade, 82 in eleventh grade, and 64 in twelfth grade); 2 boys and 2 girls were eliminated from the present analyses because of incomplete sex data or because of marriage.

Demographically, the core sample is relatively homogeneous. Almost entirely Anglo-American in ethnic background, it represents middle-class socioeconomic status. Average education level of fathers was "some years of college" and average occupational level of fathers was above the category of skilled labor.

For the college study, a random sample of 497 freshman students in arts and sciences, stratified by sex, was designated. Four hundred and sixty-two were still in school when contacted by letter and asked to participate over the next 4 years in the research. Of those contacted, 276 (60%) were tested in the spring of 1970 near the end of their freshman year; they became the Year I cohort of the college study. By the end of the Year IV college testing (1973), 226 students were still in the study, representing 83% retention. Of these 226, 205 had been tested in each of the 4 years. When, for purposes of the present study of premarital sexual experience, 14 male and 11 female married students were eliminated, there remained 78 males and 102 females on whom the college data reported here are based.

Participants in the research were followed whether they remained in the study schools, transferred elsewhere, or dropped out. Dropout and move-away were negligible in the high school study; in the college study sample, by 1973, 64% were still at the same university, 20% were at another university, and 16% had dropped out of school at some point and not returned, even though remaining in the study.

Procedure

Data were collected in April and May of each year by means of an elaborate questionnaire, approximately 50 pages in length, that required about an hour and a half to complete. The questionnaire consisted largely of psychometrically developed scales or indexes assessing a variety of personality, social, behavioral, and demographic variables. The majority of scales were kept constant over the 4 years, but modifications were made in some, and new ones were added at different times.

Although many of the measures derive from and were validated in previous work (R. Jessor et al., 1968), the entire questionnaire was pretested prior to its present use, and scales were revised to increase their appropriateness for the student samples.

The questionnaires were administered in small group sessions outside of class. Strict confidentiality was guaranteed since all questionnaires were signed rather than anonymous in order to permit longitudinal follow-up. Name sheets were removed from questionnaires upon completion and stored in a secret safe deposit box in a bank vault; analyses were carried out entirely by code number. After the initial year, participants were paid a token sum of \$2 for their assistance in filling out the questionnaire.

The high school and college forms of the questionnaire were nearly identical but more detail was gotten about sexual history and experience in the college. Questions about sex were asked every year in the college study, but the section on sexual behavior was not introduced into the high school study until 1970 (its Year II). Finally, questions about experience with sexual intercourse in the high school study were asked only of students who had reached the senior grades—Grades 10, 11, and 12.¹

Measures

Establishment of virgin-nonvirgin status. Toward the latter part of the questionnaire, after considerable inquiry about personality, peer and parent environment, and drinking and general deviance, a section several pages in length dealing with sex was introduced. Questions inquired about attitudes toward premarital sexual intercourse with and without a relationship, about positive and negative functions or reasons held to be important in favor of or against having intercourse, about experience in dating, about number of same- and opposite-sex friends who were thought to be nonvirgins, and about own personal history of experience with sexual intercourse. The key question, in both studies, with respect to classification of virgin or nonvirgin status was the following: “Have you ever engaged in sexual intercourse with someone of the opposite sex?” Those who answered no were classified as virgins, those who answered yes were classified as nonvirgins.²

¹ Since, in 1970, our high school sample was distributed over Grades 8, 9, and 10, only the latter subgroup was asked about intercourse. In 1971, the sample was in Grades 9, 10, and 11; thus, the latter two subgroups were asked about intercourse in this year. It is only in 1972, when all students had reached senior high school, that questions about sex were asked of all participants. These circumstances were necessitated by requirements of the testing agreement with the local school officials and by the inappropriateness of certain questions for younger-age students.

² In general, the intraindividual consistency across the testing years in reports of sexual experience was very high. There were, however, a small number of students whose responses to the question were inconsistent across at least 2 years of reporting. For these students, a careful appraisal by three judges was made of all of their questionnaires, and a consensual classification was developed for each one. Comparisons, subsequently made, of the social-psychological scores for these

On the basis of responses to this question, all of the college students received virgin-nonvirgin status classification for each of the 4 years of the study. It was possible thus to know not only how many students were nonvirgins in each year but, for each student who was a virgin at the beginning of the study in 1970, to know in what year the transition to nonvirginity occurred. For the high school students, it was possible to classify them only from ninth grade on. That means that those students who were in ninth grade when the study began in 1969 would have 4 years of classification, those who began in eighth grade would have 3 years of classification, and those who began in seventh grade received classification only for 2 years. For the high school students, then, although it is also possible to report prevalence of nonvirginity and to designate when the transition to nonvirginity took place, the full 4-year span applies only to those who began in ninth grade.

The classification enabled the establishment of virgin and nonvirgin groups which can be compared on the social-psychological measures. It also enabled the establishment, among those who were initially virgins, of groups of students who did make and who did not make the transition to nonvirginity, and these groups can be compared *prior to* the transition to see if, in fact, the measures reveal a proneness to change.

Assessment of the social-psychological framework. Nearly all of the measures employed in the present paper have been described in previous publications. Details about item content and scoring of measures that appeared in the initial form of the questionnaire are presented in Jessor (1969). For the most part, the scales have adequate psychometric properties as shown by Scott's Homogeneity Ratio and Cronbach's alpha index of reliability. There is substantial measurement stability over time as indicated by interyear correlations, and various kinds of validity, including construct validity, have been demonstrated. The descriptions here will be kept brief.

In the personality system, the motivational-instigation structure was assessed by 10-item rating scale measures of the importance to the student of three values or goals: academic achievement, independence, and social love and affection from peers. Parallel 10-item scales assessed the expectations of the student for attaining each of these goals. The personal belief structure was assessed by three measures, all Likert-type scales. One measure dealt with the degree to which the student held critical beliefs about the nature of contemporary American society and its institutions and intergroup relations. A second measure dealt with self-esteem in a variety of areas, and the third scale was a 15-item measure of alienation covering feelings of rejection and social isolation as well as lack of meaning in everyday role activities. In the personal control structure, a 26-item measure of attitudinal intolerance of transgression, a multi-item measure of religiosity, and an index of disjunction between positive and negative functions or reasons for engaging or not engaging in sexual intercourse were employed.

students with the mean scores of the groups to which they had been assigned strongly supported the appropriateness of the judgments.

In the perceived environment system, the distal structure included three measures: a three-item measure of perceived compatibility between parents and friends as to their views about issues important to the student; a two-item scale of the relative influence of parents or friends on the student's decisions and outlook on life; and a two-item measure of perceived parental support. In the proximal structure, there were four measures: a measure of parental controls over the student's behavior; a measure of perceived parental approval (or lack of disapproval) of problem behavior, including sex, drug use, drinking, and activist protest; a measure of perceived friends' approval for such behavior; and a measure of the perceived prevalence, among friends, of models for engaging in such behavior.

In the behavior system, measures of self-reported experience with or participation in marijuana use, sexual intercourse, problem drinking, political activism, and general deviance were collected, as well as reported frequency of church attendance and reported academic grade point average.

The variety of measures, taken together, enable an assessment of social-psychological attributes theoretically relevant to the occurrence of problem behavior and to the concept of deviance- or transition-proneness.

Results

The results include a description of the prevalence of nonvirginity in the two samples, a comparison of virgins and nonvirgins on the various social-psychological measures, and finally, data bearing more directly on the issue of antecedent transition-proneness. Both univariate and multivariate analyses are reported for both the high school and the college studies.

Prevalence of Nonvirginity

On the basis of the classification of virgin or nonvirgin status for each student, it was possible to determine nonvirginity rates by grade and sex in the high school in 1972, and by sex in the college in 1973. The data are presented in Table 14.1.

As expected, prevalence of nonvirginity increases with grade (or age) in high school, from 21% to 33% for the males, and from 26% to 55% for the females. For the college sample, by the fourth year, more than 80% of both sexes have experienced sexual intercourse. At all grade levels in the high school, the females show higher rates and, in the eleventh and twelfth grades, the differences from the male rates are substantial.

The twelfth-grade students in 1972 were in ninth grade at the start of the study in 1969, and for these students virgin-nonvirgin status was established for all 4 years. It is possible, therefore, to trace how the rate of nonvirginity *within* this subgroup increases over those years: For the males, the proportion of nonvirgins was 8% in

Table 14.1 Percentage of Nonvirgins in the High School Study for Year IV (1972) by Grade and Sex and in the College Study for Year IV (1973) by Sex

Participants	High School Study				College Study
	10th grade	11th grade	12th grade	Combined grades	
Males	21 (75) ^a	28 (60)	33 (51)	27 (186)	82 (78)
Females	26 (96)	40 (82)	55 (64)	38 (242)	85 (102)
Combined sexes	24 (171)	35 (142)	45 (115)	33 (428)	84 (180)

^aNumbers in parentheses represent the *n* in each group and are the denominators on which the percentages are based

1969, 16% in 1970, 22% in 1971, and 33% in 1972; for the females the corresponding percentages were 5%, 13%, 36%, and 55%. Although the male increase is regular, the females show a sharp rise in eleventh grade and again in twelfth grade. The increase in rates over the four years within the college sample was as follows: for the males, 46% were nonvirgins in 1970, 65% in 1971, 74% in 1972, and 82% in 1973; for the females, the corresponding percentages were 51%, 70%, 80%, and 85%. These data, although merely descriptive, are of interest in their own right and are considered further in the Discussion section.

Comparison of Virgins and Nonvirgins on the Social-Psychological Measures

The initial approach to assessing the usefulness of the social-psychological framework for describing transition-marking behavior was to compare virgin and nonvirgin students in each sample on the various measures. This is, of course, only an indirect approach since even if the nonvirgins do show greater deviance-proneness on the measures, as would be expected theoretically, that could be a function either of their pattern prior to the transition, or of the consequences of the transition, or of both. The data for these comparisons, based on the Year IV measures in each study, appear in Table 14.2. For the high school study, the data are presented by sex for the three grades combined since analyses of variance carried out within Grade \times Sex subgroups yielded very similar results.

With respect to the high school study, Table 14.2 indicates substantial support for the hypothesis that virgins and nonvirgins would differ as anticipated on the various measures. There are significant mean differences in each of the theoretical systems and in each structure within each system and for both sexes. Although the results are stronger and more consistent for the females, they are still highly supportive for the males. In general, they indicate greater deviance- or transition-proneness for the nonvirgins: in motivational-instigation (lower value on achievement, higher value

Table 14.2 Mean Scores on Personality, Perceived Environment, and Behavior Measures for Virgins and Nonvirgins in Year IV (1972) of the High School Study and Year IV (1973) of the College Study

	High School Study				College Study			
	Males		Females		Males		Females	
	Virgins (n = 136)	Nonvirgins (n = 50)	Virgins (n = 149)	Nonvirgins (n = 93)	Virgins (n = 14)	Nonvirgins (n = 64)	Virgins (n = 15)	Nonvirgins (n = 87)
<i>Personality</i>								
<i>Motivational instigators</i>								
Value on affection	63.9	64.1	71.2	65.8***	53.8	58.0	60.0	60.8
Value on achievement	65.8	61.9	66.3	56.0***	53.4	59.3	64.1	66.3
Value on independence	71.2	76.9***	76.0	78.8*	66.5	76.2**	75.9	77.4
Independence-achievement value disjunction	95.5	104.9***	99.7	112.7***	103.1	106.7	101.9	101.0
Expectations for affection	56.0	59.0	61.5	58.5	49.4	57.4	62.3	60.8
Expectations for achievement	60.3	52.2**	59.2	50.8***	47.3	56.8*	64.6	63.0
Expectations for independence	68.5	74.4**	72.8	77.9***	65.9	71.6*	66.4	69.8
<i>Personal beliefs</i>								
Social criticism	29.2	29.6	30.4	31.7**	35.6	37.8	35.5	37.7*
Self-esteem	29.3	30.9***	30.2	30.0	28.2	31.5***	31.1	32.7
Alienation	35.6	34.0	35.1	36.7*	34.5	34.0	30.7	32.8
<i>Personal controls</i>								
Attitude toward deviance	155.7	141.3**	174.6	155.4***	107.6	114.9	133.6	121.1*
Religiosity	14.1	12.8	16.6	14.3**	11.3	9.4*	11.7	9.5
Positive vs. negative sex functions	18.9	21.9***	13.0	18.6***	24.6	26.5	22.6	24.2

(continued)

Table 14.2 (continued)

	High School Study				College Study			
	Males		Females		Males		Females	
	Virgins (n = 136)	Nonvirgins (n = 50)	Virgins (n = 149)	Nonvirgins (n = 93)	Virgins (n = 14)	Nonvirgins (n = 64)	Virgins (n = 15)	Nonvirgins (n = 87)
Perceived social environment								
<i>Distal</i>								
Parent-friends compatibility	8.1	7.7	8.8	7.5****	7.9	7.8	10.3	8.4**
Parent vs. friends influence	3.3	3.6	3.5	3.9**	3.8	4.1	3.8	3.9
Parent support	7.4	6.9	7.8	7.1****	6.9	7.4	8.3	7.8
<i>Proximal</i>								
Parental controls	6.3	5.6**	6.1	5.5**	6.0	4.8**	5.4	5.2
Parental attitude toward deviance	10.8	12.1***	10.4	11.6***	11.1	12.1	9.8	10.6
Friends' approval of deviance	10.6	11.8***	10.2	12.3***	10.8	10.4	9.1	11.1*
Friends' models for deviance	10.0	12.4****	10.2	12.9****	10.0	11.5	9.1	11.3*
Behavior								
General deviance, past year	38.0	47.0****	35.8	41.0****	28.6	29.8	26.3	27.8**
Church attendance, past year	23.2	15.8*	30.6	15.0****	22.3	5.5*	15.7	3.7**
Grade-point average	2.9	2.6***	3.0	2.9	2.8	2.8	3.3	3.1**

Note: The asterisks next to the means of the nonvirgin group refer to the significance level of a two-tailed *t* test between virgin and nonvirgin group means

**p* ≤ .10
 ***p* ≤ .05
 ****p* ≤ .01
 *****p* ≤ .001

on independence, greater value on independence relative to achievement, lower expectations for achievement, and higher expectations for independence), in personal beliefs (greater social criticism and, for the males only, greater self-esteem), in personal controls (lower intolerance of deviance, lower religiosity, and more positive relative to negative reasons in favor of sexual intercourse), in both the distal environment (less parent-friends compatibility, more friends' relative to parents' influence, and less parental support) and the proximal environment (lower parental controls, less parental disapproval of problem behavior, more friends' approval and more friends' models for deviance), and finally, in behavior (greater general deviance, less church attendance, and lower school achievement).

Not all the differences mentioned were significant for both sexes and some measures (e.g., expectations for affection) did not discriminate, but the overall pattern is quite clear. Nonvirgins in the high school are more theoretically deviance- or transition-prone and less conventional than virgins of the same sex in both social-psychological instigation and controls; they also perceive a social environment more conducive to problem behavior; and they themselves have engaged more in general deviant behavior and less in conforming behavior.³

In order to evaluate the overall explanatory capability of the framework in the high school, a multiple regression analysis was run using the set of variables from the personality and perceived environment systems as "predictors" of the virgin-nonvirgin criterion. The multiple correlation for the males was .57 and that for the females was also .57, indicating in each case that about 33% of the variance in the criterion could be accounted for, a highly significant outcome.

An examination of the college study data in Table 14.2 reveals some support for the hypothesis, but it is substantially weaker and less consistent than in the high school and sometimes contradictory to theoretical expectations, for example, value and expectations for achievement. Nonvirgins in the college do appear to value and to expect independence more than virgins, to be more socially critical and less religious, to have more friends' models for deviance, and to have less involvement in conventional activities such as church attendance. Although many of the individual measures that generated significant differences in the high school fail to be discriminating in the college, taken together they do yield a highly significant multiple correlation of .61 for the males and .46 for the females in relation to the virgin-nonvirgin criterion.⁴

³A similar analysis, designed to hold age constant by dealing only with each grade subgroup's data when it was in tenth grade, yielded a very similar pattern of virgin-nonvirgin differences.

⁴In order to rule out possible differences in social background, the virgin and nonvirgin students were also compared on fundamentalism of mother's religious group membership and on the Hollingshead Index of Social Position. There were no differences in family religious background at either the high school or college level for either males or females. With regard to the Hollingshead Index, there were no differences for males or females at the college level; at the high school level, male nonvirgins had lower scores than virgins, and there was a trend in the same direction for females. However, examination of the components of the index shows that father's education for both groups averages at least some college, and father's occupation for both groups averages above skilled labor. In view of these data, variation in social background was not considered a likely contributor to the social-psychological differences that emerge in the virgin-nonvirgin comparisons.

In summary, then, the findings in Table 14.2 strengthen conviction about the relevance of the social psychology of problem behavior in accounting for transition-marking behavior such as nonvirginity, especially among those of high school age. Nevertheless, a more direct test of the utility of the framework would be its ability to specify transition-proneness in advance of the initial sexual experience and to show that there are intimations of an impending transition, prior to its occurrence, in the pattern or profile of scores among virgins. It is this issue that is taken up in the following analyses.

Prediction of the Transition to Nonvirginity

The approach taken to assess the predictability of the transition to nonvirginity was to consider only the virgins in Year III of the high school study, and to compare the Year III scores of those who remained virgins by Year IV with the Year III scores of those who became nonvirgins by Year IV. Since the Year III scores are temporally antecedent to the initial occurrence of sexual intercourse, they can be used as direct indicators of variation in transition-proneness among virgins and, in a sense, as predictors of the onset of nonvirginity during the subsequent year. In Year III of the high school study, there were 163 male virgins, of whom 136 remained virgins (no-transition group) and 27 became nonvirgins (transition group) by Year IV. The comparable figures for the females were 199 Year III virgins, of whom 149 remained virgins (no-transition group) and 50 became nonvirgins (transition group) by Year IV.⁵ The Year III mean scores for these two virgin groups, for each sex, are presented in Table 14.3.

The data in Table 14.3 provide strong support for the theoretical notion of transition-proneness. On a substantial number of the measures, the virgin transition group means are significantly different, in the theoretically expected direction, from the means of the virgin no-transition group, and although more pervasive and consistent for the females, this finding also applies to the males. Further, these significant mean differences occur on at least some measures in each of the systems of the framework. Although not necessarily significant for both sexes, those virgins who have sexual intercourse experience in the subsequent year, in comparison with those virgins who do not, tend to have higher values on and expectations for independence, to value and expect achievement less, to be more tolerant of deviance and less religious, to have friends whose views agree less with those of their parents and who influence them more than do their parents, to have parents who disapprove less of deviant behavior and friends who approve more and provide more models for deviant behavior, and finally, to have engaged more in general deviance and less in conventional activity related to church and school.

⁵The contribution to the transition groups from each grade was as follows: for the males, 16% of tenth graders, 19% of eleventh graders, and 15% of twelfth graders; for the females, the percentages were 20%, 29%, and 29%, respectively. Thus, the transition rates by grade are quite similar.

Table 14.3 Year III (1971) Mean Scores on Personality, Perceived Environment, and Behavior Measures for Virgins Who Remain Virgins by Year IV, and for Virgins Who Become Nonvirgins by Year IV—High School Study

Measures	Males		Females	
	No transition (<i>n</i> = 136)	Transition (<i>n</i> = 27)	No transition (<i>n</i> = 149)	Transition (<i>n</i> = 50)
<i>Personality</i>				
<i>Motivational instigators</i>				
Value on affection	63.3	70.1**	71.7	66.7*
Value on achievement	67.6	72.5	67.7	58.6**
Value on independence	71.1	76.8**	73.1	76.5
Independence-achievement value disjunction	93.5	94.3	95.3	107.9***
Expectations for affection	54.9	61.8**	61.3	58.5
Expectations for achievement	59.4	52.8*	59.2	47.7***
Expectations for independence	64.0	73.1***	68.6	71.3
<i>Personal beliefs</i>				
Social criticism	29.6	29.3	30.6	31.0
Self-esteem	29.4	31.1***	29.5	29.9
Alienation	36.0	34.5	35.1	35.7
<i>Personal controls</i>				
Attitude toward deviance	159.6	153.2	175.8	154.2***
Religiosity	12.5	13.1	14.2	12.3***
Positive vs. negative sex functions	18.5	18.9	11.7	13.9*
<i>Perceived social environment</i>				
<i>Distal</i>				
Parent-friends compatibility	8.2	6.8***	8.8	7.3***
Parent vs. friends influence	3.3	3.3	3.4	4.1***
Parent support	7.3	7.1	7.5	6.9
<i>Proximal</i>				
Parental controls	6.2	6.1	6.2	5.9
Parental attitude toward deviance	10.7	11.5*	10.3	11.3**
Friends' approval of deviance	10.7	11.7**	10.1	12.0***
Friends' models for deviance	9.8	11.1***	10.2	12.1***
<i>Behavior</i>				
General deviance, past year	36.6	45.1****	34.9	40.8****
Church attendance, past year	29.2	20.8	40.5	18.0****
Grade-point average	3.0	2.6***	3.0	2.6***

Note: The asterisks next to the means of the virgin transition groups refer to the significance of a two-tailed *t* test of the difference between virgin transition groups and the virgin no-transition group for each sex

* $p \leq .10$

** $p \leq .05$

*** $p \leq .01$

**** $p \leq .001$

These antecedent differences, then, clearly support the utility of the concept of transition-proneness in that they represent a pattern of prior social-psychological attributes that may well signal the onset of a transition, in this case, to nonvirginity. When the antecedent, Year III measures are taken together in a multiple regression to predict virgin-nonvirgin status by Year IV, they yield a multiple correlation of .48 for males and also of .48 for females, a highly significant outcome.

The same kind of analysis, carried out in the college study, yielded results that were far less consistent and considerably weaker than those for the high school study; in the interest of economy, no table of college study results is presented.

Discussion

The utility of a social psychology of problem behavior for understanding the transition from virginity to nonvirginity has gained support from the present research. A pattern of attributes—personality, social, and behavioral—appears to be associated with virgin-nonvirgin status in the theoretically expected direction. In addition, and more important, the pattern has been shown to obtain prior to the initiation of sexual intercourse experience and to constitute therefore a transition-proneness that significantly predicts becoming a nonvirgin during the subsequent year.

The main components of the pattern are of interest in themselves. They reflect less conventionality in values and outlook among the nonvirgins, a parent and, especially, a peer environment that is less controlling and provides more support and opportunity for transition behavior, and a lesser involvement with conventional behavior and institutions. The nonvirgins—and those virgins who are going to have sexual experience in the subsequent year—consider independence important, have loosened their ties to the family in favor of greater reliance upon friends, and have also engaged more in other nonconventional or transitional behavior. On this latter aspect, additional information is available. Measures of use of marijuana and of alcohol are also significantly associated with virgin-nonvirgin status. Among high school males, 28% of virgins reported use of marijuana more than once, whereas 61% of nonvirgins did; among high school females the respective percentages are 21% versus 67%. In the college study, the percentages are 64% and 86% for male virgins and nonvirgins, respectively, and 33% and 69% for female virgins and nonvirgins, respectively. These relationships are in accord with those reported by Arafat and Yorburg (1973) and by Goode (1972). Similar significant findings obtain with regard to drinking versus abstaining status in the high school: 96% of the nonvirgin males and 89% of the nonvirgin females are drinkers; the respective percentages for the virgins are 68% and 62%.

The association of nonvirginity with other possible transition-marking behaviors makes clear that the pattern that has been specified as deviance-or transition-proneness is not specific to sexual intercourse, nor, for example, to marijuana use or to drinking (see R. Jessor, S. L. Jessor, & Finney, 1973, and R. Jessor & S. L. Jessor, 1975); instead, it implicates a *class* of behaviors any or all of which have a higher

likelihood of occurring over subsequent time. Many of these behaviors are, in fact, linked together in the sociobehavioral ecology of youth so that their onset is often concurrent, or the onset of one makes the onset of others more probable. Thus, it appears necessary to consider transition-proneness as a general notion, one that while relevant to a variety of behaviors is also capable of application to specific behaviors that happen to be of interest—in the present case, the initiation of sexual experience.

The results were clearly more pervasive and consistent at the high school level than at the college level and, within the high school, stronger for females than for males. The reason for this may well lie in the significance of the transition concept as implying a departure from age-appropriate norms. For a student of high school age to engage in sexual intercourse, for example, is more of a departure from normative expectations than for a student of college age to do so; therefore, the present social psychology of transition may be more applicable at the earlier age level than at the later one. Similar conceptual reasoning may account for the results being stronger for females than for males in the high school—sexual intercourse still being defined, according to a persisting double standard, as a more serious normative departure for unmarried females than for unmarried males.

Relative to earlier literature, the nonvirginity rates among our samples were somewhat high. Since our initial high school and college participants constituted only 50% and 60%, respectively, of their originally designated random samples, and since there was some attrition over the years in both studies, it is obviously not possible to infer prevalence in the populations. Insofar as these rates have validity, however, they indicate a significant increase in prevalence of sexual experience and, especially, an increase for the females. Such an increase is consistent with the more recent studies of Kaats and Davis (1970, 1972), Kantner and Zelnik (1972), and Robinson et al., (1972). The recent survey by Sorenson (1972, Table 404, p. 441) provides additional data in support of an increase in prevalence at the high school level. The 16- to 19-year-old age group in his analyses is the one most comparable in age to our combined senior high school sample (age range of about 16 to 18). For that group, Sorenson reports a nonvirginity rate of 72% for males and 57% for females (both higher, incidentally, than our results of 27% and 38% for males and females, respectively).

Our finding of higher rates for females than for males in the high school study is also worth comment. Whether it reflects a pattern of differential opportunity, for the females, through dating college males in the same community, or whether their relative increase in sexual activity is due to the availability, simultaneously, of continued exposure to redefined sex roles and of ready access to contraception is difficult to say. Whatever the reason, the data suggest that the traditional male-female asymmetry in rates of premarital sexual activity may be in the process of disappearing. At the college level, the convergence in rates for males and females in our data is particularly noteworthy.

Our confidence that our rates have validity for our samples is based on several considerations: First, all of our participants had a commitment to the research and were sufficiently motivated to stay with the study for four annual testings; second,

all questionnaires were signed, and if the sex behavior reports were influenced by the lack of anonymity, it should have been in the opposite direction, that is, toward lower rates; third, the studies were carried out in a fairly well-to-do university community in which the more liberal university norms and orientation are widely influential; and fourth, the data reported are more current than most and may well be reflecting the impact of the youth movement of recent years.

It is difficult to talk of higher prevalence rates of nonvirginity without addressing the much-mentioned notion of a "sexual revolution." Thoughtful recent writers (e.g., Kaats & Davis, 1972; Reiss, 1967; Simon, Berger, & Gagnon, 1972) have reserved the term "revolution" for changes in the *meaning*, rather than just the rates, of sexual intercourse for youth. Our own data, despite the higher rates, do not support an interpretation of a radical shift in the way in which sexual intercourse is viewed at the high school level, but there is some indication of change toward greater permissiveness at the college level. In our measure of positive functions of sexual intercourse, in the high school study, the one most strongly endorsed by virgins and nonvirgins, male and female, was "It's a way of expressing love for someone one is close to"; the least endorsed function was "It's a way of gaining status among one's friends." Among the negative functions or the reasons against having intercourse, the one endorsed most strongly after fear of pregnancy was "Not caring enough about someone to want to." Thus, the predominant meaning of having intercourse appears still to implicate, for high school students, a close relationship and love, rather than a casual encounter. In the college study, however, 64% of the males and 44% of the females responded that it was acceptable "for two young people who are not married to engage in sexual intercourse if they both want to when they hardly know each other and have no special feeling for each other." Such responses at the college level do suggest that sexual standards may not continue to remain immutable in relation to the higher prevalence of nonvirginity.

Our concern in this paper has been primarily theoretical. In that regard, there are several points worth reemphasizing. First, both the personality system and the environmental system have been shown to be relevant to transition; second, the differentiation within the systems has been illuminating in that differences of interest emerged on a variety of measures within the various structures of those systems; and third, the general relevance of a social psychology of problem behavior to studies of youthful development has been empirically demonstrated. On the basis of these findings and others (e.g., R. Jessor & S. L. Jessor, 1975), the notion of transition-proneness does appear to identify a significant disposition toward youthful change and growth.

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Chapter 15

Predicting First Sexual Intercourse Experience

Richard Jessor, Frances M. Costa, Lee Jessor, and John E. Donovan

Making the transition from virginity to nonvirginity is a developmental milestone of major personal and social significance. Variation in the timing of this change in status is obviously affected by both physical maturation and the vagaries of social opportunity. However, a psychosocial act of such salience as engaging in sexual intercourse for the first time is unlikely to be completely determined by biology or entirely capricious socially. Its timing ought to reflect, instead, a more general psychosocial readiness for such an experience, a pattern of personal and environmental attributes that has systematic influence on the likelihood of occurrence of intercourse and, also, on its occurrence earlier rather than later. Exploration of that thesis is the focal concern of this paper.

Considerable attention has been given in recent years to research on premarital sexual behavior among adolescents (see reviews by Chilman, 1978; Clayton & Bokemeier, 1980; and Miller & Simon, 1980). It seems clear that the prevalence of premarital intercourse experience is increasing (Zelnik & Kantner, 1980) and that the age of onset of sexual intercourse is declining (Hopkins, 1977; Zelnik & Kantner, 1977). Much of the research remains descriptive, however, and tends to focus on variables specific to the sexual domain rather than rely on a more general social psychology of adolescent sexuality. There are exceptions to this generalization (e.g., DeLamater & MacCorquodale, 1979), and a number of studies have in fact linked adolescent sexual intercourse experience to personality and social variables such as conservatism (Joe, Brown, & Jones, 1976; Thomas, 1975), religiosity (Cvetkovich & Grote [cited in Chilman, 1978]; Moore & Caldwell, 1976; Vener & Stewart, 1974), closeness to parents (DeLamater & MacCorquodale, 1979; Miller & Simon, 1974),

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and involvement with peers (Walsh, Ferrell, & Tolone, 1976). However, most of these studies are limited in another way—they are almost without exception cross-sectional. The need for greater reliance on longitudinal studies of adolescent sexuality has been stressed by several reviewers (Clayton & Bokemeier, 1980; Wagner, 1980). Only with time-extended research will it be possible to view sexual experience as part of the larger process of psychosocial development in adolescence.

The present paper is a report from a longitudinal study that has been following adolescents since 1969 (R. Jessor & S. L. Jessor, 1977, 1984). Sexual behavior has been a key interest of the research and particular attention has been focused on the predictability of the initial sexual experience (S. L. Jessor & R. Jessor, 1975). In that earlier report, we presented a preliminary appraisal of the predictability of the transition to nonvirginity among our cohorts of junior and senior high school youth. The time interval in which transition could have occurred was a calendar year, and the research yielded significant support for the usefulness of Problem Behavior Theory (see R. Jessor & S. L. Jessor, 1977). Nevertheless, only a third of the participants had actually experienced sexual intercourse by the end of that phase of the study in 1972. The present report is based on 1979 follow-up data from the same cohorts; by that time, they were young adults and had reached the ages of 23, 24, and 25 years. Information was again obtained from them on the timing of their initial sexual intercourse, and more than 90% of the youth had by then had sexual intercourse experience. With these follow-up data in hand, it is possible to make a more comprehensive appraisal of the predictability of the transition to nonvirginity—now over a 9-year time interval—relying on the general theoretical framework of Problem Behavior Theory and the time-extended data provided by the longitudinal design.

The psychosocial variables that were measured initially in 1970 are all components of Problem Behavior Theory; they serve in this paper as predictors of variation in the timing of onset of sexual intercourse among those adolescents who were virgins in 1970. Problem Behavior Theory is a social-psychological framework designed to provide a systematic account of the occurrence of behavior that departs from prevailing norms, that is, behavior that tends to elicit some form of social-control response from the larger society (see R. Jessor, Graves, Hanson, & Jessor, 1968). Sexual intercourse, like much of adolescent “problem” behavior, is age graded, that is, considered to be a problem only if it occurs earlier than permitted or prescribed by the relevant age norms. The early occurrence of initial intercourse can be considered a departure from prevailing norms about the appropriate, acceptable, or, at least, permitted age for that experience to take place. Thus, the general concern of Problem Behavior Theory with departures from regulatory norms makes it systematically applicable in this domain.

Because a more elaborate presentation of Problem Behavior Theory—and of its application to the previous phase of this longitudinal study—can be found in R. Jessor and S. L. Jessor (1977), only a brief overview will be given here. The theory comprises three major systems: the personality system, the perceived environment system, and the behavior system. Each system, in turn, comprises structures of variables that have logical implications for the likelihood of occurrence of behaviors that depart from regulatory norms. Some of the structures represent instigations or motivations toward

problem behavior and others represent controls against engaging in problem behavior. The balance of instigations and controls, within each system and across the three systems, is what determines the magnitude of individual proneness toward problem behavior. When the behavior happens to be developmentally age graded, as is the case with initial sexual intercourse, then the balance of instigations and controls can be construed as proneness toward developmental transition.

Within the personality system, proneness is most clearly represented in the motivational-instigation structure by higher value on independence, lower value on academic achievement, higher value on independence relative to achievement, and lower expectation for academic achievement; in the personal belief structure, proneness is represented by greater social criticism and greater alienation; and in the personal controls structure, proneness refers to a more tolerant attitude toward deviance, lesser religiosity, and greater positive relative to negative reasons for engaging in problem or transition behavior. Within the perceived environment system, proneness is most clearly represented in the distal structure by lesser parental and friends controls, less compatibility between parents' and friends' expectations, and greater influence of friends relative to parents; in the proximal structure (those perceived environment variables that directly implicate the various problem behaviors), proneness refers to greater parents' and friends' approval of problem behavior and greater perceived prevalence of social models who engage in it. In the behavior system, proneness is reflected in greater involvement in other problem behavior and, at the same time, less involvement in conventional behaviors, such as attending church and doing well in school.

The relevance of this conceptualization of proneness for the initial occurrence of sexual intercourse experience should be apparent. Measures of all of these proneness variables were available in the earlier phase of the study. Information about onset of sexual intercourse was available from both the earlier and the later phases of the study. The data make it possible to examine the predictability—in adolescence—of the time of transition to nonvirginity. The main concern of this paper is whether variation apparent on the 1970 psychosocial measures is consonant with the variation—over the subsequent 9-year period—in time of onset of sexual intercourse among participants who were virgins in 1970.

Method

Design and Participants

The research was carried out in two separate phases, each of them longitudinal. The initial phase began in the spring of 1969¹ and involved the collection of four annual waves of data on three cohorts of junior high school youth: those in Grades 7, 8, and 9.

¹A parallel longitudinal study of a cohort of 205 college freshmen was initiated in the spring of 1970 and completed in 1973. That cohort was also followed up in 1979, but the college-sample findings will not be dealt with in this paper.

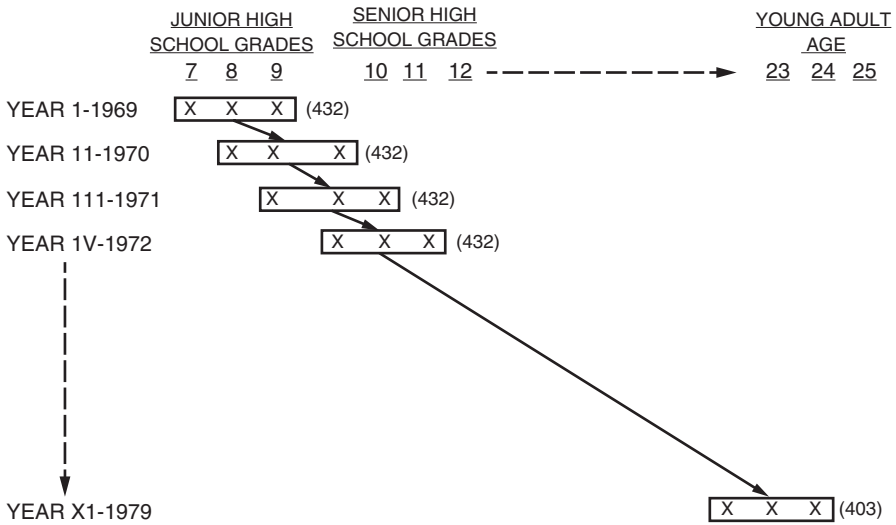


Fig. 15.1 The cohort-sequential design of the longitudinal study

When the final data wave had been collected in the spring of 1972, there were 432 participants (188 men and 244 women) who had filled out all four successive questionnaires. After a 7-year hiatus, these same youth were located, recontacted, and asked to resume participation in what is now called the Young Adult Follow-Up Study. Two of the former participants had died in the interim. Of the remaining 430, fully 94% ($N = 403$; 172 men and 231 women) agreed to fill out the 1979 questionnaire. This rather remarkable retention rate safeguards the integrity of the longitudinal sample over the 7-year interval between the earlier and later phases of the research; it also testifies to the commitment the participants had to the overall research effort.

The cohort-sequential design of the study is shown in Fig. 15.1. As can be seen, the participants had reached the senior high school grades by the conclusion of the earlier phase and had become young adults of ages 23, 24, and 25 years at the time of follow-up in 1979.

The participants had originally been randomly selected in 1969 from the enrollment in three junior high schools in a small city in the Rocky Mountain region. The sample of 1,126 adolescents was stratified by sex and grade, and each person received a letter describing the study and requesting him or her to participate; parents received a request for permission at the same time. Although initial-year participation included only 52% of the random sample, subsequent attrition was modest, and 82% of the initial-year participants were retained over the 4 years of testing. The sample, followed annually from 1969 to 1972 and then followed up in 1979, is largely Anglo-American in ethnic background and middle-class in socio-economic status. Average educational level of fathers was “some years of college,” and average occupational level of fathers was above the category of skilled labor.

Further demographic details on the participants can be found in R. Jessor and S. L. Jessor (1977, chapter 3).

Procedure

All of the data were collected by questionnaire. The annual questionnaire in the initial phase was approximately 50 pages in length and required about 1½ hours to complete. Most of the measures in the questionnaire were psychometrically developed, multiple-item scales designed to assess the theoretical variables in the personality, perceived environment, and behavior systems in Problem Behavior Theory. Alpha reliability and homogeneity were generally good (R. Jessor & S. L. Jessor, 1977, Table 3.1).

Administration of the questionnaire was done in small-group sessions at the schools, but outside of classes. Because of the longitudinal nature of the study, names of the participants were required on the questionnaires, but name sheets were removed immediately, full confidentiality was guaranteed, and all questionnaires were dealt with by code number from then on.

The follow-up questionnaire in 1979 was 65 pages in length and took an average of 2½ hours to complete. Although coverage included most of the content of the earlier versions, attention was given to additional areas of inquiry as well, especially the young-adult life areas of work, family, leisure, and friendships and the positive and negative life events that had occurred since the last questionnaire. Complete protection of privacy was again guaranteed based now on Confidentiality Certificates granted by the United States Department of Health, Education, and Welfare and the United States Department of Justice.

Establishing Time of Onset of Sexual Intercourse

Time of onset of initial sexual intercourse experience was determined jointly by the information in the earlier questionnaires and that provided in the 1979 follow-up questionnaire. Only those participants whose reports in both phases of the study were consistent were retained for the analyses in this paper. There were 17 men and 14 women who were not included either because they were still virgins at the 1972 testing and simply failed to report a time of onset in the 1979 questionnaire (although all of them were, by then, nonvirgins) or because their information was inconsistent between the two phases. These detailed analyses yielded subsamples of 142 men and 204 women who were virgins at the time of the 1970 testing. It is these two groups of 1970 virgins whose variation in subsequent time of onset of sexual intercourse between 1970 and 1979 is the focus of concern in this paper.

Time of onset between 1970 and 1979 was categorized into five sequential periods. The first two categories were based on the year-long intervals between the

1970–1971 testing and the 1971–1972 testing, and the latter three were based on a somewhat arbitrary division of the remaining time into intervals from the May 1972 testing until the end of 1973, then the two-calendar-year period of 1974 and 1975 (inclusive), and, finally, the period from 1976 to the time of testing in the summer of 1979. These five time periods, beginning in May 1970, yield six time-of-onset groups for each sex as follows: 1970–1971 (5 men and 27 women), 1971–1972 (20 men and 43 women), 1972–1973 (40 men and 50 women), 1974–1975 (38 men and 32 women), 1976–1979 (27 men and 36 women), and, finally, of course, the no-onset group of those who were still virgins in 1979 (12 men and 16 women).² These six groups vary along an earlier-versus-later time-of-onset dimension from 1970 on, and that variation constitutes the criterion measure or the dependent variable to be accounted for by the psychosocial measures obtained in 1970 when the participants were all still virgins.

Results

The presentation of findings will be organized around four topics. First, we present descriptive information about sexual or sex-related behavior in this sample of young adult men and women. Such information helps to establish the context in which the study was conducted and to characterize the participants in regard to sexual experience. Second, we examine the differences between the six time-of-onset groups on each of the 1970 predictor measures to see whether their mean scores order in a way that is consistent with the time order of their onset. Order of onset is then regressed on the several sets of psychosocial predictors to determine how much of the time-of-onset variation can be accounted for by a simultaneous additive model. Third, we examine the psychosocial follow-up measures obtained in 1979 to see whether variation in time of onset is consequential for later personality and behavioral outcome—especially for sexual behavior. Finally, we make a closer examination of the small group of young adults who have remained virgins long after nearly all of their peers have undergone the transition to nonvirginity. An “extreme cases” strategy of this sort can illuminate further the psychosocial factors that regulate time of onset of initial sexual intercourse experience.

²It is important to make clear that variation in age per se cannot account for the observed variation in time of onset. First, the time-of-onset categories range across a 9-year interval, whereas the largest mean age difference among the three grade cohorts is less than 2 years. Second, the actual age difference between the earliest onset group (1970–1971) and the latest onset group (1979 virgins) is only 11 months for the men and 17 months for the women. Finally, all of the major analyses reported in this paper were carried out within grade cohort to control for age, and in all cases the pattern of findings remains the same.

Description of Sexuality in a Sample of Young Adult Men and Women

When asked to describe their sexual identity or preference or commitment, 88% of the young adult participants report being heterosexual; the percentages are similar for both sexes. Only 3% reported being bisexual or gay, and a still smaller percentage was uncertain about sexual commitment. Homosexual experience, however, was reported by 8% of the sample, with men twice as likely to have had same-sex experience as women (12% versus 6%, respectively).

Ninety-three percent of both the men and women reported having engaged in heterosexual intercourse by 1979. The percentage was higher (98%) for the oldest cohort than for the youngest (89%). The average age for first intercourse in the sample is 18.0 years for the men and 17.7 years for the women, a difference that is not statistically significant. There were no significant differences in mean age of onset among the three cohorts either.

The context in which initial sexual intercourse took place was most frequently reported as a steady dating relationship (40% of the men and 60% of the women). For about three quarters of the women, it occurred within a committed interpersonal relationship of some sort—marriage, engagement, or steady dating—whereas this was the case for only half of the men. At the same time, a quarter of the women characterized that first experience as having been “negative” or “very negative,” whereas only half that proportion of the men did the same.

With regard to their present sexual activity, 9 out of 10 respondents reported some sexual activity during the 6 months prior to taking the 1979 questionnaire. Half of the men and nearly two thirds of the women were married or living with a sexual partner. Although the majority of respondents reported engaging in sexual intercourse with only one partner in the preceding 6-month period, about a quarter of the sample reported experience with two or more partners in that same period of time. Frequency of sexual intercourse in that 6-month period varied widely, but the average for both sexes was close to twice a week.

Asked about the importance of various reasons for or functions of engaging in intercourse, 85% of the respondents cited affectional reasons—the giving and receiving of love—as important, whereas only 19% reported that it was important in helping them to cope with problems or feelings of low self-esteem. Less than 5% attached importance to role-obligation reasons (e.g., fulfilling one’s responsibility) or manipulative reasons (e.g., as a way of getting other things one wants).

Finally, 21% of the women reported having had an abortion (3% had an abortion more than once), 8% reported having been sexually assaulted, and 4% reported having been rape victims. Nine percent of the men in the sample reported having impregnated a woman who subsequently aborted that pregnancy.

These descriptive findings suggest a wide range of sexual experience and sexual interest in the sample. They also indicate that sexual intercourse, although perceived for the most part as an aspect of affectional interaction, is engaged in by a quarter of the respondents as a way of coping and for other reasons as well.

Predicting Time of Onset of Initial Sexual Intercourse

The central concerns of this paper are the mean scores on the 1970 psychosocial measures for the six different time-of-onset groups that were described earlier. Those groups, it will be recalled, are ordered sequentially from the time of the 1970 testing through the time of the 1979 testing—a 9-year time period—with the latest group actually being a no-onset group, the members of which were still virgins when the 1979 questionnaire was taken. Because all of the participants in these analyses were virgins in 1970, the key question is whether the 1970 psychosocial predictors already vary in a systematic way that signals the earliness-lateness of the subsequent transition to nonvirginity. The data relevant to answering this question are presented in Table 15.1.

There is considerable evidence in Table 15.1 that the time-of-onset groups are arrayed in an order that was already signaled by the order of their mean scores on the 1970 measures. The most basic generalization that can be made is that the earlier onset groups had theoretically greater proneness to engage in transition-marking behavior—in this case, initial sexual intercourse—than the later onset groups.

The evidence in support of that generalization is of three related types. First, there are instances in which the mean scores for the six onset groups are perfectly ordered, with the theoretically highest proneness mean belonging to the earliest onset group; the low proneness mean belonging to the no-onset group, that is, the 1979 virgins; and the means of the in-between groups ordered as theoretically expected. An example of this type of finding is the set of means for the measure of the independence-achievement value discrepancy for the women: 107.2, 100.9, 93.9, 90.2, 90.2, and 82.2, respectively. The earliest onset group had the largest discrepancy between value on independence and value on achievement, as theoretically expected; the 1979 virgins had the smallest discrepancy; and the in-between groups are fully ordered. Given that the overall F ratio is highly significant, and also that there are significant between-group differences on this measure (by the Scheffé test), the trend being emphasized gains further support. Other instances of perfect ordering can be found elsewhere in the table: for example, for the men, the measures of drug disjunctions, parent-friends influence, friends approval of problem behavior, friends models for problem behavior, and friends approval and models for sex; for the females, religiosity and friends models for problem behavior.

Second, additional evidence is based not on perfect ordering of the groups but on a more general ordering in which the earlier onset groups appear to have mean scores that are theoretically more transition prone than the later onset groups or in which the earliest onset group and the no-onset (1979 virgin) group yield the largest mean difference. Thus, value on independence for the women has the largest mean difference between the two extreme time-of-onset groups, even though the in-between groups are not fully ordered. The same is true for the women for parental support, friends support, parent-friends compatibility, parent-friends influence, and the multiple-problem-behavior index; for the males, it can be seen for expectations for affection, social criticism, tolerance of deviance, parent approval of sex, and church attendance in the past year.

Table 15.1 Mean Scores on 1970 Personality, Perceived Environment, and Behavior System Measures for Six Time-of-Onset-of-Sexual-Intercourse Groups: 1970-1979

	Time-of-onset groups													
	Males						Females							
	5/70-4/71	5/71-4/72	5/72-12/73	1974 & 1975	1976-1979	Virgins 1979	F	5/70-4/71	5/71-4/72	5/72-12/73	1974 & 1975	1976-1979	Virgins 1979	F
1970 measures														
Personality system														
<i>Motivational instigation structure</i>														
Value on academic achievement	68.0	74.5	62.7	72.3	75.0	75.6	3.38**	60.5 _a	66.5 _{ab}	65.7 _{ab}	74.9 _b	72.3 _{ab}	77.1 _b	4.11***
Value on independence	77.0	77.0	72.1	71.1	70.4	71.5	1.06	77.7	77.4	72.1	75.1	72.5	69.3	1.94
Value on affection	68.6	72.4	64.3	62.5	64.8	71.5	1.49	68.7	72.0	69.4	78.1	73.9	75.6	2.14
Independence-achievement value discrepancy	99.0 _{ab}	92.5 _{ab}	99.4 _b	88.8 _{ab}	85.4 _a	84.9 _{ab}	3.28**	107.2 _a	100.9 _{ab}	93.9 _{bc}	90.2 _{bc}	90.2 _{bc}	82.2 _c	6.05***
Expectation for academic achievement	52.4	52.6	53.5	60.8	61.8	55.0	1.58	55.7	49.3	55.1	62.1	56.8	62.2	2.32*
Expectations for independence	66.0	68.2	61.8	60.0	60.1	59.3	1.35	66.5	69.1	61.7	67.1	61.0	59.9	2.28*
Expectations for affection	60.8	59.6	54.1	50.2	52.3	49.0	1.54	59.3	56.7	57.6	59.4	59.0	54.4	.40
<i>Personal belief structure</i>														
Social criticism	30.4	29.0	28.1	28.8	28.0	27.2	.46	30.8	30.2	29.8	29.9	30.1	29.9	.16
Alienation	37.0	37.7	36.5	36.6	35.7	36.0	.36	38.4	36.7	35.0	36.8	35.4	36.2	1.15
<i>Personal control structure</i>														
Tolerance of deviance	131.4 _a	160.3 _{ab}	159.7 _a	166.1 _{ab}	189.6 _b	198.5 _b	5.25***	164.0	165.5	171.0	189.2	184.5	184.7	2.37*
Religiosity	12.6	13.5	11.1	13.5	13.0	14.1	2.13	11.9	12.2	12.2	14.3	14.6	15.4	3.45***

(continued)

Table 15.1 (continued)

	Time-of-onset groups													
	Males						Females							
	570-471	571-472	572-1273	1974 & 1975	1976-1979	Virgins 1979	F	570-471	571-472	572-1273	1974 & 1975	1976-1979	Virgins 1979	F
1970 measures	31.2 _a	18.8 _{ab}	18.5 _{ab}	17.2 _{ab}	14.2 _b	13.8 _b	3.06 ^{**}	25.7 _{ab}	22.7 _{ab}	20.3 _{ac}	16.1 _{bc}	14.9 _c	16.8 _{abc}	5.31 ^{***}
Perceived social environment														
<i>Distal structure</i>														
Parent support	6.8	7.3	7.4	7.6	7.8	7.1	.47	6.4	7.6	7.1	7.5	7.6	8.4	2.28 [*]
Parental controls	7.0	7.3	7.4	7.4	7.7	7.1	.41	7.7 _{ab}	6.6 _b	7.7 _a	7.4 _{ab}	7.2 _{ab}	7.3 _{ab}	2.31 [*]
Friends support	6.8	7.2	6.4	6.1	6.2	5.6	1.65	7.7	7.5	7.4	6.7	7.1	6.6	1.48
Friends controls	7.0	6.5	6.7	6.8	6.6	6.6	.13	6.5	6.4	6.9	7.0	6.4	6.6	1.18
Parent-friends compatibility	6.8	6.9	8.5	8.5	8.4	8.5	2.03	7.6	7.8	8.6	8.9	8.2	9.2	1.70
Parent-friends influence	20.2	19.0	19.0	18.2	16.1	14.8	3.38 ^{**}	22.5 _a	20.6 _{ab}	20.2 _{ab}	17.2 _b	19.4 _{ab}	17.1 _b	4.41 ^{***}
<i>Proximal structure</i>														
Parent approval problem behavior	13.7 _a	11.1 _{ab}	10.7 _b	10.8 _{ab}	9.9 _b	10.0 _b	3.63 ^{**}	9.9	11.4	10.3	10.2	9.9	10.3	2.59 [*]
Friends approval problem behavior	12.3	11.0	10.6	10.4	9.7	9.1	2.41 [*]	11.7	11.8	10.6	11.0	10.3	10.0	2.60 [*]
Friends models problem behavior	12.6 _a	11.9 _a	10.2 _{ab}	9.8 _b	9.5 _b	9.0 _b	8.39 ^{***}	12.2 _a	11.9 _a	11.0 _{ab}	10.7 _{ab}	10.0 _b	9.3 _b	7.87 ^{***}
Parent approval sex	2.6	1.8	1.7	1.7	1.8	1.5	1.31	1.3	1.6	1.4	1.5	1.4	1.4	.80
Friends approval sex	6.8	6.1	5.9	5.8	5.6	4.9	1.76	5.8	5.9	5.8	5.8	5.6	5.6	.25
Friends models sex	8.8	7.6	5.9	5.0	5.2	4.4	3.53 ^{**}	7.6 _{ab}	8.1 _b	6.7 _{ab}	7.8 _{ab}	5.6 _a	5.8 _{ab}	3.20 ^{**}

Behavior system														
Multiple problem behavior index	2.2 _a	1.9 _a	1.2 _{ab}	.5 _b	4 _b	.5 _b	9.20***	1.6 _a	1.2 _{ab}	.7 _b	.5 _b	.7 _b	4 _b	6.63***
Church attendance, past year	17.8	24.0	21.9	32.6	32.9	38.5	1.54	27.0	27.4	23.7	41.1	42.3	50.3	3.51**
Grade point average	2.8	2.7	2.9	3.1	3.0	3.0	1.64	3.1	2.9	3.1	3.1	3.1	3.3	1.57
<i>n</i>	5	20	40	38	27	12		27	43	50	32	36	16	

Note: Subscripts refer to the results of multiple comparisons among groups. Means not sharing a common subscript are significantly different by Scheffe's multiple-range test with the "experiment-wise" alpha set at .10

* $p \leq .05$
 ** $p \leq .01$
 *** $p \leq .001$

Third, the last kind of evidence (shown in Table 15.1) is the overall significance of the F ratios for a larger-than-chance number of the measures (12 out of 27 for the men and 18 out of 27 for the women), that the directionality in every case that reaches significance is in the theoretically expected direction, and, further, that on 11 out of the 27 measures the significant F ratio is replicated across the two sexes.

The content of these findings is of special interest. Earlier onset, as contrasted with later onset, is associated with transition-prone characteristics in all three of the systems of Problem Behavior Theory. In the personality system, these include greater value on independence, lower value on academic achievement, greater independence-achievement value discrepancy, higher expectations for independence, lower expectations for academic achievement, greater social criticism, lower intolerance of deviance, less religiosity, and greater positive-as-against-negative reasons for drug use; in the perceived environment system, less parental support, less parent-friends compatibility, greater friends-relative to-parents influence, more parent and friends' approval for problem behavior, and more friends models for problem behavior; in the behavior system, more actual involvement in other problem behaviors and less involvement in conventional behavior. This antecedent, theoretically coherent pattern of variation in overall transition proneness in 1970 has been shown to have consonance with the variation in time of onset of nonvirginity over the succeeding 9-year interval.

In order to assess the degree to which the multivariate pattern of the 1970 psychosocial measures can account for variation in subsequent time of onset of initial intercourse, multiple regression analyses were carried out. The time-of-onset criterion was successively regressed against the sets of measures in the various theoretical systems of Problem Behavior Theory. The multiple correlations from these different "runs" are shown in Table 15.2.

Table 15.2 shows that there is significant predictability of the time-of-onset criterion and that the findings are similar for both sexes. For the combined sample, the personality system accounts for approximately 12% of the variance in time of onset ($R^2 = .123$); the perceived environment system accounts for nearly double that amount of variance ($R^2 = .230$), due largely to the measures in the proximal structure; and the aggregate set of all of the personality and perceived environment measures together yields an R^2 accounting for about 29% of the variance. The behavior system measures do somewhat better than personality but not as well as the perceived environment. Socioeconomic background accounts for almost none of the variance, it should be noted. Finally, the theoretically most parsimonious set of measures to represent Problem Behavior Theory, a total of 14 measures selected from the various structures and systems and labeled the Overall Set, does slightly less well than the aggregate set in Run 3: It accounts for a total of 27% of the variance. When 1970 grade in school is added, the variance accounted for reaches 31%.

Although less than one third of the variance in time of onset is accounted for by these 1970 antecedent measures, it should be emphasized that that refers to a highly significant R^2 . These findings tend to validate the concept of transition proneness in Problem Behavior Theory, they hold for both sexes, and they hold also within each of the three cohorts when the latter are analyzed separately to control for age and

Table 15.2 Multiple Correlations of the 1970 Measures of the Theoretical Systems of Problem Behavior Theory with the Time-of-Onset-of-Sexual-Intercourse Criterion^a

Multivariate run	Males	Females	Combined
1. Personality system	.39	.37	.35
2. Perceived environment system	.51	.44	.48
3. Aggregate of Runs 1 and 2	.60	.54	.54
4. Behavior system	.48	.39	.40
5. Socioeconomic background	.13 ^b	.22	.18
6. Overall Set ^c	.55	.53	.52
7. Overall set plus grade in school	.56	.58	.56
<i>n</i>	142	204	346

^aCriterion groups were (a) May 1970 through April 1971, (b) May 1971 through April 1972, (c) May 1972 through December 1973, (d) 1974 and 1975, (e) 1976–1979, and (f) 1979 virgins

^bThis multiple correlation does not reach an *F* value that is significant at the .05 level or better; all other correlations are significant at the .05 level or better

^cThe Overall Set is a subset of the measures used in the preceding runs selected to represent the domains of Problem Behavior Theory with the smallest number of measures (see R. Jessor & S. Jessor, 1977, chapter 7)

grade variation. Most important, the data make clear that the timing of transition behavior—initial sexual intercourse—over a 9-year time interval from adolescence to young adulthood is already signaled by scores on the 1970 measures when all of the participants were still virgins.

Relation of Time of Onset of Intercourse to Later Psychosocial Development and Sexuality

In a number of other areas, such as alcohol and drug use, early onset is associated with heavier involvement and greater subsequent problems. To our knowledge, this issue has never been explored with respect to aspects of sexual adjustment. The relation of time of onset of initial intercourse to a large set of psychosocial and behavioral measures as in 1979 is examined in this section.

On most of the 1979 measures in the motivational-instigation structure or the personal belief structure of the personality system, no consistent and significant differences emerge. The only exception to this generalization occurs among the women on several measures of perceived norms for the age when engaging in various problem behaviors, including sexual intercourse, is acceptable. The later onset groups, as might be expected, express significantly older age norms. With regard to the perceived environment system, no significant differences emerge on the measures of the distal structure. Therefore, for purposes of economy, we do not present those structures in Table 15.3. To provide more information, we added to the table a set of sex-specific measures that cover sex-related attitudes, feelings, and behaviors in young adulthood.

Table 15.3 Mean Scores on 1979 Personality, Perceived Environment, and Behavior System Measures for Five Time-of-Onset-of-Sexual-Intercourse Groups: 1970–1979

	Time-of-onset groups											
	Males					Females						
	5/70– 4/71	5/71– 4/72	5/72– 12/73	1974 & 1975	1976– 1979	F	5/70– 4/71	5/71– 4/72	5/72– 12/73	1974 & 1975	1976– 1979	F
1979 measures												
Personality system												
<i>Personal control structure</i>												
Tolerance of deviance	73.6	90.9	85.7	82.0	91.7	3.39**	90.6	89.6	90.7	92.7	90.0	.30
Religiosity	19.6	22.5	19.6	20.5	23.2	.97	19.7 _a	20.1 _a	20.8 _a	23.8 _{ab}	26.0 _b	4.24**
Morality	17.2	20.0	20.9	20.3	22.9	1.50	20.6	21.9	21.0	22.0	22.4	1.52
Positive functions of drinking	22.2	19.5	18.7	20.6	17.1	3.19*	18.5	17.5	17.6	16.4	17.9	.70
Perceived environment system												
<i>Proximal structure</i>												
Friends models for smoking	2.8	2.5	2.6	2.2	2.1	1.49	2.7 _a	2.2 _{ab}	2.3 _{ab}	2.2 _{ab}	2.0 _b	2.28
Social support for drinking	9.4 _a	7.6 _{ab}	7.3 _b	7.0 _b	6.5 _b	4.24**	7.3	6.6	6.7	6.3	6.3	2.00
Friends models for marijuana use	6.4 _a	3.8 _{ab}	4.5 _{ab}	4.0 _{ab}	3.3 _b	3.50**	3.8	3.7	3.9	3.0	3.0	2.51*
Behavior system												
Involvement with smoking	4.0	3.6	3.1	2.4	2.2	5.05***	3.7 _a	3.5 _{ab}	3.0 _{ab}	2.8 _{ab}	2.7 _b	3.49**
Activist behavior	1.6	1.3	1.0	1.3	1.3	2.28	1.3	1.3	1.2	1.3	1.2	.36
General deviant behavior index	4.4	2.8	2.7	2.7	2.3	1.71	2.6	2.8	3.1	2.6	2.8	.47
Involvement with marijuana	6.0	5.1	4.3	4.4	2.5	3.36**	4.2 _a	4.2	3.8 _{ab}	2.9 _{ab}	2.2 _b	4.31***
Use of other illicit drugs	4.2 _a	1.7 _{abc}	1.7 _{bc}	1.8 _{ab}	.5 _c	5.25***	1.4 _{ab}	1.5 _a	1.3 _{ab}	.7 _{ab}	.4 _b	3.88**
Average daily intake of alcohol	2.3	1.2	1.1	1.2	1.0	.97	.9	.9	.5	.6	.7	.72
Times drunk—last 6 months	14.4	9.3	8.1	8.8	5.0	.42	6.3	6.5	3.7	1.3	3.6	.95

Frequency of church attendance	1.4	26.4	10.8	22.2	33.8	.90	26.7	9.8	8.9	20.8	28.8	2.20
Socio-demographic-historic measures												
Educational attainment	2.6	3.1	3.4	3.6	3.9	2.79*	3.2 _{ab}	2.8 _a	3.4 _{ab}	3.4 _{ab}	3.7 _b	3.45**
Hollingshead occupational prestige group	4.3	4.5	4.6	4.2	4.8	.66	4.8	4.8	4.9	5.1	4.9	.36
Positive life events	.8	1.1	1.3	1.1	1.3	.47	1.0	.8	1.1	1.3	1.2	1.08
Negative life events	2.2	1.8	2.0	1.7	2.3	.68	2.5	2.7	2.2	1.8	2.3	1.95
General health	3.8	3.9	4.3	4.1	4.1	1.07	3.8	3.8	4.2	3.9	4.1	1.40
Sex-related measures												
<i>First heterosexual intercourse</i>												
Age at first heterosexual intercourse	15.3 _a	15.7 _a	17.5 _b	18.9 _c	21.4 _d	79.81***	15.5 _a	16.2 _a	17.3 _b	18.8 _c	21.6 _d	149.70***
Relationship to first heterosexual partner	4.0	3.5	3.5	3.6	3.0	1.41	3.2	3.3	3.2	2.9	2.9	1.56
Emotional satisfaction with first intercourse	4.0	4.1	3.7	3.9	3.9	.33	3.0	3.1	2.8	3.3	3.4	1.23
<i>Sexual satisfactions and stresses</i>												
Overall satisfaction from sex	7.0	7.0	6.4	6.1	6.6	1.22	6.6	6.9	7.1	6.9	7.1	.45
Overall satisfaction—amount	3.3	3.8	3.3	3.3	3.7	.88	3.8	4.1	3.9	4.1	3.7	.72

(continued)

Table 15.3 (continued)

	Time-of-onset groups											
	Males					Females						
	5/70- 4/71	5/71- 4/72	5/72- 12/73	1974 & 1975	1976- 1979	F	5/70- 4/71	5/71- 4/72	5/72- 12/73	1974 & 1975	1976- 1979	F
1979 measures												
Sexual satisfaction—emotional	4.0	3.6	3.9	3.6	4.0	.82	3.7	4.1	4.0	4.1	3.8	.74
Sexual satisfaction—physical	4.5	4.2	3.8	3.8	4.1	1.09	4.1	4.1	4.2	4.0	4.2	.25
Sexual satisfaction—competence	4.5	3.9	3.8	3.9	3.8	.50	4.0	3.9	4.1	4.1	4.0	.24
Satisfaction with contraceptive method	3.8	3.5	3.6	3.8	3.9	.50	3.9	3.7	4.0	3.6	3.6	.93
Overall stress from sex	5.0	3.8	4.0	3.9	4.2	1.76	4.1	4.1	4.1	4.0	3.8	.64
Sexual stress—privacy	1.8	2.2	1.4	1.3	1.5	1.23	1.3	1.3	1.4	1.4	1.3	.19
Sexual stress—too tired	1.3	1.4	1.4	1.5	1.5	.38	1.6	1.6	1.6	1.5	1.4	.83
Sexual stress—contraception	2.0 _a	1.2 _b	1.2 _b	1.1 _b	1.1 _b	3.91**	1.2	1.2	1.1	1.1	1.1	.92
Sexual stress—communication	1.0	1.4	1.3	1.4	1.4	.64	1.5	1.4	1.3	1.3	1.4	.29
<i>Functions of sex</i>												
Affectional	16.3	15.6	16.4	15.3	16.4	1.08	15.6	16.3	17.1	17.2	16.8	1.90
Coping	5.3	4.7	4.2	4.2	4.2	1.09	4.4	4.1	4.1	3.9	4.0	.60
Manipulative	3.3	3.4	2.8	3.0	2.7	1.41	2.9	2.6	2.4	2.5	2.7	1.75
Role obligation	3.8	3.8	3.6	3.7	3.2	1.17	3.3	3.2	3.2	3.3	3.3	.15

Alcohol and marijuana use as sexual cues

Alcohol	2.5	1.7	1.4	1.5	1.5	1.5	1.7	1.6	1.8	1.5	1.7	.35
Marijuana	3.0 _a	1.4 _{ab}	.9 _b	1.6 _{ab}	1.9 _{ab}	2.74*	1.6	1.7	1.3	1.7	1.3	.43
<i>Sexual behavior</i>												
Number of sexual partners— last 6 months	2.5	2.2	1.5	2.4	1.4	1.39	1.5	1.6	1.4	1.3	1.5	.26
Frequency of sexual relations—last 6 months	50.0	39.3	44.1	47.2	32.3	.45	60.2	56.1	61.0	55.8	52.9	.16
<i>n</i>	5	20	40	38	27		27	43	50	32	36	

Note: Subscripts refer to the results of multiple comparisons among the groups. Means not sharing a common subscript are significantly different by Scheffe's multiple-range test with the "experiment-wise" alpha set at .10

* $p \leq .05$

** $p \leq .01$

*** $p \leq .001$

Variation on some of the personal control structure measures of the personality system reflects variation in the length of time since onset. The latest onset group (the group with the shortest time since onset) tends to be more intolerant of deviance than the earliest onset group (the group with the longest time since onset) among the men, and it also tends to be more religious, to have a stricter morality score, and to report fewer positive functions of alcohol use; the results for the women are similar with regard to religiosity and morality. The measures of the proximal structure of the perceived environment system indicate that the young adult friends of the latest onset group are less likely to model or approve of problem behaviors than are the friends of the earliest onset group—they have fewer friends models for cigarette smoking and for marijuana use, and they perceive less social support for alcohol use. Thus, the friendship network in the perceived environment is consonant with the patterning of their own stricter or more conventional personality controls.

Further consonance with this pattern, distinguishing the time-of-onset groups in young adulthood, can be seen in the patterning of the measures in the behavior system. The most recent onset group tends to be less involved with cigarette smoking, less involved with marijuana and with other illicit drugs, less frequently drunk, and more frequently in attendance at church than the earliest onset group. It has also attained a higher educational level than the earliest group. Taken together, the preceding findings are coherent in indicating a relation between later onset of intercourse experience and a more general psychosocial conservatism and conventionality in young adulthood. The word to emphasize is *relation*, because it is most likely that later onset is just another facet of a more general pattern rather than being an influence on or a determinant of that pattern.

Of special interest in Table 15.3 are the various sex-related measures. The only consistent and significant measure is, of course, the age at first heterosexual experience, a built-in correlate of the time-of-onset criterion. As expected, the age of onset of the earliest group is significantly younger—by about 6 years—than that of the latest onset group for both sexes. Almost none of the other measures of sex-related experience—whether sexual satisfactions or stresses, reasons for having intercourse, definition of alcohol and marijuana as sexual stimuli, or actual behavior in relation to number of sexual partners and frequency of intercourse in the past 6 months—show any systematic variation related to time of onset. There is, in short, no evidence in these data that the earliness-lateness of initial sexual experience has any relation to the nature of later sexual behavior or adjustment. It is as if making the transition to nonvirginity, whenever it takes place, results in a rapid “homogenizing” of the newer with the older nonvirgins in the area of sexuality. This is an important finding, especially when it is recalled that such “homogenization” did not occur in regard to the more general pattern of psychosocial conventionality or conservatism revealed in earlier sections of Table 15.3.

Analysis of Virginity in Young Adulthood

Virgin status is relatively rare in young adulthood according to the prevalence findings in the present study. By 1979, when the three cohorts of participants had reached the ages of 23, 24, and 25 years, all but 7% (12 men and 16 women) had experienced sexual intercourse. Remaining a virgin at this stage of life—when 93% of one's peers are nonvirgins, when one is surrounded by a pervasive cultural emphasis on sex, and when there are persistent social expectations and pressures to engage in sex—suggests that there must be strong, countervailing factors at work. Such factors, it would seem likely, should be similar to those that play a role in influencing the earliness-lateness of onset among the nonvirgins. Closer examination of the young adult virgins should illuminate further our understanding of variation in time of onset of initial intercourse.

The following analyses are based on the two cohorts that were originally in the seventh and eighth grades (there were only two virgins remaining in the original ninth-grade cohort by 1979). In those two cohorts, there were 26 virgins in the 1979 testing, 11 men and 15 women. Analyses carried out within each of the two cohorts, and for each sex separately, are sufficiently consistent to make it possible to present the data for the cohorts and sexes combined. The 1979 mean scores of the virgin group ($n = 26$) are compared on a variety of psychosocial measures with those of two different nonvirgin groups: a group ($n = 62$) that made the transition to nonvirginity relatively early, that is, during the last two years of the first phase of the study (May 1970 to April 1972), and a group ($n = 166$) that made the transition later, that is, between the end of the first phase and the initiation of the second phase of the study (May 1972 to December 1979). The relevant data are shown in Table 15.4.

In the personality system, none of the motivational-instigation measures distinguish the virgin group from the nonvirgin groups, but several of the measures in both the personal belief and the personal control structures do (both of these structures are defined as constituting sets of controls in Problem Behavior Theory). Virgins have higher internal control scores, maintain older perceived age norms for the onset of sexual intercourse for both male and female adolescents, tend toward greater intolerance of deviance, are higher in religiosity, report stricter morality, and acknowledge fewer positive reasons for drinking than the nonvirgin groups. The latter groups tend not to differ between themselves.

In the distal structure of the perceived environment system, the virgins report relatively greater parents' influence as against that of friends and greater friends and coworker controls. Such variables constitute theoretical constraints against engaging in problem or problem-prone behavior. At the same time, the virgins do not report greater stress or less satisfaction in relation to family, work, and friends. The immediate social milieu for the virgins, as represented by the measures in the proximal structure, includes fewer models and supports for problem behavior and more models for religious involvement than does that of the nonvirgins. Finally, consistent with the preceding differences, the virgins are less involved in various problem

Table 15.4 Mean Scores on 1979 Personality, Perceived Environment, and Behavior System Measures, Comparing the 1979 Virgin Group with the Two Groups of Nonvirgins

1979 measure	Cohorts and sexes combined			
	1970–1972 nonvirgin ^a	1972–1979 nonvirgin	1979 virgin	F
<i>Personality system</i>				
<i>Motivational instigation structure</i>				
Value on recognition	6.9	6.8	6.7	.33
Value on independence	6.4	6.2	6.2	.85
Value on affection	6.9	7.0	7.1	.46
Value on dependency	5.4	5.6	5.9	1.68
Expectation for recognition	6.0	6.0	6.0	.05
Expectation for independence	6.1	6.1	5.8	.68
Expectation for affection	6.1	6.4	6.2	1.84
Expectation for dependency	5.9	6.2	6.2	1.25
<i>Personal belief structure</i>				
Social criticism	19.5	19.3	18.7	.94
Internal-external control	23.4 _a	24.1 _a	25.4 _a	4.81***
Alienation	18.2	17.8	17.3	.64
Sex role attitudes	31.9	31.1	31.3	.60
Self-esteem	36.5	38.8	36.2	.63
Trust	14.8	15.2	15.4	.84
Age norm for sex for males	15.8 _a	16.5 _b	18.5 _c	10.08***
Age norm for sex for females	15.9 _a	16.7 _b	18.4 _c	9.23***
<i>Personal control structure</i>				
Tolerance of deviance	88.8	88.8	93.7	1.43
Religiosity	20.1 _a	22.4 _a	29.2 _b	11.46***
Morality	20.9 _a	21.5 _a	23.8 _b	5.01**
Positive functions of drinking	18.5	18.0	16.9	.88
<i>Perceived environment system</i>				
<i>Distal structure</i>				
Parent-friends influence	4.1 _a	4.1 _a	3.5 _b	2.60
Friendship satisfaction	30.6	31.6	32.8	2.17
Total stress from friendship	13.8	13.5	14.0	.28
Friends controls	5.5 _a	5.7 _a	6.5 _b	4.82**
Overall family stress	7.6	7.7	8.0	.16
Parental controls	3.7 _a	3.8 _b	3.8 _{ab}	3.69*
Total work satisfaction	42.8	41.3	43.2	.83
Total stress from work	13.1	12.5	12.4	.38
Co-workers controls	5.5	5.3	6.0	1.69
Work adjustment	4.4	4.1	4.3	.52
General satisfaction across life areas	11.5	11.6	11.9	.28
General stress across life areas	8.7	8.5	8.4	.17

(continued)

Table 15.4 (continued)

1979 measure	Cohorts and sexes combined			
	1970–1972 nonvirgin ^a	1972–1979 nonvirgin	1979 virgin	<i>F</i>
Freedom of movement across life areas	11.3	11.5	11.4	.20
<i>Proximal structure</i>				
Friends models for smoking	2.5 _a	2.3 _a	1.6 _b	7.97***
Social support for drinking	7.0 _a	6.7 _a	5.6 _b	7.10***
Friends models for marijuana use	4.0 _a	3.7 _a	2.5 _b	6.22**
Friends models for religion	1.8 _a	2.1 _b	2.5 _c	15.41***
<i>Behavior system</i>				
Involvement with smoking	3.6 _a	2.8 _b	1.7 _c	19.23***
Activist behavior	1.3	1.2	1.1	1.07
General deviant behavior index	2.8	2.8	2.1	2.09
Involvement with marijuana	4.6 _a	3.6 _b	1.0 _c	16.25***
Use of other illicit drugs	1.7 _a	1.1 _b	.1 _c	9.51***
Average daily intake of alcohol	1.0 _a	.9 _a	.2 _b	3.31*
Times drunk--last 6 months	5.5	5.8	.8	1.39
Frequency of church attendance	12.4 _a	22.0 _a	50.5 _c	5.50**
<i>Socio-demographic-historic measures</i>				
Educational attainment	2.9 _a	3.4 _b	3.8 _c	11.20***
Hollingshead occupational prestige group	4.7 _{ab}	4.6 _b	5.2 _a	2.41
Positive life events	.9	1.2	1.2	2.21
Negative life events	2.3	2.1	1.9	.58
General health	3.8 _a	4.1 _b	4.2 _{ab}	2.93
<i>N</i>	62	166	26	

Note: Subscripts refer to the results of multiple comparisons among the groups. Means not sharing a common subscript are significantly different by Scheffe's multiple-range test with the "experiment-wise" alpha set at .10

* $p \leq .05$

** $p \leq .01$

*** $p \leq .001$

^aNonvirgins whose first intercourse occurred before May 1970 were not included in these analyses

behaviors, are more involved in church going, and have attained higher educational and occupational status than the nonvirgins by 1979.

The picture of conservative conventionality that emerges—stronger personal and social controls; greater commitment to the conventional institutions of school, work, and church; and less exploration of problem-prone behaviors such as alcohol and drug use—is consistent with the earlier analyses and is theoretically coherent. In order to elaborate these findings about virginity in young adulthood, a careful

review was made, for each of the 26 virgins, of their entire 1979 questionnaires and also of their scores on particular items in the already presented multiple-item scales. This review added further detail about the central importance of religion and religious involvement and about a general conservatism that includes the political domain as well. What became much clearer, however, was that the virgins, although having as many close friends as the nonvirgins and being able to establish same-sex relationships as easily as the latter, felt themselves to be significantly less competent to establish relationships with members of the opposite sex and reported perceptions of their own physical attractiveness that were significantly lower than those of the nonvirgins. Thus, in addition to the emphasis we have placed on personal and social controls, it appears clear that issues of competence in opposite-sex interpersonal relationships and of inadequate self-concept with regard to physical attractiveness are also involved in the delay of transition to nonvirginity among young adults.

Whether the characteristics that distinguish the 1979 virgins from their nonvirgin peers in 1979 were characteristics that had recently emerged in young adulthood or were more enduring characteristics that were operative during their adolescence is an important, remaining question. To answer it, we compared the 1979 virgin group with the two nonvirgin groups on the various psychosocial measures obtained 7 years earlier (the 1972 testing). The data for that comparison are shown in Table 15.5; they are clear and compelling.

As far back as 1972, the 1979 virgins were the most conventional participants. They had the strongest personal and social controls, and they engaged least in problem behavior and most in conventional behavior compared to the other two groups. It is interesting to note that although their scores are usually significantly different from the 1970–1972 nonvirgin group, they are less often significantly different from the 1972–1979 nonvirgin group. The latter, of course, was still a virgin group at that 1972 testing. Most important, however, is the fact that the scores of the three groups are ordered in almost every case as would be expected theoretically in relation to variation in transition proneness. This generalization applies also to the self-esteem items; the latter show that the 1979 virgins, even back in 1972, were feeling significantly less capable about opposite-sex relationships and were seeing themselves as significantly less physically attractive than the other two groups. Overall, then, it is apparent that the personality and environmental characteristics that may have served to restrain the young adult virgin group from making the transition to nonvirginity are characteristics that have endured from at least as far back as their adolescent years in senior high school.

Discussion and Conclusion

Our findings indicate that variation in time of onset of initial sexual intercourse is systematically linked with psychosocial development more generally. This major transition in the lives of most young people, rather than being an adventitious occurrence, appears to be regulated, in part at least, by a network of personality, social,

Table 15.5 Mean Scores on 1972 Personality, Perceived Environment, and Behavior System Measures, Comparing the 1979 Virgin Group with the Two Groups of Nonvirgins

1972 measure	Cohorts and sexes combined			
	1970–1972 nonvirgin ^a	1972–1979 nonvirgin	1979 virgin	F
Personality system				
<i>Motivational instigation structure</i>				
Value on academic achievement	57.9 _a	66.1 _b	73.2 _b	6.32**
Value on independence	77.4 _a	74.8 _a	70.8 _a	2.60
Value on affection	66.6	68.8	72.0	1.08
Independence-achievement value discrepancy	109.5 _a	99.1 _b	87.6 _c	11.27***
Expectation for academic achievement	47.7 _a	58.0 _b	61.5 _b	8.29***
Expectation for independence	77.9 _a	69.7 _b	67.7 _b	12.48***
Expectation for affection	58.7	57.8	57.6	.11
<i>Personal belief structure</i>				
Social criticism	31.3	29.8	28.8	2.76
Self-esteem: Total	30.3	29.4	28.6	1.95
Self-esteem: Ability to establish same-sex relationships	3.0	3.0	2.9	.11
Self-esteem: Ability to establish opposite-sex relationships	3.1 _a	2.4 _b	2.2 _b	16.14***
Self-esteem: Physical attractiveness	3.0 _a	2.7 _b	2.4 _b	9.04***
Self-esteem: Interestingness to others	2.8	2.9	2.7	1.17
Alienation	36.7	35.9	35.0	.79
Internal-external control	59.3	61.1	62.5	1.83
<i>Personal control structure</i>				
Tolerance of deviance	150.9 _a	164.2 _b	175.1 _b	4.25**
Religiosity	13.2 _a	15.3 _{ab}	17.9 _b	4.00**
Drug disjunctions	24.4 _a	19.2 _b	15.9 _b	8.57***
Perceived environment system				
<i>Distal structure</i>				
Parental support	6.6 _a	7.4 _b	7.7 _b	4.51**
Parental controls	5.4 _a	6.3 _b	6.2 _{ab}	4.90**
Friends support	7.4	7.1	6.9	.69
Friends controls	5.9	6.4	6.6	3.27*
Parent-friends compatibility	7.2 _a	8.1 _b	9.1 _b	5.89**
Parent-friends influence	3.9 _a	3.4 _a	3.0 _b	5.67**
<i>Proximal structure</i>				
Parent approval problem behavior	11.8 _a	10.4 _b	10.0 _b	8.03***
Friends approval problem behavior	12.3 _a	10.5 _b	8.8 _c	17.34***

(continued)

Table 15.5 (continued)

1972 measure	Cohorts and sexes combined			<i>F</i>
	1970–1972 nonvirgin ^a	1972–1979 nonvirgin	1979 virgin	
Friends models problem behavior	12.7 _a	10.0 _b	8.6 _c	54.80***
Parent approval sex	2.4 _a	1.9 _b	1.7 _b	7.99***
Friends approval sex	6.7 _a	6.1 _b	5.3 _c	10.26***
Friends models sex	9.6 _a	5.7 _b	4.5 _b	59.31***
Behavior system				
Multiple problem behavior index	2.0 _a	.9 _b	.2 _c	33.01***
Church attendance, past year	12.6 _a	27.8 _b	41.2 _b	9.74***
Grade point average	2.9	3.1	3.1	3.57*
<i>N</i>	62	166	26	

Note: Subscripts refer to the results of multiple comparisons among the groups. Means not sharing a common subscript are significantly different by Scheffe's multiple-range test with the "experiment-wise" alpha set at .10

* $p \leq .05$

** $p \leq .01$

*** $p \leq .001$

^aNonvirgins whose first intercourse occurred before May 1970 were not included in these analyses

and behavioral factors. The relation of those factors to the timing of initial intercourse has been shown to go beyond mere covariation; they actually antedate sexual onset and signal whether onset is likely to take place sooner rather than later. Because the network of factors is one that was specified by Problem Behavior Theory, these findings serve to support and strengthen that theoretical formulation and extend its reach beyond the areas of alcohol and drug use among youth.

Several important findings of the present study bear reviewing. First, the precursors of sexual onset are variables in all three of the psychosocial systems in Problem Behavior Theory—the personality system, the perceived environment system, and the behavior system. Among adolescent virgins, both male and female, relative earliness of subsequent onset of sexual intercourse is related to personality system variables such as higher value on and expectation for independence, lower value on and expectation for academic achievement, more socially critical beliefs about society, more tolerance of deviance, and less religiosity. In the perceived environment system, earliness of onset is linked with less compatibility between parents and friends, less parental influence relative to that of friends, and more perceived social approval and models for problem behavior, including sexual behavior. With respect to the behavior system, earliness of onset is signaled by an already greater involvement in other problem behavior and less involvement in conventional behavior such as attendance at church. The pervasiveness of these variables across the different systems of Problem Behavior Theory suggests that there is a general psychosocial patterning of proneness to, or readiness for, transition rather than proneness being

confined to only one or two variables or to one or another system or only to those variables that are specifically sex related.

Second, it is important to emphasize that the variation in time of onset of initial intercourse is predictable at a significant level and that a sizable portion of that variation can be accounted for. Multiple correlations of the measures of the major variables in Problem Behavior Theory with the time-of-onset criterion reach a level greater than .50, accounting for approximately 30% of the variance. This is far from trivial for a prediction of onset over a subsequent 9-year interval, from 1970 to 1979. Prediction could well be enhanced further by taking into account several sex-specific variables measured in 1970, for example, frequency of “petting” and dating opportunity for sex, that are also consonant with time of onset for both sexes. Because of our interest in testing the utility of the more general framework of Problem Behavior Theory, however, we did not include those measures in the regressions.

Third, of special importance is the finding that the relative earliness versus lateness of initial intercourse is unrelated to variation in a wide variety of later life or “outcome” measures of sexual attitudes, sexual satisfactions, sexual stresses, or sexual behavior in young adulthood. Nonvirgins emerge as homogeneous on these measures irrespective of how long a history of heterosexual intercourse they have had. It suggests that making the transition to nonvirginity is a homogenizing experience as far as the sexual domain is concerned. What gives added interest to this finding is that the more general conventionality that characterized those virgins who would have late onsets over the 1970–1979 time period is not homogenized once the transition is made. The 1970 virgins who initiate sexual intercourse later continue to maintain a more conservative position with regard to personal and social controls and with regard to other problem behaviors in 1979—after their transition—than their earlier onset peers. Thus, the homogenizing effect of transition is limited, in these data, to the sexually relevant measures only.

Finally, what has been learned about young adults who have continued their virgin status long after nearly all of their own age-mates have become nonvirgins is illuminating. They tend to be the most conventional subgroup of young adults, especially in regard to personal and social controls and experience with various problem behaviors such as alcohol and drug use. Their conventionality is reflected particularly in involvement with religion and church, but it appears as well in their sociopolitical outlook and in their commitment to education. They are also marriage oriented and tend to see sexual behavior as something that follows after marriage. (It is interesting to note in this connection that among the 26 non virgins whose initial intercourse took place in a marital relationship, two thirds were in the latest onset group.)

Beyond conventionality, however, it is also evident that those who have remained virgins in young adulthood see themselves as having significantly less capability in cross-sex relationships and as being significantly less attractive physically. In short, the concept they have of themselves does not seem likely to foster efforts in the direction of pursuing relationships with the opposite sex. The conventionality and the self-

definitions that characterize the young adult virgins are not to be taken as a set of recent, young-adult developments. The analyses showed the 1979 virgins to have had much the same characteristics as long ago as 1970, when they were still in high school.

Once these factors, their patterning, and their relative enduringness have been noted, it is essential to balance the picture of the young adult virgin group. It decidedly does not emerge as either “maladjusted,” socially marginal, or otherwise unsuccessful. The 1979 virgins not only have as many same-sex friends as the non-virgins do, but they also feel just as capable in same-sex relationships as the latter. Further, they report no less satisfaction and no more stress in the different life areas than do the nonvirgins. Finally, they tend to be more successful than the nonvirgins in relation to educational and occupational attainment. Thus, the delay of or the decision to postpone the transition to nonvirginity does not, at least in this group of young adult virgins, interfere with a more, general personal, interpersonal, and societal adaptation.

There are, of course, a number of limitations in this work. Beyond the limitation imposed on generalization by the initially unrepresentative sample, the fact that some of the time-of-onset reports, were inconsistent, and that a number of participants had to be dropped from the analyses because of that, imposes an additional limitation on inference. Further, the analyses of the group of young adult virgins were necessarily based on a rather small sample. Finally, some of the 1979 measures, especially the set of sex-related measures, had not been previously or independently validated. It should also be noted, not as a limitation of the research but as a limitation of the analyses thus far, that we have emphasized the findings that have been similar across both sexes. There is some suggestion, however, for example, in the data shown for the sexes combined in Table 15.5, that predictability is stronger for females than for males. Gender differences in variables related to time of onset have not been fully explored as yet; there is a suggestion of possibly important gender differences in the relation of such measures as internal-external control and self-esteem; these will need to be explored further to establish their consistency and validity.

Without dismissing these limitations, however, we need to stress that the findings are theoretically coherent; they emerged across an unusually large and diverse set of measures; they tend to replicate the earlier findings on the 1-year transition interval (S. L. Jessor & R. Jessor, 1975); and they replicate for the most part in the present study across the three cohorts and across both sexes.

The theoretical implications of the findings in this study relate to a larger issue in contemporary personality theory and social psychology: that is, the argument about whether there is continuity of personality over time; about whether personality is an ephemeral and transitory phenomenon or something to be conceptualized, instead, as relatively enduring; and about whether personality plays an important, explanatory role in behavior or whether behavior reflects only the vicissitudes of the momentary context. The weight of our findings is heavily on the continuity side, on the side of personality as relatively enduring rather than ephemeral, and on personality as a significant source of variance in behavior. The data show that the occurrence of a complex social behavior such as initial sexual intercourse is systematically linked with personality variation and that its timing over a subsequent 9-year interval

is already signaled by antecedent personality variation. Such a demonstration provides strong support for the continuity perspective on the nature and role of personality in behavior and development.

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Chapter 16

Understanding Early Initiation of Sexual Intercourse in Adolescence

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Early sexual activity can have significant personal, social, and economic consequences for adolescents in this country. Teenage pregnancy often disrupts the course of adolescents' lives by limiting educational and employment aspirations, opportunities, and achievements (Hayes, 1987). The rising incidence of HIV infection and other sexually transmitted diseases adds to the risk of early sexual behavior (Cates, 1991).

This study examined the relationship of psychosocial unconventionality to earliness of transition to nonvirginity among contemporary urban adolescents. Psychosocial unconventionality implies a rejection of societal norms and values and a proneness to engaging in nonconforming behavior. It is a key construct of Problem Behavior Theory (R. Jessor, Donovan, & Costa, 1991; R. Jessor & S. L. Jessor, 1977), which is concerned with the explanation of transgression of social norms, especially in adolescence. The variables included in the theoretical framework have to do with the tendency to depart from the conventional norms of adult society; they are presumed to reflect an underlying dimension that summarizes this commonality and is termed *unconventionality* (see Donovan & R. Jessor, 1985; R. Jessor, 1984; R. Jessor et al., 1991; R. Jessor & S. L. Jessor, 1978).

Problem Behavior Theory specifies three interrelated domains of influence: the *personality system*, the *perceived environment system*, and the *behavior system*. The likelihood of engaging in problem behavior depends on personality characteristics, social environmental factors, and other behaviors that reflect greater or lesser orientation toward, attachment to, and involvement with conventional values, goals, and institutions. Greater orientation toward and attachment to conventional society

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(i.e., greater conventionality) indicate a lower likelihood of becoming involved in problem behavior; detachment from conventional institutions and rejection of conventional goals and values (i.e., greater unconventionality) indicate a greater likelihood of problem behavior involvement. In this theoretical formulation, behavior is considered to be an outcome of the interaction or joint influence of personality and environment; neither the person nor the situation is assigned causal priority. In this respect, Problem Behavior Theory represents a social-psychological field theory (see R. Jessor & S. L. Jessor, 1977, for a full description of the conceptual framework of Problem Behavior Theory and the rationale for each of the variables in the theory reflecting unconventionality or proneness to normative departure).

Early or precocious sexual intercourse is considered problem behavior in adolescence, that is, behavior that departs from the regulatory norms of conventional society defining appropriate behavior for that age or stage in life. Previous applications of Problem Behavior Theory have provided a significant account of early transition to nonvirginity (R. Jessor, Costa, L. Jessor, & Donovan, 1983; R. Jessor & S. L. Jessor, 1977; S. L. Jessor & R. Jessor, 1975). The antecedents of first intercourse in adolescence were shown to consist of a theoretically coherent pattern reflecting psychosocial and behavioral unconventionality. Discriminating factors included personality characteristics, such as low expectations for academic achievement and high tolerance of deviance; perceived environment factors, such as low compatibility between parents and friends and more models among friends for problem behavior; and behaviors, such as low school achievement and high involvement in the use of illicit drugs.

These earlier findings were based on a relatively homogeneous sample of middle-class, White adolescents tested in the late 1960s and early 1970s, and their generality for other groups of young people and for contemporary American society is unclear. Important historical changes have occurred since then in social norms concerning sexuality. A re-examination of the role of psychosocial and behavioral unconventionality in the context of the current normative environment and in a more diverse sample of contemporary youths seemed warranted.

Early sexual activity has been linked to a wide range of sociodemographic characteristics, including race/ethnicity (e.g., Aneshensel, Becerra, Fielder, & Schuler, 1990; Zelnik, Kantner, & Ford, 1981), socioeconomic status (Furstenberg, Morgan, Moore, & Peterson, 1987; Hogan & Kitagawa, 1985), and family composition (Hogan & Kitagawa, 1985; Zelnik et al., 1981). The relation of early sexual activity to one or another aspect of unconventionality has also been established, including lower religiosity (Thornton & Cambum, 1989), lower levels of academic involvement and achievement (Miller & Sneesby, 1988), and involvement in other problem behaviors, such as cigarette smoking, drinking, and use of illicit drugs (Alexander et al., 1989; Elliott & Morse, 1989; Ketterlinus, Lamb, & Nitz, 1991; Rosenbaum & Kandel, 1990). These more recent studies, however, have important limitations, including reliance on retrospective reports or on indirect indicators of the time of first intercourse, investigation of only cross-sectional rather than longitudinal relations between unconventionality and early sexual activity, and examination of only a few selected indicators of unconventionality (Alexander et al., 1989; Elliott & Morse, 1989; Miller & Sneesby, 1988; Rosenbaum & Kandel, 1990).

This study examined the linkage of patterned unconventionality to the earliness of transition to nonvirginity. The present study extends earlier work by engaging the contemporary social context and by including White, Hispanic, and African-American adolescents from socioeconomically diverse backgrounds.

Method

Study Design and Procedures

Four waves of data were collected: spring of 1989, 1990, 1991, and 1992. At Wave 1, participants were in Grades 7 through 9 in six middle schools and four high schools in a large, metropolitan school district in the Rocky Mountain region. Schools were assigned to the study by school district officials to maximize representation of Hispanic and African-American students from inner-city areas.

Active parental and personal consent was sought for all students enrolled in the selected schools. Letters describing the study and consent forms were written in both English and Spanish.

Study participants were released from class to take part in large group questionnaire administration sessions proctored by members of the research staff. At the Wave-2, Wave-3, and Wave-4 follow-up times, questionnaires were also mailed to students no longer enrolled in the school district or otherwise unavailable for in-school testing. Bilingual versions of the questionnaire were available for students who preferred to work in Spanish. Each participating student received a token payment of \$5.

Participants

A total of 2,410 students participated in Wave 1 of the study in 1989. Questionnaires were filled out by 67% of the middle-school students (Grades 7 and 8) and by 49% of the high-school students (Grade 9) in Wave 1. At Wave 2 (1990), questionnaires were completed by 2,016 students (84% of the Wave-1 sample). In Wave 3 (1991), 1,974 students (82% of the Wave-1 sample) completed questionnaires, and in Wave 4, 1,782 students (74% of the Wave-1 sample) took part. Overall, 1,591 students (66% of the Wave-1 sample) filled out all four annual questionnaires.

Forty-three percent of the 4-wave longitudinal sample was male. Equal proportions of the sample were in the seventh-, eighth-, and ninth-grade cohorts. With respect to race/ethnicity, 36% of the sample was White, 36% was Hispanic, 22% was African American, 4% was Asian, and 2% was Native American. With respect to socioeconomic background, 26% of participants' fathers had not graduated from high school, 20% of fathers were high school graduates, and 54% had some education beyond high school. About one third of participants' fathers were employed in unskilled jobs; one third, in skilled or clerical jobs; and one third, in managerial or

professional jobs. Forty-five percent of the participants were from intact families, 22% had a stepparent living with them (usually stepfather), 29% lived with a single parent (usually mother), and 3% lived with other relatives or guardians.

Sample Loss

Initial Nonparticipation. Although the initial response rate was lower than desired, analyses suggested that initial losses did not threaten the validity of the research findings. Comparisons of the 2,410 Wave-1 participants with the 2,022 nonparticipants on data from school records revealed that nonparticipants had lower grades, lower achievement test scores, more disciplinary actions, and more absences from school. Although the group means were significantly different, both extremes of the full range of scores on these measures in the total population were also found in the participant sample.

Subsequent Attrition. The effects of attrition subsequent to Wave 1 on the integrity of the participating sample were also examined. The 1,591 four-wave longitudinal participants were slightly but significantly younger than participants lost to attrition (13.6 vs. 13.9 years old in Wave 1), higher in socioeconomic status, more likely to live with both natural parents, and more likely to be White and less likely to be Hispanic. (The 819 non-four-wave participants included participants having only one ($N = 212$), two ($N = 215$), or three ($N = 392$) waves of data.) Comparisons of mean scores on 12 different measures of psychosocial and behavioral unconventionality showed that the four-wave longitudinal participants were more conventional than the nonlongitudinal participants, as indicated by significant mean differences in the expected direction on 9 of the 12 measures. The actual size of the mean differences, however, was insubstantial in four of these nine instances. More importantly, when the intercorrelations of the variables within the two samples were examined, there was no evidence of bias in the relationships among the measures of unconventionality.¹

The fact that attrition after Wave 1 involved somewhat less conventional students means that the data should have yielded more conservative estimates of the relation between unconventionality and initiation of sexual intercourse.

Sample Loss Due to Incomplete Data. A small number ($N = 171$) of four-wave participants were omitted from the analyses because they made incomplete,

¹A test of the equality of the covariance structure matrices in the two groups, based on nine representative variables, resulted in a goodness of fit index of .997, indicating a high degree of similarity between the two matrices. Although the associated chi-square statistic for lack of fit was 79.8 with 36 degrees of freedom, which is significant, this chi-square was small considering the sample sizes and the number of variables involved and indicates no serious degree of difference in the covariance structures for the four-wave participants versus the non-four-wave participants. In other words, the pattern and magnitude of relationships among the predictor variables were essentially equivalent in the two groups.

inconsistent, or frivolous responses to questions about their sexual intercourse experience: Twenty-three were missing data on sexual intercourse experience; 21 reported age at first intercourse as 10 years old or younger; 13 made frivolous responses to the questions about sexual behavior; 63 gave contradictory reports about intercourse experience from year to year; and, for 51, incomplete or inconsistent reports made it difficult to determine confidently the year in which first intercourse occurred. These omitted participants accounted for 7% or less of the White, Hispanic, and African-American female four-wave participants, for about 15% of the White and Hispanic male four-wave participants, and for fully one third of the African-American male longitudinal participants.

Despite the initial nonparticipation, the subsequent attrition, and the omission of subjects having incomplete or inconsistent data on sexual intercourse, the full range of variation on the key measures in the analyses was retained in the participating four-wave sample.²

Measurement of Sexual Behavior

Virgin/nonvirgin status and time of first intercourse were established on the basis of participants' responses in each year of the study to two questions: "Have *you* ever had sexual intercourse ('gone all the way') with someone of the opposite sex?" and "How old were you the *first* time you had sexual intercourse?" There were 1,330 White, Hispanic, and African-American participants whose reports were consistent across their four waves of data collection: 295 White girls, 228 White boys, 313 Hispanic girls, 198 Hispanic boys, 207 African-American girls, and 89 African-American boys. (Due to the small numbers in the other racial/ethnic groups, Asian-American and Native-American adolescents were not included in the analyses.) Not only was the African-American sample the smallest of the three groups, but, as was noted earlier, a relatively large proportion of African-American boys were omitted from the analyses because they provided incomplete or inconsistent data about their sexual intercourse experience.

Variation in sexual experience in this sample is shown in Table 16.1. Comparable with data reported by others, greater proportions of boys than girls reported having had sexual intercourse, and greater proportions of African Americans and Hispanics than Whites had had intercourse. Girls reported being significantly older than boys at first intercourse (14.8 vs. 14.2 years old), and African-American boys and girls reported initiating sexual intercourse at a significantly younger age than Whites and Hispanics (controlling for socioeconomic status).

²For reference, a table of unadjusted means, standard deviations, and ranges on the measures used in this paper is presented in the Appendix for the following three groups: four-wave participants used in the analyses; four-wave participants omitted from analyses due to incomplete, inconsistent, or untrustworthy responses to questions about sexual behavior; and Wave-1 participants lost to subsequent attrition.

Table 16.1 Percentage of Sexually Experienced Adolescents in Each Wave by Race/Ethnicity and Gender

Gender/Wave	Wave 1 (1989)	Wave 2 (1990)	Wave 3 (1991)	Wave 4 (1992)
<i>Girls</i>				
White ^a	12	23	37	54
Hispanic ^b	15	35	52	66
African-American ^c	26	48	59	72
Total ^d	17	34	49	63
<i>Boys</i>				
White ^e	16	27	44	58
Hispanic ^f	40	58	72	81
African-American ^g	51	61	73	80
Total ^h	32	45	60	71

^a*n* = 295^b*n* = 313^c*n* = 207^d*n* = 815^e*n* = 228^f*n* = 198^g*n* = 89^h*n* = 515

In their consistency with recent national sample data³ and with the findings of other investigators (Alexander et al., 1989; Furstenberg et al., 1987; Ketterlinus et al., 1991; Rosenbaum & Kandel, 1990; Sonenstein, Pleck, & Ku, 1991; Torres & Singh, 1986), the Table 16.1 data provide additional support for the representativeness of the four-wave participant sample and for the validity of the measures of sexual experience used in this study.

Measurement of Psychosocial and Behavioral Unconventionality

The annual questionnaire included a wide range of measures of unconventionality drawn from the three systems of Problem Behavior Theory. A thorough description of these variables, their theoretical significance, their measurement, and the rationale for using each of the measures as an indicator of proneness toward normative transgression was presented elsewhere (R. Jessor et al., 1991; R. Jessor & S. L. Jessor, 1977).

³The levels of sexual experience reported in this sample are comparable to levels based on national sample data (Centers for Disease Control, 1992) collected in 1990. For example, in the 1990 national sample, 53% of 10th-grade boys and 43% of 10th-grade girls (Whites, Hispanics, and African Americans combined) in the United States reported having had intercourse, compared with 53% and 46% of the Wave-2 (1990) 10th-grade boys and girls, respectively, in the present sample.

Three measures of unconventionality were taken from the personality system of Problem Behavior Theory. Greater personality unconventionality is indicated by higher value placed on independence relative to achievement, by lower expectations for academic achievement, and by higher tolerance of deviance.

Independence-Achievement Value Discrepancy. This measure is a derived index that reflects the degree to which value on independence (a 4-item scale; $\alpha = .67$) is greater than value on academic achievement (a 4-item scale; $\alpha = .74$). Placing a higher value on the goal of independence than on the goal of academic achievement implies a lower likelihood of engagement with and of action directed toward the conventionally sanctioned goal of doing well in school and a greater orientation away from conventionality and from adult regulation and control.

Expectation for Achievement. This 4-item scale assesses expectations for success in the area of academic achievement ($\alpha = .85$). Having lower expectations for academic achievement may imply a detachment from the conventional institution of school.

Attitudinal Tolerance of Deviance. This 10-item scale assesses the rated “wrongness” of various normative transgressions, such as theft, physical aggression, and lying ($\alpha = .90$). Greater tolerance of departures from normatively approved behaviors has a fairly obvious connection to unconventionality.

Four measures were taken from the perceived environment system of Problem Behavior Theory. Greater perceived environment unconventionality is indicated by less compatibility between parents and friends, by greater influence of friends relative to parents, by lower parental disapproval of problem behavior, and by relatively more friends who model problem behavior.

Parent-Friends Incompatibility. This measure is a 3-item scale of perceived agreement between parents and friends regarding what is important in life, the kind of person the respondent should become, and what the respondent should be getting out of being in school ($\alpha = .72$). Because parents’ outlooks and expectations can be expected to be more conventional, greater incompatibility between parents and peers implies a greater degree of unconventionality in the peer context and, therefore, exposure to more unconventional attitudes and expectations and to challenges of the legitimacy of and the controls exercised by parents and other adult authorities.

Parent-Friends Influence. This 3-item scale assesses the relative influence of parents and friends on the respondent’s outlook on life and on his or her choices and behavior ($\alpha = .58$). Because parental influence is expected to be more conventional, greater orientation to friends than to parents indicates that the adolescent is exposed to and oriented toward more unconventional standards and socialization influences.

Parental Disapproval-Approval of Problem Behavior. This 2-item scale assesses perceived parental attitudes toward adolescent use of alcohol and marijuana ($\alpha = .56$). The perception of low parental disapproval of adolescent problem behavior implies a more unconventional orientation in the parental context.

Friends as Models for Problem Behavior. This measure is a 3-item scale assessing the respondent’s perception of the prevalence of models for nonnormative or illegal

behavior. It includes friends who smoke cigarettes, who use alcohol, or who use marijuana (e.g., “How many of your friends drink alcohol fairly regularly?”; response options ranged from *none* (1) to *all of them* (4); $\alpha = .76$). Higher prevalence of models for engaging in problem behavior indicates a more unconventional social context.

Three measures of problem behavior and two of conventional behavior were taken from the behavior system of Problem Behavior Theory. Behavioral unconventionality is indicated by higher levels of involvement in problem behaviors and lower involvement in conventional behavior.

Deviant Behavior. This 10-item scale assesses frequency of engagement in various delinquent-type behaviors in the past 6 months, including physical aggression, property destruction, theft, and lying ($\alpha = .83$).

Problem Drinking. This measure is a 3-component scale assessing frequency of drunkenness in the past 6 months, frequency of high-volume drinking (five or more drinks per occasion) in the past 6 months, and negative consequences of drinking (including frequency of trouble with parents, at school or with schoolwork, with friends, with dates, and with the police; $\alpha = .83$).

Marijuana Behavior Involvement. This 4-item scale assesses extent of involvement in marijuana use, including whether the respondent has ever used, ever gotten high or stoned, frequency of current use, and perceived availability of the drug ($\alpha = .85$).

School Performance. This variable is measured by school record data of the respondent’s grade-point average for the previous academic year.

Family Activities. This measure is a single item assessing the number of hours each week the respondent spends doing things with his or her family.

All analyses controlled for gender; grade in school⁴; race/ethnicity; family composition (intact family vs. nonintact family, i.e., families that include both biological parents vs. families missing at least one biological parent); and socioeconomic status, a Hollingshead-type measure based on father’s educational attainment, mother’s educational attainment, and father’s occupational status.

Results

The presentation of findings is organized into two parts. First, we report the examination of the bivariate relationships of Wave-1 measures of unconventionality to the timing of subsequent transition to nonvirginity. Second, we report the assessment of the multivariate linkage of unconventionality at Wave 1 to the timing of subsequent transition to nonvirginity. Both sets of analyses were based on those participants who were virgins at Wave 1.

⁴Grade in school, rather than chronological age, was used as a control because of our interest in the contemporary heterosocial situation that grade membership represents. When the analyses reported in Tables 16.2, 16.3, 16.4, and 16.5 were replicated using age instead of grade as a control, results were essentially identical.

Predicting Time to First Sexual Intercourse: Bivariate Analyses

The main focus of this paper is on the extent to which psychosocial and behavioral unconventionality are predictive of the timing of first sexual intercourse among participants who were virgins at Wave 1 (1989). Four nonvirginity status groups were established for use in the analyses: 209 participants whose first intercourse took place between Wave 1 and Wave 2 (Nonvirgin by Wave 2); 195 participants who began having intercourse between Wave 2 and Wave 3 (Nonvirgin by Wave 3); 177 participants whose first intercourse occurred between Wave 3 and Wave 4 (Nonvirgin by Wave 4); and 451 participants who were still virgins at Wave 4 (Wave-4 Virgin). These four groups vary in the time (number of years) that elapsed between the Wave-1 assessment and first sexual intercourse.

The four groups were compared on their psychosocial and behavioral measures of unconventionality at Wave 1, when they were all virgins. The analyses of variance controlled for gender, socioeconomic status, grade in school, and family composition through their inclusion as covariates. All analyses were done separately for White, Hispanic, and African-American adolescents. Results are presented in Tables 16.2, 16.3, and 16.4. Also presented in Tables 16.2 and 16.3, for reference, are unadjusted means on demographic variables used as control measures.

The data in Tables 16.2, 16.3, and 16.4 indicate that, for White and Hispanic adolescents, those who made an earlier transition to nonvirginity already differed, as virgins, in the expected direction of psychosocial and behavioral unconventionality from those who initiated intercourse later. Among African-American adolescents, however, there were no significant differences on the measures of unconventionality for the different nonvirginity status groups (see Table 16.4).

For White and Hispanic youths, earliness of sexual intercourse initiation was associated with higher value on independence than on academic achievement; lower expectations for academic achievement; greater tolerance of deviance; greater influence from peers than from parents (Whites only); less parental disapproval of problem behavior (Hispanics only); more friends who were involved in other problem behaviors; less involvement in the conventional behavior of school achievement; and more involvement in delinquent behavior, problem drinking, and marijuana use.

On 17 of the 18 measures where the F ratio was statistically significant, the adolescents who made the earliest transition to nonvirginity were the most unconventional group as Wave-1 virgins, and those who remained virgins at the final assessment in Wave 4 were the most conventional group as Wave-1 virgins. Furthermore, in nearly all of the cases where the F ratio was significant (seven out of nine instances among White youths and eight out of nine instances among Hispanic youths), the mean scores were perfectly ordered across the four groups: those who made the transition to nonvirginity within 1 year were most unconventional as virgins at Wave 1, followed, in order, by those who made the transition within 2 years, within 3 years, and not at all. Thus, although the actual size of many of the significant mean differences presented in Tables 16.2 and 16.3 is small, the overall pattern of attributes related to earlier initiation of intercourse is coherent and consistent.

Table 16.2 Mean Scores on Wave 1 (1989) Measures of Unconventionality for Four Nonvirginity Status Groups (All Virgins at Wave 1) for Whites

Wave 1 Measures	Nonvirgins at Wave 1 ^{ac}	Nonvirgin by Wave 2 ^d	Nonvirgin by Wave 3 ^e	Nonvirgin by Wave 4 ^f	Wave 4 Virgins ^g	<i>F</i>
<i>Demographic measures</i>						
Grade in school	8.2	8.1	8.0	7.9	7.8	2.53
Socioeconomic status	5.2	5.6	5.9	6.2	6.4	4.40*
Family composition	1.5	1.5	1.5	1.5	1.6	1.74
<i>Personality measures</i>						
Independence-achievement value discrepancy	9.9	9.8	9.4	9.2	9.0	2.79*
Expectation for achievement	7.7	7.3	6.7	6.8	6.3	3.55*
Tolerance of deviance	19.6	18.1	18.1	17.4	15.3	8.37*
<i>Perceived environment measures</i>						
Parent-friends incompatibility	5.7	5.1	5.2	5.2	5.2	0.07
Parent-friends influence	5.9	5.7	5.6	5.3	4.8	10.15*
Parental disapproval-approval of problem behavior	2.9	2.7	2.7	2.6	2.6	1.21
Friends as models for problem behavior	5.9	5.3	5.4	4.5	4.1	18.47*
<i>Behavior measures</i>						
Problem						
Deviant behavior	21.0	17.4	16.3	15.3	13.4	11.31*
Problem drinking	6.9	4.3	4.3	3.9	3.3	7.61*
Marijuana involvement	2.8	1.7	1.4	1.0	0.7	9.30*
Conventional ^b						
School performance	2.8	2.9	3.1	3.1	3.3	9.16*
Family activities	2.9	3.6	3.2	3.4	3.5	1.54

Note: Means are adjusted for the effects of the following sociodemographic covariates: gender, socioeconomic status, grade in school, and family composition

No covariates were used in the analyses comparing mean differences on the demographic measures. These are unadjusted means

^aWave 1 nonvirgin means are included for descriptive purposes. These means are not included in the *F* test

^bWith the exception of the conventional behavior measures, higher scores indicate greater unconventionality

^c*n* = 73

^d*n* = 57

^e*n* = 80

^f*n* = 81

^g*n* = 232

**p* ≤ .05

Table 16.3 Mean Scores on Wave 1 (1989) Measures of Unconventionality for Four Nonvirginity Status Groups (All Virgins at Wave 1) for Hispanics

Wave 1 Measures	Nonvirgins at Wave 1 ^{ac}	Nonvirgin by Wave 2 ^d	Nonvirgin by Wave 3 ^e	Nonvirgin by Wave 4 ^f	Wave 4 Virgins ^g	<i>F</i>
<i>Demographic measures</i>						
Grade in school	8.3	8.0	8.1	7.9	7.8	2.90*
Socioeconomic status	4.0	3.8	3.9	4.1	3.5	2.61*
Family composition	1.4	1.4	1.5	1.5	1.5	2.96*
<i>Personality measures</i>						
Independence-achievement value discrepancy	10.1	9.9	9.5	8.8	8.6	7.75*
Expectation for achievement	8.4	8.1	8.4	7.5	7.2	4.85*
Tolerance of deviance	20.2	18.7	17.6	16.6	16.0	3.89*
<i>Perceived environment measures</i>						
Parent-friends incompatibility	5.0	5.0	5.0	5.0	4.8	0.41
Parent-friends influence	4.9	5.0	4.9	4.7	4.6	1.58
Parental disapproval-approval of problem behavior	2.8	2.9	2.8	2.7	2.5	2.70*
Friends as models for problem behavior	6.5	6.0	5.6	5.2	4.9	7.64*
<i>Behavior measures</i>						
Problem						
Deviant behavior	21.0	17.8	17.0	15.5	14.1	7.51*
Problem drinking	7.7	5.1	4.7	4.1	3.5	9.73*
Marijuana involvement	4.0	3.0	2.2	1.5	1.2	14.50*
Conventional ^b						
School performance	2.2	2.3	2.5	2.6	2.7	5.42*
Family activities	3.4	3.2	3.6	3.7	3.5	1.53

Note: Means are adjusted for the effects of the following sociodemographic covariates: gender, socioeconomic status, grade in school, and family composition

No covariates were used in the analyses comparing mean differences on the demographic measures. These are unadjusted means

^aWave 1 nonvirgin means are included for descriptive purposes. These means are not included in the *F* test

^bWith the exception of the conventional behavior measures, higher scores indicate greater unconventionality

^c*n* = 127

^d*n* = 96

^e*n* = 81

^f*n* = 64

^g*n* = 143

**p* ≤ .05

These analyses were replicated for girls and boys separately, controlling race/ethnicity, socioeconomic status, grade in school, and family composition. In general, the means were ordered as anticipated for both genders (these data were not tabled; table available from Frances Costa upon request). Mean differences on measures of unconventionality were statistically significant in a greater number of instances for girls (10 measures) than for boys (7 measures). These data indicate that greater psychosocial and behavioral unconventionality is linked to earlier transition to nonvirginity for female and male adolescents.

Also presented in Tables 16.2, 16.3, and 16.4 are the mean scores of those participants who were already nonvirgins at Wave 1. Among White and Hispanic adolescents, this group of already sexually experienced youths was, as anticipated, the most unconventional on nearly all of the Wave-1 measures.

Predicting Time to First Sexual Intercourse: Multivariate Analyses

The multivariate predictive relationship between psychosocial and behavioral unconventionality, on the one hand, and subsequent transition to nonvirginity, on the other, was assessed by the Cox proportional hazards regression method. This is a regression technique that can use continuous predictors to predict survival times and that can be applied to data that include censored observations (Christensen, 1987; Kelsey, Thompson, & Evans, 1986). Analyses were run to validate the assumption of proportionality of hazards (Trussell & Hammerslough, 1983), and they indicated that there was no serious violation.

The dependent variable in the Cox regressions was time from the Wave-1 assessment until report of first sexual intercourse. It was designated as the midpoint between the last report of virginity and the first report of intercourse: 0.5 years for those whose first intercourse occurred between Waves 1 and 2, 1.5 years for participants whose first intercourse took place between Waves 2 and 3, and 2.5 years for those whose first intercourse occurred between Waves 3 and 4. Two consecutive blocks of variables were entered into the prediction model: first, the sociodemographic control measures (gender, grade in school at Wave 1, socioeconomic status, and family composition) and, second, the predictor measures of psychosocial unconventionality. Four separate regressions were run this way, one for the personality predictors; one for the perceived environment predictors; one for the behavior predictors; and one for the combined set of personality, perceived environment, and behavior predictors.

Model improvement contributed by each set of unconventionality variables was assessed by the significance of the change in chi-square from a model containing only the sociodemographic control measures. Relative risk, that is, the ratio of the hazard of transition for adolescents with greater unconventionality compared to those with less unconventionality, is indicated by the antilog of the regression coefficient (e^b). If the relative risk is greater than 1.0, the variable is associated with

Table 16.4 Mean Scores on Wave 1 (1989) Measures of Unconventionality for Four Nonvirginity Status Groups (All Virgins at Wave 1) for African-Americans

Wave 1 Measures	Nonvirgins at Wave 1 ^{ac}	Nonvirgin by Wave 2 ^d	Nonvirgin by Wave 3 ^e	Nonvirgin by Wave 4 ^f	Wave 4 Virgins ^g	<i>F</i>
<i>Demographic measures</i>						
Grade in school	8.2	8.0	8.3	7.7	7.8	3.56*
Socioeconomic status	5.2	5.0	5.2	5.6	5.5	1.47
Family composition	1.2	1.2	1.3	1.3	1.4	1.74
<i>Personality measures</i>						
Independence-achievement value discrepancy	9.4	9.5	9.2	8.8	8.6	2.11
Expectation for achievement	7.4	7.7	7.5	7.7	7.6	0.04
Tolerance of deviance	17.6	16.1	15.0	15.4	14.7	0.94
<i>Perceived environment measures</i>						
Parent-friends incompatibility	5.1	4.9	5.0	4.9	5.4	1.16
Parent-friends influence	4.8	4.7	5.2	4.8	4.4	2.37
Parental disapproval-approval of problem behavior	2.7	2.6	3.1	2.5	2.6	1.77
Friends as models for problem behavior	5.0	4.6	4.5	4.4	4.3	0.32
<i>Behavior measures</i>						
Problem						
Deviant behavior	17.2	16.1	14.9	14.4	14.3	1.34
Problem drinking	4.7	3.5	3.6	3.4	3.4	0.14
Marijuana involvement	1.9	1.1	0.6	0.9	0.9	0.85
Conventional ^b						
School performance	2.3	2.5	2.6	2.4	2.7	1.51
Family activities	3.4	3.2	3.3	3.3	3.5	0.47

Note: Means are adjusted for the effects of the following sociodemographic covariates: gender, socioeconomic status, grade in school, and family composition

No covariates were used in the analyses comparing mean differences on the demographic measures. These are unadjusted means

^aWave 1 nonvirgin means are included for descriptive purposes. These means are not included in the *F* test

^bWith the exception of the conventional behavior measures, higher scores indicate greater unconventionality

^c*n* = 98

^d*n* = 56

^e*n* = 34

^f*n* = 32

^g*n* = 76

**p* ≤ .05

increased risk of early transition to nonvirginity; if the relative risk is less than one, the variable is associated with decreased risk of early transition. Results are presented separately for White, Hispanic, and African-American adolescents in Table 16.5.

The data in Table 16.5 support the central hypothesis that antecedent psychosocial unconventionality in adolescence is associated with increased risk of earlier transition to nonvirginity. Measures from each of the three theoretical systems (Runs 1, 2, and 3) significantly improved prediction of transition to nonvirginity for White and Hispanic adolescents, $p \leq .01$, but not for African-American youths. For White and Hispanic adolescents, the prediction model for each of the three sets of unconventionality measures was statistically significant, $p \leq .001$.

As noted earlier, African-American boys accounted for a large share of those who were omitted from analyses due to unreliable data on sexual intercourse experience. It is possible that African-American boys who were included in the analyses may have been the source of undetected unreliable data regarding transition to nonvirginity; and, if that were the case, it could have adversely affected the fit of the model for African-American youths. Other possible explanations for the lack of fit of the model in this sample are taken up later in the Results section and in the Discussion section.

The regression coefficients reported in Table 16.5 reflect the contributions of the individual predictor measures to the risk of earlier transition to nonvirginity. For White and Hispanic adolescents, measures from all three theoretical systems were associated with a significant difference in risk of transition to nonvirginity. With respect to personality unconventionality (Run 1), greater tolerance of deviance was significantly associated with risk of transition for Whites, and higher value on independence than on achievement was significant for Hispanics. With respect to perceived environment unconventionality (Run 2), greater influence of friends relative to parents and having relatively more friends who engage in problem behavior were related to greater risk of transition for White adolescents, and having relatively more friends who engage in problem behavior was associated with greater risk for Hispanic adolescents. With respect to behavioral unconventionality (Run 3), deviant behavior, problem drinking, and poor school performance were associated with increased transition risk for White youths, and problem drinking was associated with increased transition risk for Hispanic adolescents. These findings support the contribution of unconventionality measures from each system of Problem Behavior Theory to transition proneness.

When all of the unconventionality measures were entered simultaneously as a block into the regression model (Run 4), their addition to the sociodemographic control measures significantly improved the model chi-square for White and Hispanic adolescents. Because of the degree of intercorrelation among the different measures of unconventionality, however, the direct influence of a number of the individual predictors on transition risk diminished in the model. For White and Hispanic youths, this overall model was statistically significant, $p < .001$. For

Table 16.5 Survival Analyses Predicting Timing of Transition to Nonvirginity among Wave 1 Virgins by Race/Ethnicity

Variables	White		Hispanics		African-Americans	
	β	exp (β)	β	exp (β)	β	exp (β)
Control Measures						
Gender	-.05	1.0	-.20	0.8	.01	1.0
Grade in school	.17*	1.2	.18*	1.2	.16	1.2
Socioeconomic status	-.11**	0.9	.06	1.1	-.07	0.9
Family composition	-.26	0.8	-.24	0.8	-.36	0.7
<i>Overall chi-square</i>	16.4**		13.8**		6.6	
Predictor sets						
<i>Run 1: Personality measures^a</i>						
Independence-achievement value discrepancy	.03	1.0	.08*	1.1	.08	1.1
Expectation for achievement	.05	1.1	.04	1.0	-.02	1.0
Tolerance of deviance	.04**	1.0	.02	1.0	.02	1.0
<i>Overall chi-square</i>	37.3***		33.0***		10.8	
<i>Change chi-square^b</i>	18.3***		18.6***		4.5	
<i>Run 2: Perceived environment measures^a</i>						
Parent-friends incompatibility	-.05	0.9	.02	1.0	-.12	0.9
Parent-friends influence	.15**	1.2	.04	1.0	.09	1.1
Parental disapproval-approval of problem behavior	.03	1.0	.07	1.1	.09	1.1
Friends as models for problem behavior	.19***	1.2	.11**	1.1	.03	1.0
<i>Overall chi-square</i>	65.3***		28.7***		13.0	
<i>Change chi-square^b</i>	40.8***		14.6**		6.2	
<i>Run 3: Behavior measures</i>						
Deviant behavior ^c	.39*	1.5	.25	1.3	.28	1.3
Problem drinking ^c	.41*	1.5	.53***	1.7	-.10	0.9
Marijuana involvement ^c	.28	1.3	.22	1.2	.13	1.1
School performance ^d	.32**	1.4	.13	1.1	.22	1.2
Family activities ^c	-.02	1.0	.13	1.1	.25	1.3
<i>Overall chi-square</i>	57.8***		46.8***		15.4	
<i>Change chi-square^b</i>	40.5***		32.5***		7.8	
<i>Run 4: Total set of measures</i>						
Independence-achievement value discrepancy ^a	.03	1.0	.07	1.1	.07	1.1
Expectation for achievement ^a	.01	1.0	.03	1.0	-.08	0.9
Tolerance of deviance ^a	.00	1.0	.00	1.0	.01	1.0
Parent-friends incompatibility ^a	-.05	1.0	-.02	1.0	-.16*	0.9
Parent-friends influence ^a	.15**	1.2	.00	1.0	.10	1.1
Parental disapproval-approval of problem behavior ^a	.05	1.0	.02	1.0	.13	1.1

(continued)

Table 16.5 (continued)

Variables	White		Hispanics		African-Americans	
	β	exp (β)	β	exp (β)	β	exp (β)
Friends as models for problem behavior ^a	.09	1.1	.02	1.0	.00	1.0
Deviant behavior ^c	.30	1.3	.10	1.1	.31	1.4
Problem drinking ^c	.21	1.2	.50**	1.6	-.38	0.7
Marijuana involvement ^c	.14	1.2	.14	1.1	.32	1.4
School performance ^d	.26*	1.3	.08	1.1	.29	1.3
Family activities ^c	-.08	0.9	.06	1.1	.29	1.3
<i>Overall chi-square</i>	72.3***		50.3***		25.6	
<i>Change chi-square^b</i>	51.3***		35.1***		20.2	

^aVariables entered as continuous measures are scored so that higher values represent greater unconvictionality and, therefore, theoretically greater risk of transition

^bThe reported change chi-square represents model improvement contributed by predictor variables after entry of gender, grade in school, socioeconomic status, and family composition

^cBased on median splits of distribution of values for these measures. For problem drinking and marijuana involvement, the contrasts are any involvement with no involvement

^dContrasts grade point average in lowest or middle tercile to the highest tercile, based on distribution of grade point average within each ethnic group

* $p \leq .05$

** $p \leq .01$

*** $p \leq .001$

African-American adolescents, the overall model marginally approached significance, $p \leq .10$.⁵

Because a portion of the study sample was already sexually experienced at Wave 1, it is possible that sample selection bias may have affected the findings. Although we have reservations about the appropriateness of applying sample selection bias correction techniques to our data (see Stolzenberg & Relies, 1990; Udry & Billy, 1987), we nevertheless assessed the influence of sample selection on the predictive models presented in Table 16.5. Using a two-stage model of sample selectivity bias

⁵In order to test whether there were significant differences in the predictive model across the three racial/ethnic groups, a Cox regression analysis was run for the combined group of White, Hispanic, and African-American youths. Three consecutive blocks of variables were entered into the prediction model: first, sociodemographic control measures, including two dummy variables measuring race/ethnicity (White/non-White and Hispanic/non-Hispanic); second, the full set of 12 unconvictionality measures; third, the interactions of each of the race/ethnicity measures with each of the other control measures and with each of the measures of unconvictionality.

Results indicate a significant main effect of race/ethnicity in Step 1 of the analysis, but no significant improvement to the model at Step 3 when the set of interaction terms was entered. Although White adolescents are less likely to make an early transition to nonvirginity than non-White adolescents, the relationship of the control and unconvictionality measures with time of transition is not statistically different for the three racial/ethnic groups.

proposed by Heckman (1979), we estimated the omitted selectivity variable with a probit model that included measures of gender, grade in school, socioeconomic status, family composition, and a summary measure of overall unconventionality.⁶ The selectivity proxy variable was shown to have a significant effect in the African-American sample but not in the White and Hispanic samples.

When the regression analysis, including sociodemographic controls, all measures of unconventionality, and the measure of sample selectivity, was run for the African-American sample, the predictive model was statistically significant. Compared with the predictive model that did not include the selectivity measure, this model significantly improved prediction of transition to nonvirginity for African-American adolescents. In addition, personality, perceived environment, and behavior indicators of greater unconventionality were significantly associated with a greater risk of earlier transition to non-virginity. These findings suggest that sample selection bias may have had a detrimental influence on our ability to fit the predictive model to the data in the African-American sample. Given our reservations about the appropriateness of the correction for sample selection, these findings should be interpreted cautiously.

Although gender is one of the control variables used in the model, it was deemed informative also to test whether the explanatory model may differ for boys and girls. Cox regression analyses were run in which a third set of variables was added to the set of control variables and the total set of unconventionality measures. This third step in the analyses consisted of the interaction terms of gender with each of the 12 unconventionality measures. When these interaction terms were entered, there was no significant improvement in the prediction of risk of transition to nonvirginity for any of the racial/ethnic groups. These findings support the conclusion that the predictive model is similar for boys and girls. In addition, analyses presented in Table 16.5 were replicated for boys and girls separately (controlling race/ethnicity). Findings were very similar for the two genders. A table presenting these results is available from Frances Costa upon request.

The relationship of unconventionality to the survival of virginity from Wave 1 to Wave 4 can be illustrated using Cox regression analyses in which a single measure of overall unconventionality (described in Footnote 6) at Wave 1 is added to the block of sociodemographic control variables. This measure of unconventionality was dichotomized for the three racial/ethnic groups. Participants scoring at or below the median were defined as *conventional*, and those scoring above the median were defined as *unconventional*. The smoothed survival curves for the two groups, conventional and unconventional Wave-1 virgins, are presented in Figs. 16.1, 16.2, and 16.3

⁶This composite measure was computed by adding the standardized scores of the 12 measures of unconventionality: independence-achievement value discrepancy, expectation for achievement, tolerance of deviance, parent-friends incompatibility, parent-friends influence, parental disapproval-approval of problem behavior, friends as models for problem behavior, deviant behavior, problem drinking, marijuana involvement, school performance, and family activities. Scores were standardized separately for Whites, Hispanics, and African Americans. For respondents missing scores on two or fewer of the 12 measures, the missing values were replaced with the mean of the remaining scores.

for White, Hispanic, and African-American adolescents, respectively. The curves for conventional and unconventional Wave-1 virgins were significantly different for both White and Hispanic youths but not for African-American adolescents.

As can be seen in the figures, decreasing proportions of both conventional and unconventional Wave-1 virgins remained virgins, that is, “survived”, at each subsequent wave of the study. More importantly, in all three racial/ethnic groups, the cumulative survival at each time point was lower for the unconventional Wave-1 youths than it was for the conventional Wave-1 youths. Among the White adolescents shown in Fig. 16.1, about 66% of the conventional Wave-1 virgins had not had intercourse, that is, survived, by Wave 4; this compares with only about 29% of the unconventional Wave-1 virgins who survived. Among the Hispanic Wave-1 virgins shown in Fig. 16.2, approximately 46% of those in the conventional group had not had intercourse by Wave 4; this compares with only about 22% of those in the unconventional group who survived. The comparable figures for the African-American adolescents in Fig. 16.3 are about 43% and 33%, respectively, the smallest difference in survival as virgins.

Discussion

A significant developmental linkage between psychosocial and behavioral unconventionality, on the one hand, and earlier transition to nonvirginity, on the other, was demonstrated in this study. The relationship holds when the sociodemographic characteristics of gender, socioeconomic status, grade in school, and family composition are controlled. The present findings extend earlier work to show that the linkage applies to contemporary White and Hispanic urban adolescents. The relationship does not apply, however, to African-American youths.

Results of the bivariate analyses indicate that, for White and Hispanic youths, precursors of earlier transition to nonvirginity include personality characteristics—a higher value on independence relative to value on achievement, lower expectations for success in school, and greater tolerance of deviance; perceived environment characteristics—greater influence from peers than from parents, lower parental disapproval of problem behavior, and having relatively more friends who engage in problem behavior; and behavioral characteristics—lower school achievement and greater involvement in other problem behaviors, such as delinquency, problem drinking, and marijuana use. Despite the shared variance among the sets of unconventionality measures used in the multivariate analyses, a number of variables still emerged as antecedents of earlier transition to nonvirginity, including, for White youths, greater tolerance of deviance, greater influence from friends than from parents, more friends as models for problem behavior, greater involvement in delinquency and problem drinking, and lower school achievement, and, for Hispanic youths, a higher value on independence relative to achievement, more friends as models for problem behavior, and greater involvement in problem drinking.

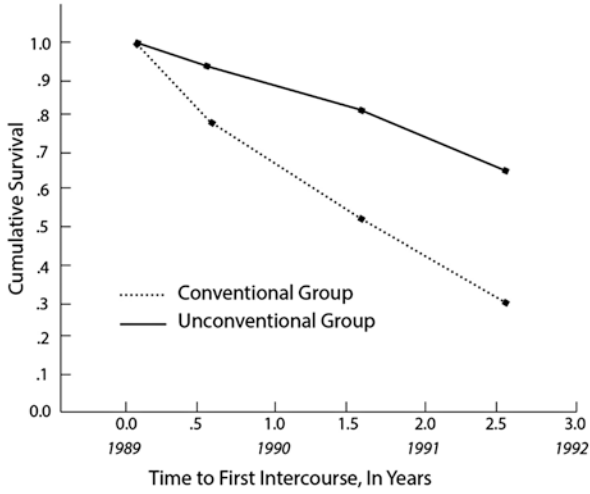


Fig. 16.1 Survival curves for White adolescents

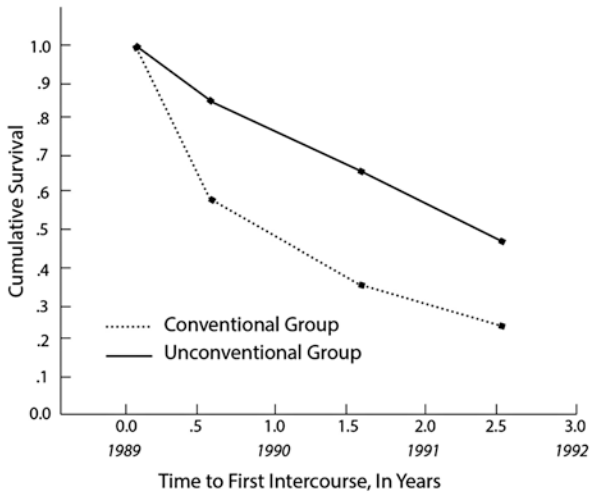


Fig. 16.2 Survival curves for Hispanic adolescents

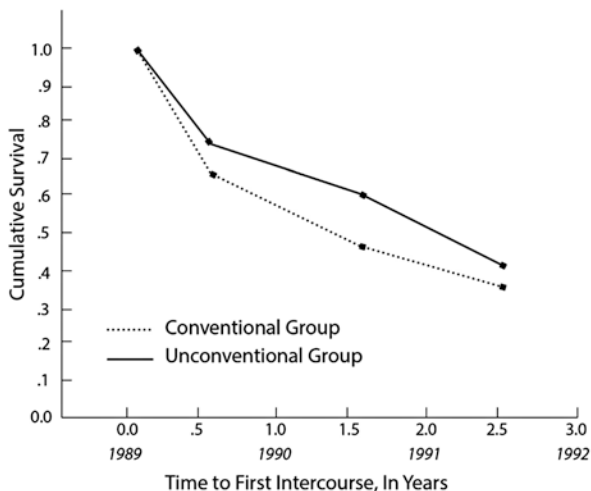


Fig. 16.3 Survival curves for African-American adolescents

As the survival curves showed, adolescents who varied in antecedent unconventionality exhibited divergent developmental pathways with respect to sexual intercourse initiation. By Wave 4 (1992), there were major differences in the proportions of virgin survivors between the Wave-1 conventional and unconventional groups. In fact, over the three-year time course of the study, the proportion of survivors among conventional youths was roughly double that among unconventional youths. These findings hold for both the White and Hispanic adolescent samples but not for the African-American sample.

The findings are comparable to earlier work based on middle-class White adolescents studied in a small city more than twenty years ago (R. Jessor & S. L. Jessor, 1977), and they suggest a historical invariance in the relationship between unconventionality and early sexual intercourse. As was the case more than two decades ago, early intercourse, like other problem behaviors, can be understood, at least in part, as a departure from prevailing social norms, a departure influenced by the psychosocial instigations toward and controls against such behavior specified in Problem Behavior Theory. The present data also demonstrate the generality of this explanatory framework here applied to adolescents of different racial/ethnic and socioeconomic backgrounds.

Although the theoretical model fit well for both White and Hispanic youths, the linkage between greater unconventionality and earlier transition to nonvirginity did not hold for African-American adolescents. It is possible that this outcome may have to do with the relatively small number of African-American participants or with the fact that the African-American male participants were the source of the least reliable data on sexual behavior (this phenomenon was also noted by

Rowe & Rodgers, 1991). In addition, there was a significant effect of sample selection bias in the African-American sample, but not for White and Hispanic youths. As indicated earlier, we have concerns about the appropriateness of this correction in our data. The failure of the theoretical model to fit the African-American sample may also have to do, however, with differences in social structural factors or normative orientations. Stanton et al. (1993), for example, reported that, among impoverished African-American youths, sexual intercourse formed a different domain from other problem behaviors, as reflected by adolescents' own behaviors, their feelings about the behaviors, and their perceptions of friends' involvement in the behaviors.

In examining our data, it was evident that considerably higher proportions of African-American youths were from nonintact families, that is, families missing at least one biological parent (77%, compared with 45% of the White and 51% of the Hispanic sample). This observation led us to investigate whether the failure of the theoretical model to fit the African-American adolescents may have been affected by this difference in family composition. Indeed, additional Cox regression analyses revealed a significant interaction effect between family composition and the measure of overall unconventionality for African-American adolescents, but not for adolescents in the other two groups.

Cox regression analyses were then performed separately for Wave-1 African-American virgins living in intact families and Wave-1 African-American virgins living in nonintact families. Greater Wave 1 unconventionality was associated with earlier transition to nonvirginity for African-American youths living in intact families (overall model chi-square and chi-square change were both significant at $p \leq .10$), but not for African-American youths living in nonintact families. Survival curves plotted for African-American adolescents from nonintact families showed that, by Wave 4, the proportions of conventional and unconventional Wave-1 virgins who had not yet initiated intercourse were nearly identical (about 34%). Survival curves plotted for African-American adolescents living in intact families, however, showed that a substantially greater proportion of Wave-1 conventional than unconventional youths were still virgins at Wave 4 (64% vs. 32%).

Although these findings were of marginal statistical significance, they are, nevertheless, important and suggestive. They help to illuminate the way in which sociodemographic factors may qualify the relationship of psychosocial characteristics to early sexual activity among African-American adolescents. The importance of family structure has recently been implicated in the risk of premarital births, a different but not unrelated indicator of sexual behavior. Wu and Martinson (1993) found that the strength of the linkage between family structure (intact vs. nonintact) and premarital births varied as a function of race/ethnicity, being stronger for Whites and Hispanics and weaker for African Americans. In the present study, for African-American youths living in nonintact families, earlier initiation of sexual intercourse appears to be independent of variation in psychosocial and behavioral unconventionality. Early sexual behavior may have different

determinants and even different normative status in different sociodemographic subgroups in the African-American community. Further research to explore these possibilities would be valuable.

Findings from this study also indicated that earlier transition to nonvirginity was linked to greater psychosocial and behavioral unconventionality for both male and female adolescents. These results contrast with those reported by Udry and his colleague (Udry, 1988; Udry & Billy, 1987), who found that stronger bonds to conventional society are related to lower likelihood of engaging in sexual intercourse for girls but not for boys. Differences in measures of psychosocial variables may at least partly account for this discrepancy in findings. As Udry (1988) noted, his research omitted social-control theory variables "that have been shown to be important in other research." (p. 718).

Several limitations of this study need to be noted. First, the Wave-1 sample represented only 60% of the students who were asked to take part in the study, and only 66% of the Wave-1 sample participated in all three of the subsequent data collections. The initial sample appears not to have been seriously distorted by the less-than-desirable level of participation in Wave 1, however, and the longitudinal sample does not appear to have been seriously distorted by subsequent attrition between Waves 1 and 4.

A second limitation is that the data are based solely on participants' self-reports; the findings could, therefore, reflect some common method factor. Third, it is possible that, despite clear safeguards to ensure the confidentiality of the data, participants may have felt uneasy reporting on sensitive matters such as sexual behavior and drug use. On this point, however, the longitudinal nature of the study enabled us to rely on the multiple reports of behavior statuses and involvement in order to identify inconsistencies in the data.

Despite these limitations, the present results replicated our earlier findings in a different historical period (R. Jessor & S. L. Jessor, 1977; R. Jessor et al., 1983; S. L. Jessor & R. Jessor, 1975) and extended them to a more socioeconomically and ethnically diverse population of youths. The findings are theoretically coherent, and they demonstrate the continuing relevance of psychosocial and behavioral unconventionality to an understanding of early sexual behavior.

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Appendix

Means and Standard Deviations on Measures of Unconventionality and Sociodemographic Characteristics for Study Participants, Subjects Omitted from Analyses, and Subjects Lost to Attrition

Measures	Four-Wave Participants Used in Analyses ^a			Four-Wave Participants Omitted from Analyses ^{bd}			Participants Lost to Attrition ^c		
	M	SD	Range	M	SD	Range	M	SD	Range
Independence-achievement value discrepancy	9.29	2.11	1–17	9.23	2.08	4–15	9.50	2.29	2–17
Expectation for achievement	7.36	2.53	4–12	7.63	2.53	4–12	8.25	2.54	4–12
Tolerance of deviance	17.18	6.10	10–40	19.11	6.96	10–40	18.94	6.82	10–40
Parent-friends incompatibility	5.10	1.62	3–9	5.21	1.58	3–9	5.11	1.62	3–9
Parent-friends influence	4.95	1.45	3–9	4.95	1.50	3–9	5.04	1.53	3–9
Parental disapproval/approval of problem behavior	2.69	0.92	2–6	2.71	1.07	2–6	2.81	1.02	2–6
Friends models for problem behavior	5.04	1.86	3–11	5.02	1.92	3–12	5.77	2.06	3–12
Deviant behavior	16.19	6.68	10–50	17.10	7.69	10–50	18.99	8.33	10–50
Problem drinking	4.41	3.08	3–23	4.32	3.20	3–24	5.92	4.62	3–24
Marijuana involvement	1.69	2.16	0–8	1.57	1.80	0–8	2.76	2.72	0–8
School performance	2.72	0.82	0–4	2.48	0.75	0.6–3.9	2.08	0.87	0–4
Family activities	3.40	1.42	1–6	3.40	1.42	1–6	3.30	1.52	1–6
Grade in school	7.99	0.81	7–9	7.81	0.80	7–9	8.04	0.82	7–9
Socioeconomic status	5.02	1.85	1–8.3	4.74	1.84	1–8.3	4.37	1.73	1–8.3
Family composition	1.45	0.50	1–2	1.40	0.49	1–2	1.26	0.44	1–2

^a*n* = 1330

^b*n* = 171

^c*n* = 819

^dThese four-wave participants were omitted from analyses on the basis on incomplete, inconsistent, or untrustworthy responses to questions about sexual behavior

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Part IV
Health-Related Problem Behaviors:
Cigarette Smoking

Chapter 17

Explaining Smoking Behavior in Adolescence

Mark S. Turbin, Richard Jessor, and Frances M. Costa

Cigarette smoking in adolescence is a prominent public health issue, and concern about its well-established health-compromising consequences has prompted many schools and government agencies to implement programs to prevent the onset of or curb involvement in adolescent smoking. Numerous school-based interventions designed to reduce initiation of adolescent smoking continue to reflect its classification as a health-compromising behavior and its consequences for health and fitness (Hansen & O'Malley, 1996). The emphasis on health consequences of tobacco in the Surgeon General's Report on Preventing Tobacco Use Among Young People (U.S. Department of Health & Human Services, 1994), the implementation of state laws that mandate education about smoking and health in schools, and even contemporary, school-based prevention programs emphasizing refusal skills and more general life skills training, all call attention to the link between tobacco use and health. Although the latest generation of prevention approaches has eschewed the earlier information deficit model about long-term health hazards, "Providing knowledge of the health consequences of smoking is still an important task for public health..." (U.S. Department of Health & Human Services, 1994, p. 217), and at least minimal information concerning long-term health consequences of smoking is still a frequent program component (Botvin, Baker, Dusenbury, Botvin, & Diaz, 1995; Hansen & O'Malley, 1996; Silvia, Thorne, & Tashjian, 1997). Although the need for health-related information seems obvious, there is a real question about how adolescents themselves understand cigarette smoking, the functions it serves in their lives, and the place it occupies in the larger organization of adolescent risk behavior.

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The category of risk behaviors in adolescence encompasses several different subsets of behaviors that can compromise health, well-being, and positive developmental outcomes (Jessor, 1998). One subset includes behaviors, such as alcohol abuse, delinquency, and illicit drug use, that involve transgressions of social and legal norms and that often elicit sanctions from others or the larger society. These have traditionally been referred to as problem behaviors (Jessor, Donovan, & Costa, 1991; Jessor & Jessor, 1977). Another subset of risk behaviors, such as unhealthy dietary habits and insufficient exercise, are those that compromise health, but that do not necessarily violate social or legal norms or result in societal sanctions. We will refer to these as health-compromising behaviors. Although it may be argued that some problem behaviors, such as alcohol abuse, can also compromise health, the key distinction between the two subsets has to do with whether or not the behaviors involve normative transgressions and implicate societal sanctions.

Although both problem and health-compromising behaviors entail risk, there may well be important differences in the subjective meanings or functions the behaviors have for adolescents, and such differences could have important implications for programmatic efforts to change behaviors. The issue with respect to cigarette smoking is whether it is construed as or functions as an element in the health-related behavior structure or in the problem behavior structure, or in both. From a problem-behavior perspective, adolescent cigarette smoking as a normative transgression could be motivated by goals such as rejecting the norms of conventional society, affirming membership in a peer group, asserting independence from parents, or being seen as more mature. Such functions are not necessarily implicated by health-compromising behaviors, such as poor dental hygiene or not wearing a seatbelt. Clues to common functions or meanings underlying different behaviors can emerge from the empirical correlations among them. The main objective of this study is to determine whether adolescent cigarette smoking covaries more with health-related behaviors than it does with problem behaviors, or vice versa, or equally with both.

There are logical as well as empirical grounds for expecting adolescent cigarette smoking to have associations with both problem behaviors and health-compromising behaviors. Like other problem behaviors, adolescent cigarette smoking involves a transgression of social and legal norms. And like other health-compromising behaviors, smoking involves actions that have obvious and long-term negative health consequences. Previous research has already shown that cigarette smoking is associated with a variety of adolescent problem behaviors, including alcohol abuse, high-volume drinking, marijuana use, the use of other illicit drugs, delinquency, unprotected sex, and having more sex partners (Biglan et al., 1990; Botvin & Botvin, 1992; Epstein, Botvin, Baker, & Diaz, 1999; Escobedo, Reddy, & DuRant, 1997; Farrell, Danish, & Howard, 1992; Hays, Stacy, Alan, & DiMatteo, 1984; Jessor, Donovan, & Widmer, 1980; Neumark-Sztainer et al., 1997; Valois, Kammermann, & Drane, 1997). Indeed, there is recent evidence that a reduction in the initiation of cigarette smoking can result from an intervention in elementary school targeting other problem behaviors (aggressive/disruptive classroom behavior), at least in boys (Kellam & Anthony, 1998). At the same time, there is established evidence that

adolescent smoking is associated with various health-compromising behaviors, such as unhealthy diet, unhealthy weight regulation practices, low levels of physical activity, not using seat belts, inadequate hours of sleep, and poor dental hygiene (Burke et al., 1997; Coulson, Eiser, & Eiser, 1997; Donovan, Jessor, & Costa, 1991; Hawkins, 1992; Isralowitz & Trostler, 1996; Pate, Heath, Dowda, & Trost, 1996; Robinson et al., 1987), and that teenagers' attempts to quit smoking are associated with several health-related values and behaviors (Fisher, Stanton, & Lowe, 1999).

At the same time, research has shown that the subsets of problem behaviors and health-related behaviors can be empirically distinguished. Neumark-Sztainer et al. (1997) described a health-promoting behavior construct that appeared to be a separate factor from a problem behavior construct. Hays et al. (1984) also reported that a cluster of health-enhancing behaviors was empirically distinguishable from a cluster of problem behaviors. Roysamb, Rise, and Kraft, (1997) found both general and specific factors underlying substance use and health-related behaviors. Terre, Drabman, and Meydrech (1990) reported multiple dimensions of health-related behaviors, with cigarette smoking contained in only one of those dimensions. In addition, Donovan, Jessor, and Costa (1993) reported analyses yielding separate but inversely correlated latent variables of problem behavior and health-enhancing behavior. The implication of these various studies of adolescent risk behavior structures is that, although cigarette smoking relates to both problem behaviors and health-related behaviors, there is some distinctiveness to each domain.

The key concern of the present study is to determine whether adolescent smoking relates more strongly to a structure of problem behaviors or to a structure of health-compromising behaviors, or similarly to both. That determination should have important implications for public health and the design of prevention efforts.

Method

Study Design, Procedures, and Participants

The present analyses employed data from the final wave (1992) of a longitudinal questionnaire study of adolescent behavior and development in a large urban area in the Rocky Mountain region. Participants were drawn from six middle schools and four high schools selected by school officials to maximize minority racial/ethnic representation. Letters describing the study and requesting participation were written (in both English and Spanish) to the students and to their parents, and students returned signed consent forms to the school. Confidentiality was safeguarded by a Certificate of Confidentiality from the U.S. Department of Health and Human Services. Study participants were released from class to take part in large-group sessions administered by the researchers. Bilingual versions of the questionnaire were available for those students who preferred to work in Spanish. Annual waves of data were collected from Spring 1989 through Spring 1992. Students received token payments of \$5 for participating in each wave.

Data from Wave 4 provided the most comprehensive set of behavior measures available and the highest prevalence of smoking (48% had tried smoking). The Wave 4 questionnaire was completed by 1782 (74%) of the Wave 1 participants. Fifty-six percent of the Wave 4 participants are female; 38% are Hispanic, 34% are non-Hispanic white, 22% are black, 4% are Asian, and 2% are American Indian. Equal proportions were in 7th, 8th, and 9th grades at Wave 1 (1989). Forty-four percent of the Wave 4 participants are from intact families; 17% have a stepparent living with them (usually stepfather); 33% live with one parent (usually mother) or alternate living with each parent; and 6% live with other relatives or guardians. Further details of the study sample are reported elsewhere (Jessor, Van Den Bos, Vanderryn, Costa, & Turbin, 1995).

To gauge the possible biasing effect of attrition from the original Wave 1 participant sample, we compared those who participated in Wave 4 with those who did not on 12 selected measures of conventionality from the Wave 1 questionnaire. Results of the comparison of covariance matrices were presented in an earlier publication (Jessor et al., 1995); they showed that correlations among those measures would have been about the same if no cases had been lost to attrition. The findings reported below, therefore, are not likely to have been biased by sample loss after Wave 1.

Measurement of Cigarette Smoking

Cigarette smoking was assessed by two items. The first item is "Have you ever smoked a cigarette?" Response options were "never," "once," "a few times," and "more than a few times." The second item asked, "During the past month, how many cigarettes have you smoked on an average day?" Seven response categories ranged from "none" to "about two or more packs a day."

Measurement of Problem Behaviors

Four problem behaviors were assessed: early sexual intercourse experience, alcohol abuse, illicit drug use, and delinquency. Sexual intercourse experience was assessed with two items: virgin/nonvirgin status and number of sex partners in the past year. Alcohol abuse in the past 6 months was assessed with three items: frequency of drinking, frequency of drinking five or more drinks on one occasion, and number of times drunk. Illicit drug use was measured by three items: ever used marijuana, frequency of marijuana use in the past 6 months, and number of times other illicit drugs were used in the past 6 months. Delinquency was measured by two two-item scales assessing the frequency in the past 6 months of damaging others' property and of theft.

Measurement of Health-Compromising Behaviors

Four health-compromising behaviors were assessed: unhealthy diet, sedentary behavior, unsafe behavior, and poor dental hygiene. Unhealthy diet was assessed with two single items and a two-item scale: the two items asked respondents if they pay attention to “eating some fresh vegetables every day,” and “eating healthy snacks like fruit instead of candy”; the two-item scale asked about “keeping down the amount of fat you eat,” and about “eating foods that are baked or broiled rather than fried.” Response options— “a lot,” “some,” or “none”— defined a three-point scale of unhealthy diet. Sedentary behavior was assessed with three items that asked how many hours each week the respondent spends in organized sports, pickup games, and physical activities. Sedentariness was inferred from responses that ranged from “8 or more hours a week” (not sedentary) to “none” (very sedentary). Unsafe behavior was assessed with two items that asked, “When riding with a friend [or with a parent], do you use your seatbelt?” Unsafeness was inferred from responses that ranged from “almost always” to “hardly ever.” Two items were used to assess poor dental hygiene: frequency of brushing (“after every meal” to “every couple of days”) and flossing (“once a day or more” to “almost never”).

Analytic Procedures

To locate cigarette smoking in relation to other behaviors, a model of structural relations was tested for consistency with the data. The first step in this procedure is to establish a measurement model linking the 22 measured indicators described above with nine first-order latent variables (cigarette smoking, four problem behaviors, and four health-compromising behaviors). In the second step, the structural model was tested with paths to the nine first-order latent variables from two second-order latent variables—problem behavior, and health-compromising behavior. Regression coefficients in this model indicate the location of the cigarette smoking latent variable in relation to the other eight behavioral latent variables, and goodness-of-fit measures indicate how well that structural model summarized the data.

On the recommendations of several authors (e.g., Hoyle & Panter, 1995; Hu & Bentler, 1995; Kline, 1998; Marsh, Balla, & Hau, 1996), we report multiple measures of fit including chi-square in relation to degrees of freedom (d.f.), goodness-of-fit index (GFI), comparative fit index (CFI), nonnormed fit index (NNFI), and root mean square error of approximation (RMSEA). A good fit of the model to the data is indicated by a ratio of chi-square to d.f. less than 3, values of GFI, CFI, and NNFI greater than .90, and values of RMSEA .05 or smaller (Kline, 1998). A log transformation was used for each highly positively skewed measure if that transformation did not make the kurtosis very much worse. Severely negatively skewed measures were transformed by squaring them.

Table 17.1 Correlation among First-Order Latent Variables of Cigarette Smoking, Four Problem Behaviors, and Four Health-Compromising Behaviors

Behavior	1	2	3	4	5	6	7	8
1. Cigarette smoking								
2. Sexual intercourse	.35							
3. Alcohol abuse	.55	.51						
4. Illicit drug use	.67	.53	.71					
5. Delinquency	.31	.35	.47	.44				
6. Unhealthy diet	.13	.13	.20	.15	.27			
7. Sedentary behavior	.15	-.08	.03 ^a	.08	.18	.21		
8. Unsafe behavior	.12	.30	.23	.28	.20	.19	.04 ^a	
9. Poor dental hygiene	.08 ^a	.06 ^a	.06 ^a	.08 ^a	.22	.42	.18	.14

Note: $n = 1016$

^aCritical ratio < 2 ; correlation is not reliability different from zero

Amos version 3.61 (Arbuckle, 1997) was used for the structural equation modeling because it provides a full information maximum likelihood estimate of the covariance matrix that would have obtained from the full sample had there been no missing data. The covariance matrix estimated from all available participants including those with incomplete data ($n = 1782$) was analyzed, as was the covariance matrix computed from those participants who do have complete data for all the measures used in the model (listwise deletion; $n = 1016$, 57% of the 1782 Wave 4 participants). For the findings of principal interest, results are presented from both analyses. The goodness-of-fit measures presented are for the analyses with no missing data, so it is the parameter estimates from those analyses that are displayed in the figures. Although all significance tests rely on critical ratios of unstandardized parameter estimates divided by their standard errors, standardized parameter estimates are shown in the figures so they can easily be compared with one another. The 36 covariances among the 9 latent variables were included in the measurement model; the corresponding correlations are shown in Table 17.1.

Results

Establishing the Measurement Model

The measurement model relating the 22 measured indicators to 9 latent variables of cigarette smoking, sexual intercourse experience, alcohol abuse, illicit drug use, delinquency, unhealthy diet, sedentary behavior, unsafe behavior, and poor dental hygiene fits the data quite well. Although the chi-square measure of lack of fit, 480.78, is significant, it is less than three times the degrees of freedom (173), indicating a good fit; GFI = .96, CFI = .97, NNFI = .96, and RMSEA = .04. The fit of

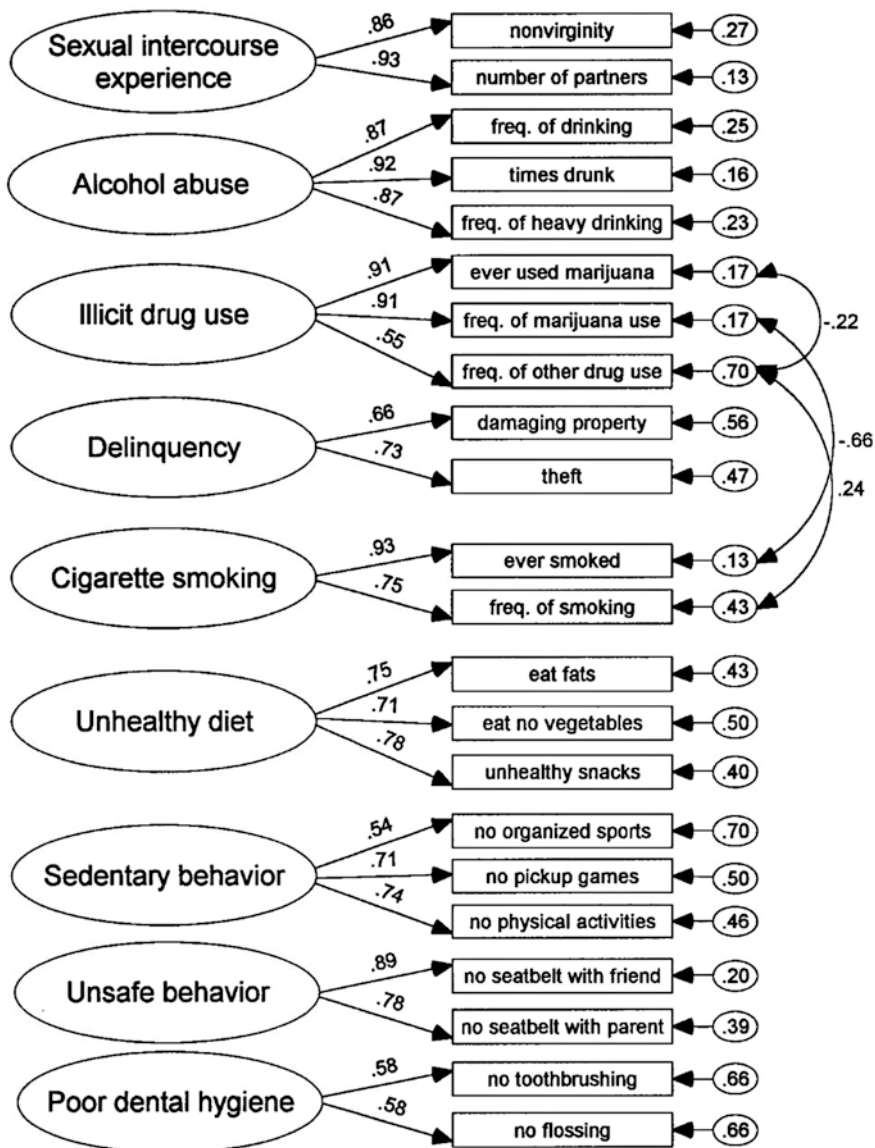


Fig. 17.1 Measurement model of problem behaviors and health-compromising behaviors. Large ovals are latent variables; rectangles are measured indicators; small ovals are residual variances; curved arrows are correlations; straight arrows are standardized regression weights. All correlations and regression weights are significant ($p < .05$), based on critical ratios of unstandardized parameter estimates

the measurement model can be enhanced slightly by allowing three of the correlations among residual variances of indicator measures to be nonzero and to be estimated from the data (chi square/d.f. = 1.99, GFI = .97; CFI = .98, NNFI = .98 and RMSEA = .03). This enhanced model is shown in Fig. 17.1. Each measured indicator loaded significantly and greater than .50 on the appropriate first-order latent variable, showing that the measured indicators accurately reflect their respective constructs and that the latent variables are reliably assessed. These results constitute a confirmatory factor analysis, confirming nine factors underlying the 22 measured indicators of problem behaviors, health-compromising behaviors, and cigarette smoking.

Bivariate correlations among the nine first-order latent variables (Table 17.1) provide the first evidence that adolescent smoking relates most strongly to problem behaviors. The latent variable of cigarette smoking is correlated more strongly with the four problem behavior latent variables ($r = .31-.67$) than it is with the four health-compromising behavior latent variables ($r = .08-.15$). It should also be noted that the problem behavior latent variables are more strongly correlated among themselves ($r = .35-.71$) than are the health-compromising latent variables ($r = .04-.42$), even though item variances are comparable between the two sets of measures.

Estimating a Structural Model With Two Second-Order Latent Variables

Step 2 of the analytic procedure involved testing a structural model of the relations of cigarette smoking with the second-order latent variables of problem behavior and health-compromising behavior, allowing cigarette smoking to load on both second-order latent variables, and estimating both loadings from the data (Fig. 17.2). The model fits the data well: chi-square/d.f. = 2.79; GFI = .95; CFI = .96, NNFI = .96, and RMSEA = .04. As can be seen, the loading of the latent variable of cigarette smoking on the problem behavior latent variable is large (.71, $p < .001$), whereas its loading on the health-compromising behavior latent variable is not significantly different from zero (-.02). In the additional analysis based on the full sample, which corrects for bias due to missing data, those same two loadings are estimated to be .66 and -.01, respectively. The parameter estimates indicate that adolescent cigarette smoking is strongly related to problem behavior but has no direct relation to health-compromising behavior. These findings demonstrate that the very modest correlations that cigarette smoking does have with health-compromising behaviors (see Table 17.1) are actually indirect relations, relations that rest upon the correlation (.35) of the problem behavior latent variable with the health-compromising latent variable (Fig. 17.2).

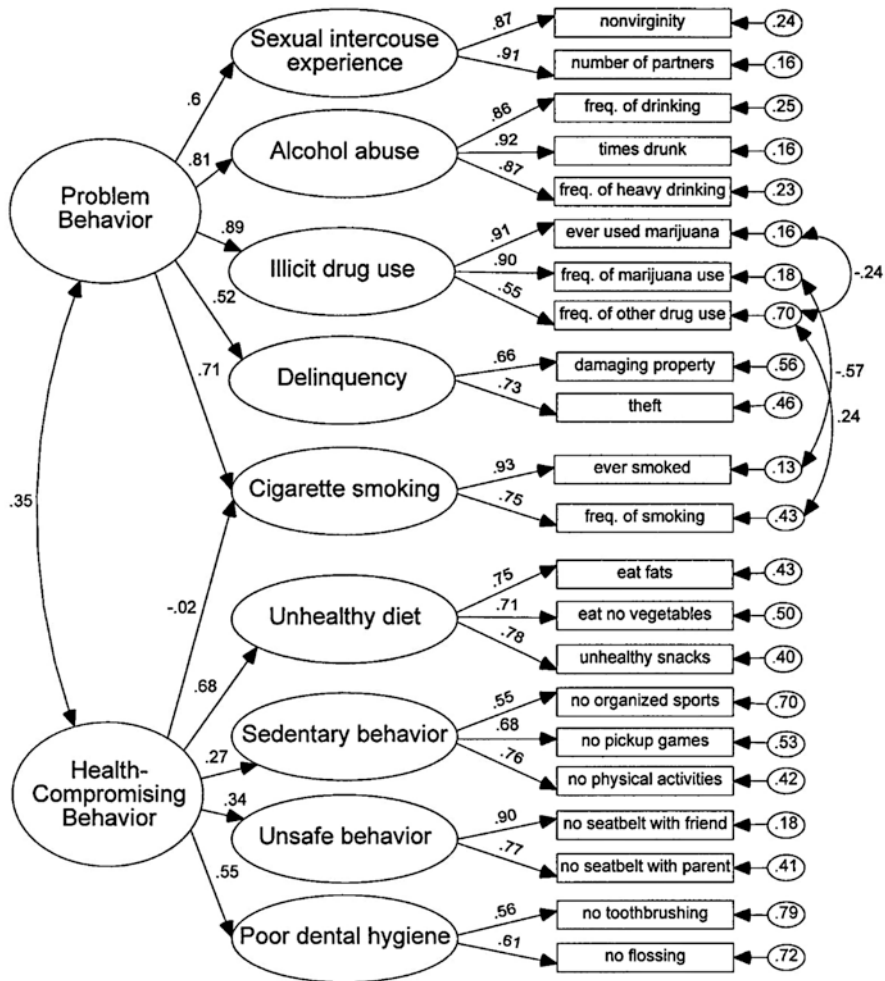


Fig. 17.2 Cigarette smoking in a structural model of problem behaviors and health-compromising behaviors. Large ovals are latent variables; rectangles are measured indicators; small ovals are residual variances; curved arrows are correlations; straight arrows are standardized regression weights. All correlations and regression weights except $-.02$ are significant ($p < .05$), based on critical ratios of unstandardized parameter estimates

Examining Possible Sources of Estimation Bias

Because measured indicators with non-normal distributions can produce biased estimates of coefficients and their standard errors, asymptotically distribution-free (ADF) estimates, which do not require multivariate normality, were obtained in an auxiliary analysis using LISREL (Jöreskog & Sörbom, 1989). Those estimates were

essentially similar to the Amos maximum likelihood estimates, except that the ADF estimates of parameters and of their critical ratios were, in general, a little larger, and most measures of goodness of fit were a little better. These results, which are free of bias from non-normality, again show that the relationship of cigarette smoking with problem behavior is strong and significant, whereas with health-compromising behavior it is close to zero and nonsignificant.

As noted, we used Amos to estimate a covariance matrix based on all 1782 cases, some with incomplete data. This analysis provides estimates of relations among variables, corrected for bias owing to missing data. We compared the parameter estimates to the already reported estimates based on the 1016 cases with complete data. Of the 36 correlations among measured indicators, 27 differed by .03 or less between the two analyses. Only five differed by more than .05; the largest of those is .07. The average absolute value of the discrepancies is .024. Thus, the correlations among those variables show no systematic bias from missing data. The regression coefficients in the structural model were also approximately the same when estimated from complete and from incomplete data. Therefore, the relationships shown in Figs. 17.1 and 17.2 are essentially the same as would have been observed if no cases had been lost owing to missing data.

Estimation of the Structural Model Within Gender and Ethnic Subgroups

The structural model of latent variables was next examined within each gender and within the three largest ethnic groups in the sample, Hispanic, white, and black. In general, the parameter estimates were similar across subgroups in most parts of the model, and goodness-of-fit measures varied very little. The primary differences were found in the variability among coefficients between the second-order health-compromising behavior latent variable and the first-order latent variables that loaded on that factor. Among females, the loadings were more uniform across behaviors; among males, the loading for unhealthy diet was substantially higher than in the overall sample, while the loading for unsafe behavior was substantially lower. Similar heterogeneity in loadings among the first-order latent variables of health-compromising behaviors was also seen in parameters estimated within each ethnic group.

The factor loading of cigarette smoking on the second-order problem behavior latent variable is quite consistent across genders and ethnic groups (.70–.77), except for a smaller but still substantial loading (.50) among black adolescents. Loadings of the cigarette smoking latent variable on the second-order health-compromising behavior latent variable are not significantly different from zero within any demographic subgroup.

Replicating the Analysis with an Alternative Analytic Method: Regression Analyses

Hierarchical multiple regression affords an alternative way to examine the relations of cigarette smoking with problem behaviors and with health-compromising behaviors. The pattern of relations found in the structural model imply that problem behaviors should share a large portion of variance with cigarette smoking, while health-compromising behaviors should not account for significant variance in smoking after controlling for problem behaviors. Those expectations were confirmed.

A hierarchical multiple regression of cigarette smoking on the four problem behaviors and the four health-compromising behaviors was carried out. The cigarette smoking criterion measure in this analysis is a composite (sum of z scores) of the two smoking measures described above. A similar composite of measured indicators was computed for each of the other eight behaviors represented by the first-order latent variables shown in Fig. 17.2. To control for sociodemographic effects, measures of gender, ethnic group, grade cohort, socioeconomic status, and intactness of the biological family were entered at the first step in the hierarchical regression. The four problem behavior composite measures were entered next, and at the third step, the four health-compromising behavior composite measures were entered. The change in R^2 at that third step shows how much of the variance in cigarette smoking is shared with those behaviors and not with the problem behaviors. At Step 2, the four composite problem behaviors accounted for an additional 33% of variance in cigarette smoking, $F(4, 1003) = 133.1, p < .001$. At Step 3, the four composite health-compromising behaviors accounted for an additional increment of less than 1% of unique variance, $F(4, 999) = 3.8, p < .01$. If health-compromising behaviors were entered at Step 2, and problem behaviors were entered at Step 3, problem behaviors would account for 30% of unique variance. These results confirm that adolescent cigarette smoking is closely related to the set of problem behaviors and only minimally related to health-compromising behaviors.

Replicating the Analysis with an Independent Sample: Robustness of the Findings

At the first wave of the longitudinal study (1989), we also collected cross-sectional data from an independent sample of students who were then in grades 10–12 ($n = 1807$) and who were not followed further. This earlier grade 10–12 sample, in which 44% had already tried smoking, was used to cross-validate the measurement model in Fig. 17.1 and the structural model in Fig. 17.2. The measurement model, using the 1127 participants with complete data, again fit the data well: chi-square/d.f. = 2.37; GFI = .97; CFI = .98, NNFI = .97, and RMSEA = .03. The structural model fit the data nearly as well: chi-square/d.f. = 3.37; GFI = .95; CFI = .96, NNFI = .95, and RMSEA = .05. The factor loading of cigarette smoking on problem

behavior is .80 ($p < .001$), and on health-compromising behavior, it is $-.09$ (not significant). Those loadings, estimated for the full sample ($n = 1807$) from incomplete data, are .78 ($p < .001$) and $-.06$ (not significant).

The hierarchical regression analyses described above were also replicated on this earlier, cross-sectional 1989 high school sample. In this sample, problem behaviors accounted for 34% of variance in cigarette smoking, $F(4,1028) = 152.5$, $p < .01$, while health-compromising behaviors accounted for a nonsignificant increment of 0.4% of unique variance, $F(4, 1024) = 1.9$, $p > .05$. When the set of problem behaviors was entered after the set of health-compromising behaviors, it accounted for 31% of unique variance.

These results in an independent sample confirm again that adolescent cigarette smoking is closely related to problem behaviors and essentially unrelated to health-compromising behaviors.

Discussion

The present findings suggest that adolescent cigarette smoking can be better conceptualized as a problem behavior involving normative transgression than as a health-compromising behavior. Cigarette smoking in adolescence covaries strongly with a set of adolescent problem behaviors, and it has little or no direct relationship with the set of adolescent health-related behaviors. These findings suggest that adolescents' decisions regarding smoking entail concerns similar to those involved in other normative transgressions (e.g., peer group membership, autonomy from authority, greater maturity), rather than concerns for health or fitness. The functional organization of behavior in these samples of adolescents encompasses cigarette smoking as just one more behavior in the problem behavior set. In light of this, efforts to prevent or alter adolescent smoking need to attend more to the personal and social determinants—the psychosocial risk and protective factors—that have been shown to influence problem behaviors (e.g., Jessor et al., 1995). A construal of cigarette smoking as largely or solely entailing compromises of health is unlikely to be relevant—and, therefore, unlikely to be effective—for many young people. Indeed, Slovic (1998) argues that young smokers, especially, perceive little risk for themselves, even in the face of widely recognized negative health effects of cigarette smoking. Interventions that do not engage the functions that smoking serves for adolescents are less likely to affect their smoking behavior.

The study has limitations that constrain the inferences that may be drawn. First, although the problem behavior measures consist of multiple-item, well-established scales that have been used in a wide range of previous studies, the measures of health-compromising behavior are less comprehensive and less well developed. In particular, unsafe behavior and dental hygiene could be assessed more comprehensively. However, it is important to emphasize that the variances of the measures in the two sets were very similar. Also, the less-than-desirable initial participation rate of the sample drawn, and the attrition over the subsequent 3 years, deserve mention

as potential limitations, even though we were able to show that the resulting bias is probably inconsequential, and that the same results were obtained in an independent replication sample that had not been reduced by longitudinal attrition.

Despite these limitations, the study has shown that relationships of cigarette smoking to problem behaviors and to health-related behaviors differ markedly in each sample, as well as within each demographic subgroup within samples. The findings illuminate the role of normative transgression in adolescent cigarette smoking. The relations of cigarette smoking with problem behaviors are far stronger and direct, while its relations with health behaviors are minimal and only indirect. Interventions to prevent or reduce adolescent smoking should focus more on psychosocial factors that have been shown to influence adolescent problem behavior.

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Chapter 18

Protection and Risk in College Student Smoking

Frances M. Costa, Richard Jessor, and Mark S. Turbin

Introduction

Despite widespread recognition of the serious public health consequences of tobacco use (Kessler, 1995), research on college students' use of cigarettes and other tobacco products appears to be sparse, and “determinants of smoking among college students are largely unknown” (Emmons, Wechsler, Dowdall, & Abraham, 1998, p. 104). This study examined the role of theoretically derived psychosocial and behavioral protective factors and risk factors in smoking involvement among college students. It also investigated whether these protective and risk factors are related to the initiation of cigarette smoking over the first 2 years of college.

The prevalence of cigarette smoking rose substantially among college students in the 1990s (Ehlinger, 2000; Johnston, O'Malley, Bachman, & Schulenberg, 2005b; Sax, 1997; Wechsler, Rigotti, Gledhill-Hoyt, & Lee, 1998), but smoking prevalence has been declining since then (Johnston et al., 2005b). The previous decade's rise in smoking prevalence among college students has been attributed to a cohort effect, reflecting the aging of earlier, heavier-smoking classes of high school seniors (Johnston, O'Malley, Bachman, & Schulenberg, 2005a; Wechsler et al., 1998). Nevertheless, although many students have already tried smoking by the time they enter college, many others begin smoking after coming to college (Ehlinger, 2000). Several recent studies report that 11%–14% of college students who had ever smoked reported smoking their first cigarette after high school (Everett et al., 1999; Naquin & Gilbert, 1996; Wechsler et al., 1998), and 28%–37% of those who had ever smoked

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began regular smoking only after high school (Naquin & Gilbert, 1996; Wechsler et al., 1998). Consequently, the college years provide a key opportunity for assessing protective and risk factors associated with the likelihood of student smoking.

Developments over the past decade in social and developmental psychology and behavioral epidemiology have contributed to a growing interest in the role of protective and risk factors in influencing young people's involvement in risk behaviors such as tobacco use, problem drinking, and the use of illicit drugs (Jessor, 1991, 1998). A theory-based protection and risk approach has proved useful in accounting for adolescents' involvement in problem behaviors and health behaviors in samples of secondary-school adolescents in the United States and abroad (Costa et al., 2005; Jessor, Turbin, & Costa, 1998; Jessor et al., 2003; Jessor, Van Den Bos, Vanderryn, Costa, & Turbin, 1995). The model is derived from Problem Behavior Theory (Jessor & Jessor, 1977), and it encompasses a comprehensive range of both distal and proximal protection and risk variables. The present study extends application of the protection and risk model to a college population and to variation in involvement in cigarette smoking.

Conceptually, protective factors decrease the likelihood of engaging in risk behaviors such as cigarette smoking. Psychosocial protective factors refer to models for positive or prosocial behavior (e.g., peer models for health-enhancing behaviors such as regular exercise), personal and social controls against norm-violative behavior (e.g., attitudinal intolerance of deviance, and peer sanctions for transgression), and an environment of support (e.g., family closeness). Behavioral protective factors refer to involvement in positive or prosocial activities, such as academic pursuits and attendance at religious services, which promote conventional attitudes and values and embed young people in more conventional social groups. Protective factors are posited not only to decrease the likelihood of negative outcomes but also to moderate (decrease) the impact of risk factors.

Risk factors, by contrast, increase the likelihood of engaging in risk behaviors such as cigarette smoking. Conceptually, psychosocial risk factors refer to models for risk behavior (e.g., peer models for smoking), opportunity for engaging in risk behavior (e.g., availability of cigarettes), and personal and social vulnerability to engaging in risk behavior (e.g., low self-esteem and peer pressure for smoking). Behavioral risk factors refer to involvement in other risk behaviors, such as problem drinking and use of illicit drugs, which constitute opportunities and social support for a risk behavior such as smoking. Risk factors are considered conceptually distinct from, or orthogonal to, protective factors, rather than the opposite end of a protection-risk continuum, and empirical evidence has supported that perspective (Jessor et al., 1995). The explanatory framework, showing the direct effects of protective and risk factors on risk behavior involvement, and the moderator effect of protection on the impact of risk, can be seen in Fig. 18.1.

Cross-sectional research suggests that college students' cigarette use is positively associated with involvement in problem behaviors, including problem drinking, use of marijuana and other illicit drugs, and having multiple sex partners (Bell, Wechsler, & Johnson, 1997; Emmons et al., 1998; Lenz, 2004; Oleckno & Blacconiere, 1990; Rigotti, Lee, & Wechsler, 2000; Rigotti, Regan, Majchrzak,

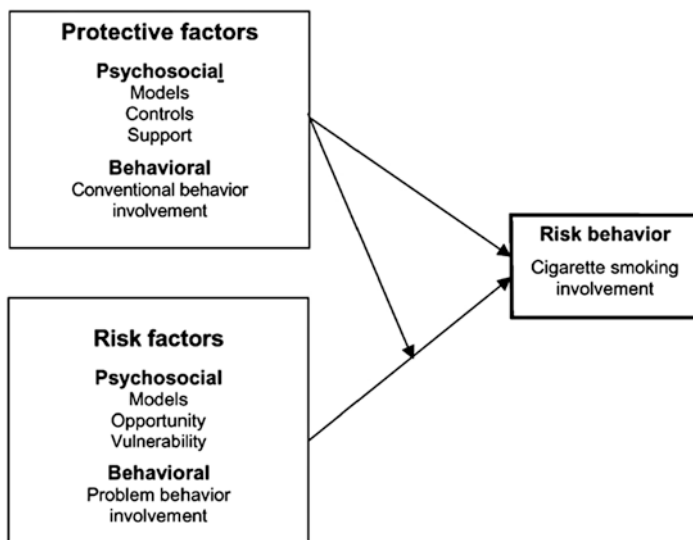


Fig. 18.1 Protection/risk explanatory framework of variation in college student cigarette smoking

Knight, & Wechsler, 2002; Schorling, Gutgesell, Klas, Smith, & Keller, 1994; Wetter et al., 2004) and negatively associated with involvement in positive or prosocial behaviors, including academic achievement (Schorling et al., 1994) and health-enhancing behaviors such as exercise, safety practices, and healthy diet (Oleckno & Blacconiere, 1990). Greater involvement with smoking also has been shown to be related to social and individual-level variables that are proximal to that behavior, including parental and peer models for smoking, stronger positive smoking outcome expectancies, and weaker negative smoking outcome expectancies (Hestick, Perrino, Rhodes, & Sydnor, 2001; Morrell, Cohen, Bacchi, & West, 2005; Stockdale, Dawson-Owens, & Sagrestano, 2005; Wetter et al., 2004). College smoking has been shown to be negatively associated with spirituality (Hestick et al., 2001) and positively associated with stress (Jones, Harel, & Levinson, 1992; Naquin & Gilbert, 1996) and depression (Lenz, 2004).

Few longitudinal studies of college smoking behavior are available. In a small sample of female students, smoking initiation was associated with escalating depression and with increases in alcohol-related problems (Saules et al., 2004). Data based on a sample of male and female students in London indicated that, although stress was associated with increased smoking among women, the impact of stress was moderated by social support (Steptoe, Wardle, Pollard, Canaan, & Davies, 1996). Among women under stress, smoking increased among those with low social support but not among those having high social support. Extent of smoking involvement at baseline was strongly related to smoking outcome 4 years later among low-level and occasional college smokers, whereas exercise importance and peer approval of smoking were unrelated to the outcome measure (Kenford et al., 2005).

Finally, predictors of change in smoking behavior over a 4-year interval were generally significant only among students who were occasional smokers at Wave 1 and not among nonsmokers or daily smokers in Wave 1 (Wetter et al., 2004).

A key contribution of the present, longitudinal study is its reliance on a theory-based model of protection and risk. The study has three goals: (a) to examine whether psychosocial and behavioral protective and risk factors can account for variation in college students' cigarette smoking, (b) to examine whether protection moderates the impact of risk on college students' smoking involvement, and (c) to explore whether protective and risk factors are associated with initiation of smoking during the early college years.

Method

Study Design, Participants, and Procedures

Questionnaire survey data were collected as part of a three-wave study of tobacco use among college students. A 32-page "Survey of Personal and Social Development at CU" (SPSD) was used to assess a broad range of psychosocial protective and risk factors, as well as behaviors. With content theoretically derived from the constructs in Problem Behavior Theory (Jessor & Jessor, 1977), the SPSD is the most recent version of a questionnaire used in a variety of previous studies (e.g., Jessor et al., 2003; Jessor et al., 1995).

In fall 2002, a total of 975 first-semester freshmen at the University of Colorado, Boulder (CU), who were at least 18 years old and had just graduated from high school (548 males and 427 females) participated in Wave 1 of the survey. The Wave 1 participants were closely representative of the entire freshman class. No significant differences were found between students in the Wave 1 sample and the other students ($N = 4,094$) in the freshman class on high school grades, admission test scores, or grades at the end of the first year of college, 2003. The gender and racial/ethnic composition of the Wave 1 sample was similar to the composition of the entire freshman class and also to the composition of undergraduate students attending many of the colleges and universities across the United States (Wechsler et al., 1998). Of the Wave 1 participants, 56% were male and 54% were in-state residents; 87% of the sample self-described as White, 5% as Hispanic/Latino, 1% as African American, 5% as Asian American, and 2% as American Indian.

The great majority of participants' parents were employed in managerial or professional-level jobs (80% of fathers and 70% of mothers). Almost 90% of parents had attended college, and more than three-quarters of parents were college graduates. A total of 71% of participants were from intact families (families with both biological parents present), and 12% were affiliated with a fraternity or sorority.

Participants were recruited by two different means: By mail and E-mail to a stratified random sample of freshmen drawn from university records; and by flyers inviting freshmen to participate, posted in each building where the survey was

administered, mainly dormitories, on the day of data collection in that building. University record data were used to randomly select samples of 480 men and 480 women from first-year freshmen enrolled in fall 2002. These students were sent a letter by mail and E-mail to describe the study; inform them that participants would receive payment for filling out the questionnaires (US\$20 at Wave 1, \$25 at Wave 2, and \$40 at Wave 3); and inform them of the various dates, times, and campus locations for the survey. Of those contacted, 282 (129 men and 153 women; 29% of the sample) completed the survey at Wave 1. An additional 693 similarly aged freshmen (419 men and 274 women) participated in Wave 1 in response to flyers posted in the dormitories. They were given the same information about the study the other participants had received, and all participants signed informed assent forms.

Students recruited by mail and by flyers were compared on their Wave 1 demographic, psychosocial, and behavioral measures in the SPSD to check for differences between the two subsamples. Females constituted 54% of the students recruited by mail and 40% of the students recruited by a flyer; in-state students were 63% of the mail subsample and 51% of the flyer subsample. About equal proportions of each subsample were non-White and affiliated with a fraternity or sorority. Participants recruited by mail were generally more conventional and less problem-behavior prone, compared with students recruited by flyer and the population of freshman students as a whole. Relative to those in the flyer subsample, students from the mail subsample reported lower levels of cigarette smoking, marijuana use, and high-volume drinking; higher grade point averages in their last semester of high school; higher scores on three of the five psychosocial protection measures; and lower scores on the four psychosocial risk measures. Despite these observed subsample mean differences, however, relationships between the predictors and criterion were not biased by subsample differences. In separate regression analyses, a dummy variable that indicated whether students were drawn from the mail subsample or from the flyer subsample was included, along with its interaction with each protective and risk factor. No significant interactions with the dummy variable were found; that is, the effects of the predictor measures did not differ between the two subsamples. The two subsamples were combined to provide a final sample that, as noted earlier, was demographically similar to the CU freshman class as a whole and provided increased variability on the key measures in the research.

Wave 2 data and Wave 3 data were collected from students still enrolled at the university in spring 2003 and spring 2004, respectively. At Wave 2, a total of 785 Wave 1 participants (81%; 86% of students still enrolled at CU) were surveyed again. At Wave 3, a total of 709 Wave 1 participants (73%; 85% of those still enrolled at CU) were surveyed again. Overall, 73% of the Wave 1 participants were retained through Wave 3. Of the 975 students in Wave 1, 630 (65%) responded to all three waves, 208 (21%) did not participate in at least one subsequent wave even though they were still enrolled at CU, and 137 (14%) withdrew from CU before Wave 2 or Wave 3.

The effect of attrition bias on the final regression models was tested with a two-stage selection model (Berk, 1983; Heckman, 1979). No evidence was found that nonrandom attrition from the sample biased the results.

Measurement of Psychosocial and Behavioral Protective Factors and Risk Factors

Three types of psychosocial protection (models protection, controls protection, and support protection) and three types of psychosocial risk (models risk, opportunity risk, and vulnerability risk) were measured. Measures were drawn from two key social contexts—family and peers—and from attributes of the individual—attitudes, beliefs, and values. They were based on the theoretical properties described earlier; a comprehensive description of their rationale as indicators of protection and risk is presented elsewhere (Costa et al., 2005; Jessor et al., 2003; Turbin, Jessor, & Costa, 2006). Two measures of behavioral protection and two measures of behavioral risk were used in the present study. A description of the measures is presented in Table 18.1.

Each psychosocial composite measure was constructed by averaging all of the items in its component subscales, standardized and equally weighted, with a mean of zero. The internal coherence of the composite measures was established by a confirmatory factor analysis, for each measure, that showed all of its component subscale items loading on a single factor. The proportion of variance accounted for by the various single factors ranged from 27% to 60%. A factor analysis of the 10 items comprising controls protection/family and controls protection/peers also showed only one common factor underlying those items, which accounted for 31% of the items' variance. In the interest of parsimony, these items were combined into a single measure of controls protection/social, which had an alpha reliability of .75, compared with alphas of .75 and .71 for the separate family and peer measures, respectively.

Correlations among the five psychosocial protective factor measures ranged from .02 to .40, and correlations among the four psychosocial risk factor measures ranged from $-.03$ to $.36$. The protection and risk measures were generally, as expected, minimally related empirically, consistent with their conceptual orthogonality. Of the 20 correlations between the psychosocial protective factor measures and the risk factor measures, 10 were negative ($-.25$ to $-.08$, except for one at $-.49$), 9 were essentially 0 ($-.05$ to $.05$), and one was positive (.11).

The correlation between the two measures of behavioral protection was .05 (not significant), possibly related to low variance in church attendance. The correlation between the two measures of behavioral risk was $.42$ ($p < .001$). As expected, the correlations between the behavioral protective factors and the behavioral risk factors were negative; they ranged from $-.25$ to $-.14$.

Measurement of Smoking Involvement

Smoking involvement was measured by self-reported quantity of daily cigarette smoking in the past month: "During the past month, how many cigarettes have you smoked *on an average day*?" Response options ranged from "none at all" to "about

Table 18.1 Description of measures

Measure with description (number of items; Cronbach α)	Example item(s)
Psychosocial protection	
1. <i>Models protection/family</i> : parental models for health-enhancing behavior (6; .72)	Do your parents [or the adults who raised you] pay attention to eating a healthy diet themselves?
2. <i>Models protection/peers</i> : friends as models for conventional behavior and for health-enhancing behavior (8; .74)	How many of your friends do volunteer work in the community? How many of your friends make sure they get enough exercise?
3. <i>Controls protection/social</i> : social regulation (10; .75)	
Parental disapproval of problem behavior	When you were in middle school and high school, how did your parents feel about kids who drank alcohol?
Friends' disapproval of problem behavior	How do most of your friends or acquaintances at CU feel about someone your age using marijuana?
Friends' control against transgression	If your friends or acquaintances at CU thought you were violating CU's policy about academic dishonesty, would they try to stop you?
4. <i>Controls protection/individual</i> : personal regulation (16; .82)	
Value on health	How important is it to you to feel like you are in good shape?
Perceived health effects of health-compromising behavior	Do you think regular use of alcohol can have an effect on the health of people your age?
Attitudinal intolerance of deviance	How wrong do you think it is to cheat on tests or homework?
Value on achievement	How important is it to you to get at least a B average this year?
5. <i>Support protection/family</i> : expressed interest and support from parents (6; .86)	When you are having problems, can you talk them over with your parents?
Psychosocial risk	
1. <i>Models risk/peers</i> : models for substance use among friends and among other students (8; .74)	How many of your friends or acquaintances at CU use marijuana?
	How many of the students at CU are heavy drinkers?
2. <i>Opportunity risk</i> : perceived availability of alcohol (1)	If you wanted some beer, wine, or liquor, how easy would it be for you to get some?
3. <i>Vulnerability risk/peers</i> : perceived peer pressure for smoking and drinking (3; .63)	Do your friends or acquaintances at CU ever encourage you to get drunk?
4. <i>Vulnerability risk/individual</i> : personal vulnerability to risk (12; .82)	
Stress	In the past month, how much stress or pressure have you felt because of your schoolwork?
Depression	In the past month, have you just felt really down about things?

(continued)

Table 18.1 (continued)

Measure with description (number of items; Cronbach α)	Example item(s)
Low self-esteem	How well do you make decisions about important things in your life?
Behavioral protection	
1. <i>Academic involvement</i> : (1)	Which of the following best describes your grade point average last semester (spring semester of your last school year, even if you were in high school)?
2. <i>Religious involvement</i> : (1)	How many times have you gone to church or religious services during the past month?
Behavioral risk	
1. <i>Problem drinking</i> : (2; .66)	
Frequency of drunkenness (1)	In the past month, how often did you actually get drunk?
Negative consequences of drinking (8)	Negative consequences of drinking in the past month, such as "You've had problems at school or with schoolwork."
2. <i>Marijuana involvement</i> (1)	In the past month, how often have you used marijuana (or hash)?

2 packs or more a day," scored 1 through 9. Never-smokers were instructed to skip this question and were assigned a score of 0.

Among current smokers, this single-item criterion measure correlated .83 with a six-item scale of dependent smoking that assessed, for example, whether it was characteristic of the participant to "light up a cigarette first thing in the morning" and to "smoke consistently and regularly throughout the day." It also correlated .68 with an item that assessed smoking involvement during senior year of high school. These data provide validity support for the smoking criterion measure.

Prevalence of Smoking

At Wave 1, when study participants were first-semester freshmen, 48% of males and 50% of females reported that they had smoked cigarettes at least "a few times." More than a quarter of the students reported that they had smoked in the past month (27% and 28% of males and females, respectively). Daily smoking was reported by 18% of male students and 16% of female students. Recent national surveys indicate that 53% of college students have "ever smoked" cigarettes, that about one-quarter (23%–29%) of students have smoked in the past 30 days, and that 14%–16% smoke every day (Johnston et al., 2005b; Rigotti et al., 2000). These descriptive findings are largely consonant with the national survey data.

Results

Analyses addressed the three research goals mentioned in the introduction: (a) to examine whether psychosocial and behavioral protective and risk factors can account for variation in college students' smoking involvement, (b) to examine whether protection moderates the impact of risk on college students' smoking involvement, and (c) to explore whether protective and risk factors are associated with initiation of smoking during the early college years.

Examining the Protection and Risk Model of College Student Smoking Involvement, and Testing for Moderation

To examine whether the protective and risk factors are indeed related to cigarette smoking, we first examined the bivariate correlation of each psychosocial and behavioral protective and risk factor with smoking involvement. As expected, each of the five psychosocial protective factor measures was inversely related to smoking involvement (see first column in Table 18.2). The strongest correlations were for the two controls measures, controls protection/social ($-.27$) and controls protection/individual ($-.25$). Three of the four psychosocial risk factors were positively correlated, as expected, with smoking involvement. Opportunity risk was uncorrelated with the criterion; it was retained in the model, however, to provide a more comprehensive assessment of risk and to allow further examination of its relationships with smoking in multivariate analyses. The two behavioral protective factors and the two behavioral risk factors also had significant correlations in the expected directions.

The cross-sectional multivariate relationships of psychosocial and behavioral protective and risk factors with smoking involvement were examined in each of the three waves of data with a hierarchical multiple regression analysis, controlling for five sociodemographic background measures (gender, in-state student, fraternity/sorority affiliation, non-White ethnicity, and socioeconomic status) at step 1 of each regression. Hierarchical multiple regression lends itself to determining proportions of variance uniquely accounted for by protective and risk factors from different domains, and to estimating interaction or moderator effects (Cohen & Cohen, 1983). In all analyses, theoretically based, directional expectations for the significance of protective and risk factors were tested with one-tailed t tests.

Wave 1 results. Sociodemographic measures, entered at step 1 of the hierarchical regression, accounted for 3% ($p < .001$; Table 18.2) of the variance in smoking involvement. The five composite psychosocial protective factors, entered at step 2, accounted for an increment of 9% of variance ($p < .001$). The four psychosocial risk factors, entered at step 3, accounted uniquely for an additional increment of 6% of variance ($p < .001$). In this regression model, before the behavioral predictor measures were included, there were two significant psychosocial protective factors: Controls protection/social, $t = -1.7$, $p < .05$, and controls protection/individual,

Table 18.2 Hierarchical regression of cigarette smoking involvement on psychosocial and behavioral protective factors and risk factors: final model, Wave 1 (2002)

Step	Measures entered	<i>r</i>	<i>b</i> ^a , step 4	<i>b</i> ^a , final step	ΔR^2	<i>R</i> ²
1	<i>Sociodemographic background</i>				0.03	0.03
	Gender	.01	.05	.13*		
	In-state student	-.16***	-.13	.01		
	Fraternity/sorority	-.04	-.29	-.31*		
	Non-white	-.03	-.17	-.11		
	Socioeconomic status	.05	.06	.07		
2	<i>Psychosocial protective factors</i>				.09 ^b	0.12
	Models protection/family	-.04*	.02	-.01		
	Models protection/peers	-.12***	.03	-.02		
	Controls protection/social	-.27***	-.25*	.06		
	Controls protection/individual	-.25***	-.70***	-.33***		
	Support protection/family	-.11***	-.05	-.04		
3	<i>Psychosocial risk factors</i>				.06	.19
	Models risk/peers	.35***	.99***	.37**		
	Opportunity risk	-.01	-.10	-.10		
	Vulnerability risk/peers	.06*	-.25	-.23		
	Vulnerability risk/individual	.10**	.24*	.25**		
4	<i>Psychosocial protection × psychosocial risk interaction^c</i>				.01	.20
	Support protection/family × vulnerability risk/individual	–	.40***	-.32***		
5	<i>Behavioral protective factors</i>				.01 [†]	.20
	Grade point average	-.19***		-.13*		
	Church attendance	-.12***		.03		
6	<i>Behavioral risk factors</i>				.12	.33
	Problem drinking	.40***		.46***		
	Marijuana use	.48***		.63***		

Note: *N* = 880 with complete data

^aUnstandardized regression weights; standardized weights are inappropriate with interaction terms (Aiken & West, 1991, pp. 40–47). Significance of protective and risk factors was tested with one-tailed *t* tests

^bVariance accounted for *uniquely* by psychosocial protective factors = .04***

^cOnly interactions that were significant at the step at which they were tested are included
All ΔR^2 and *R*² values are significant at *p* < .001 except for one, as noted: [†]*p* < .06; **p* < .05; ***p* < .01; ****p* < .001

t = -5.0, *p* < .001. Two psychosocial risk factors were significant: Models risk/peers, *t* = 7.3, *p* < .001, and vulnerability risk/individual, *t* = 2.1, *p* < .01. (Given that some variance is shared between protective and risk factors, psychosocial protective factors were entered *after* the psychosocial risk factors in a supplementary analysis, and they accounted uniquely for 4% of variance, *p* < .001.)

To examine whether protective factors were moderators of the effects of risk factors, and to determine whether those moderator effects provided a significant additional increment in variance accounted for, we tested all 20 of the interactions of 5 psychosocial protective factors as moderators of 4 psychosocial risk factors by entering them into the hierarchical regression model at step 4. One of those interactions was significant ($t = -3.5, p < .001$): Support protection/family moderated the effect of vulnerability risk/individual; that is, individual vulnerability was less related to smoking for those students who reported greater support protection/family.

At step 5 of the regression, the two behavioral protective factor measures, grade point average from the previous semester and church attendance, were entered and accounted for another 0.5% of variance ($p < .057$). At step 6, the two behavioral risk factor measures, problem drinking and marijuana use, were entered and accounted for an additional 12% of variance ($p < .001$). At step 7, we tested for interaction effects of the two behavioral protective factors, grade point average and church attendance, as moderators of the two behavioral risk factors, problem drinking and marijuana use. No significant moderator effect was found at this step. The total R^2 for the full model, .33, indicates that about one-third of the variance in college student smoking was accounted for by the protection/risk theoretical model.

In this final model, one of the psychosocial protective factors that had been significant before the behavioral protective and risk factors were entered (see column 2 of Table 18.2), controls protection/individual, remained significant. The two psychosocial risk factors that had been significant before the behavioral protective and risk factors were entered, models risk/peers and vulnerability risk/individual, remained significant in the final model. The moderator effect of support protection/family also retained significance in the final model. One behavioral protective factor, grade point average, and the two behavioral risk factors, problem drinking and marijuana use, also were significant. (Vulnerability risk/peers had a large negative regression weight; however, its positive bivariate correlation indicated that it was acting as a suppressor variable.) The final regression model was tested for gender differences by entering the cross products of gender with all of the protective and risk factors and with their significant interactions at a final step of the hierarchical regression. No significant gender interaction was found, indicating that the final regression model did not differ by gender.

The psychosocial protective and risk factors, together with their interaction term, accounted for 16% of the variance in smoking involvement with sociodemographic measures controlled, as shown in Table 18.2. The behavioral protective and risk factors, then, accounted uniquely for 12.5% of variance, beyond what was already accounted for by the psychosocial and sociodemographic measures. Given that some variance is shared between the psychosocial and behavioral measures, the psychosocial measures were entered after the behavioral measures in a supplemental analysis; they accounted uniquely for 3% of variance (compared with 12.5% for the behavioral measures). Thus behavioral protection and risk, as measured, accounted uniquely for a larger proportion of variance in smoking involvement, but psychosocial protection and risk accounted for a significant increment in variance that was not accounted for by the behavioral measures.

Replication in Waves 2 and 3. The Wave 1 analysis was replicated with the Wave 2 and Wave 3 data, with similar results (tables available from the authors). In Wave 2, the protective and risk factors accounted for 36% of the variance in smoking involvement. Grade point average was a significant protective factor; problem drinking and marijuana use were significant risk factors. For the women only, models protection/peers and vulnerability risk/individual also were significant, and support protection/family moderated the effects of models risk/peers and vulnerability risk/individual. Behavioral protective and risk factors accounted uniquely for 13% of variance ($p < .001$), and psychosocial protective and risk factors accounted uniquely for 4% ($p < .01$). In Wave 3, the protective and risk factors accounted for 27% of the variance. Controls protection/individual was a significant protective factor, and no significant psychosocial risk factors were found. Behavioral protective and risk factors accounted uniquely for 13% of variance ($p < .001$; grade point average, problem drinking, and marijuana use were significant), and psychosocial protective and risk factors accounted uniquely for 2% ($p < .05$). No significant gender interaction was found in Wave 3.

Results were generally consistent across the three waves of data and for both genders. A model of psychosocial and behavioral protective and risk factors has provided a significant and substantial account of college students' smoking involvement; the effects of behavioral protection and risk were larger than the effects of psychosocial protection and risk, but both effects were substantial and significant; and some support was observed for a moderating effect of protection on the impact of risk. Since half the participants had never smoked at Wave 1, and nearly three-fourths of the sample reported no smoking in the past month, we also examined the relationships reported above among Wave 1 current smokers only. As would be expected, the variance of the smoking involvement measure was reduced (2.1 vs. 4.1), and the correlations with the predictors, especially with problem drinking and marijuana use, were somewhat smaller than in the entire sample. Hierarchical regression analyses were run for each wave of data, excluding the nonsmokers. Results were generally similar but somewhat weaker.

Analyzing the Component Scales of the Composite Measures of Protection and Risk

Hierarchical regression analysis was used to assess the importance of the specific components of the composite psychosocial protective and risk factors for college smoking (Table 18.1). In this analysis (table available from the authors), we “unpacked” the significant composite psychosocial protective factor measure (controls protection/individual) into its four component psychosocial protection scales—value on health, perceived health effects of health-compromising behaviors, intolerance of deviance, and value on achievement—and entered those components into the regression model. The significant composite psychosocial risk factor

(vulnerability risk/individual) was unpacked into its three component risk measures—stress, depression, and low self-esteem—which were entered in the regression model. Models risk/peers, another significant psychosocial risk factor in the previous analyses, was already a single scale, so it was included unchanged in this model, as was support protection/family, which had a significant moderating effect on vulnerability risk/individual. The single-scale measures of grade point average, problem drinking, and marijuana use were included unchanged. The consistently nonsignificant protective and risk factors were omitted. Thus, 12 component measures of the previously used composite scales were entered in the unpacked regression equation.

In this unpacked regression model, value on health was a significant psychosocial protective factor, and stress and models risk/peers were significant psychosocial risk factors. Grade point average and the two behavioral risk factors remained significant predictors, as before. In this analysis, we tested all 20 psychosocial moderator effects. Three of these interaction terms had significant (one-tail $p < .05$) coefficients. When value on health was high, the effect of models risk/peers was attenuated; perceived health effects moderated the effect of depression; and value on achievement moderated the effect of stress. The moderator effect of value on health retained significance in the final model, when the behavioral protection and risk factors were included.

Total R^2 for this unpacked and trimmed model was .32, about the same as in the analysis that used the composite protective and risk factors, and the relative proportions of variance uniquely accounted for, respectively, by psychosocial protection and psychosocial risk, and by the psychosocial and behavioral factors, also were similar to those in the previous analyses. A test for gender interactions showed that value on health was not a significant protective factor for the women.

Exploring Whether Antecedent Protective and Risk Factors Predict Smoking Initiation: A Developmental Analysis

The examination of change in smoking in the present study was limited by the relatively low variation in smoking involvement and by the substantial stability of smoking behavior over time. The means of the smoking involvement measures at Wave 1 and Wave 3 did not differ significantly, and the two measures were correlated at .72. The cross-time correlations for most of the psychosocial and behavioral protective and risk factors showed similar stability between Waves 1 and 3. Therefore, not a great amount of change in smoking involvement had to be accounted for, nor did the most important predictor measures change by a great deal, which restricted the degree to which relationships between them might be found. Despite these restrictions, a fixed-effects maximum-likelihood regression analysis that examined the relationship of change in protection and risk to change in smoking involvement (table available from the authors) was carried out. Findings, though

Table 18.3 Group means on standardized scores of Wave 1 psychosocial and behavioral protection and risk measures: Two smoking onset groups, Wave 1 to Wave 3

Wave 1 measure	No onset of smoking (<i>n</i> = 297)	Onset of smoking (<i>n</i> = 83)	<i>t</i>
<i>Psychosocial protective factors</i>			
Models protection/family	.01	-.03	0.48
Models protection/peers	.08	.07	0.13
Controls protection/social	.19	.06	1.77*
Controls protection/individual	.13	.02	1.88*
Support protection/family	.09	.07	0.26
<i>Psychosocial risk factors</i>			
Models risk/peers	-.21	-.04	2.34**
Opportunity risk	-.03	.01	-0.15
Vulnerability risk/peers	-.10	.18	-2.86**
Vulnerability risk/individual	-.06	.03	-1.23
<i>Behavioral protective factors</i>			
Grade point average	8.79	8.74	0.32
Church attendance	2.10	1.52	3.49***
<i>Behavioral risk factors</i>			
Problem drinking	-0.39	-0.10	-3.44***
Marijuana use	1.31	2.08	-2.89**

Note: * $p < .05$; ** $p < .01$; *** $p < .001$; one-tailed *t* tests

limited, were theoretically consistent; they showed that, among ever-smokers, decreases over time in models risk/peers and marijuana use were related to a decrease in smoking involvement over time.

In contrast to the relative stability of smoking involvement, a sizeable proportion (22%) of Wave 1 students who had never smoked cigarettes began smoking by Wave 3. Exploratory analyses examined whether antecedent protective and risk factors were associated with initiation of smoking in the first 2 years of college. Mean comparisons from *t* test analyses were used to examine the predictiveness of Wave 1 protection and risk measures for subsequent initiation of smoking among Wave 1 never-smokers. The two groups compared were Wave 1 never-smokers who reported smoking onset by Wave 3 (*n* = 83) and those who did not (*n* = 297). Results are shown in Table 18.3.

Findings agree with theoretical expectations. Lower psychosocial protection, higher psychosocial risk, lower involvement in conventional behavior (e.g., church attendance), and higher involvement in problem behaviors at Wave 1 were significantly more characteristic of Wave 1 never-smokers who started smoking by Wave 3 than of Wave 1 never-smokers who did not. Significant mean differences were found for controls protection/individual, controls protection/social, models risk/peers, vulnerability risk/peers, frequency of church attendance, problem drinking, and marijuana use.

A two-way (smoker/nonsmoker by gender) MANOVA was carried out to assess the multivariate significance of these significant protection and risk measures and to determine whether the explanatory model differed for men and women. Hotelling's T^2 was .08, $p < .05$, indicating that the protection and risk measures had significant effects in the multivariate model. The model did not differ for males and females. Although limited by the relatively small number of students who initiated smoking in the early college years, the findings about change nevertheless support the protection/risk model.

Discussion

The protection/risk theoretical model accounted for substantial variation in college students' cigarette smoking in the present study. Psychosocial and behavioral protective and risk factors accounted for significant variation in smoking involvement, and protection moderated the impact of risk. Findings were consistent, for the most part, for both genders and across three separate waves of data. Further, the explanatory model provided a significant account of the initiation of smoking in the early college years.

Psychosocial predictors of smoking involvement in the cross-sectional multivariate models included two aspects of controls—social and individual—and two types of risk—models risk/peers and vulnerability risk/individual. In addition, support protection/family (expressed interest and support from parents) moderated vulnerability risk/individual (stress, depression, and low self-esteem); that is, when support protection was high, the influence of vulnerability risk was attenuated. Behavioral protective and risk factors were consistent and significant predictors of college smoking involvement: Greater academic achievement, a behavioral protective factor, was associated with lower smoking involvement; and higher involvement in problem drinking and marijuana use, both behavioral risk factors, was associated with greater smoking involvement.

The salient role of controls protection is noteworthy, especially when considering the component subscales of which it is composed. Two of those at the individual level—value on health, and perceived health effects of health-compromising behavior—implicate commitment to and concern about health and fitness. And one of the subscales, value on achievement, implicates the importance of doing well academically in college; the latter gains additional importance from the protective role played by grade point average—actual academic achievement behavior. With respect to controls protection at the social contextual level, the composite that included both peer controls against transgression and parental and peer disapproval of problem behavior emerged as important. The role of support protection/family as a moderator of risk raises the possibility that support protection from other social contexts relevant to college students' lives (e.g., the peer group or the larger university community) also may be protective against smoking in this population. These other sources of support need attention in future research.

Two of the key psychosocial protective and risk factors—controls protection/individual (value on health, perceived health effects of health-compromising behavior, attitudinal intolerance of deviance, and value on academic achievement) and vulnerability risk/individual (stress, depression, and low self-esteem)—are distal from smoking; that is, they have no obvious direct relationship to smoking or, indeed, to substance use of any sort. Much of the prior research that has examined psychosocial correlates and antecedents of adolescent cigarette smoking has focused on correlates or predictors that are very proximal to smoking, such as attitudes and expectancies about smoking, family models for smoking, and peer models for smoking (Perry & Stauffer, 1996; Tyas & Pederson, 1998). The present findings indicate that measures that are conceptually distal but still theoretically relevant also exert an influence on college student smoking, and such distal variables warrant greater consideration in future research.

Psychosocial protection and psychosocial risk had essentially equivalent influences on college students' cigarette smoking involvement in terms of their direct effects. The measures of protection accounted for 4% unique variance, and the measures of risk accounted for 6% unique variance in the Wave 1 hierarchical regression analyses. This finding suggests that intervention efforts to discourage smoking among college students should include efforts not only to diminish psychosocial risk factors but also to enhance psychosocial protective factors.

The key composite psychosocial protective and risk factors in the present study are consistent with findings from other research. The importance of controls protection and models risk in accounting for variation in adolescent risk behaviors has been demonstrated in other studies (Barber & Olsen, 1997; Costa et al., 2005; Greenberger, Chen, Beam, Whang, & Dong, 2000; Herman, Dornbusch, Herron, & Herting, 1997; Jessor et al., 1995, 2003). Developmental theory on adolescent socialization (Barber, 1997; Barber & Olsen, 1997; Jessor & Jessor, 1977) has long emphasized the importance of regulation and modeling in accounting for participation in risk behaviors.

With respect to behavioral protection and risk, the findings are also congruent with those from other research (Bell et al., 1997; Emmons et al., 1998; Lenz, 2004; Oleckno & Blacconiere, 1990; Rigotti et al., 2000; Schorling et al., 1994; Wetter et al., 2004) and consonant with the well-established covariation that exists among risk behaviors (Donovan & Jessor, 1985; Elliott, 1993).

The behavior measures, particularly the behavioral risk factors, accounted for a substantially greater proportion of unique variance in college students' smoking involvement than did the psychosocial measures—12.5% vs. 3%, respectively, in the Wave 1 regression analyses. In light of the strong and consistent covariation of substance use behaviors, this finding is not surprising. Despite the relatively powerful predictive role played by the behavioral risk factors, however, the generally more distal psychosocial protective and risk factors accounted for a significant increment in unique variance.

When the composite measures of the psychosocial constructs were unpacked, one component of the controls protection/individual composite—personal value on health—and one component of the vulnerability risk/individual composite—

stress—emerged as key psychosocial predictors. Other studies have identified stress as contributing to greater smoking involvement among college students (Jones et al., 1992; Naquin & Gilbert, 1996; Steptoe et al., 1996). The importance of these particular variables should not be overemphasized, however, because of the covariation that exists among protective factors and among risk factors. Indeed, at the bivariate level, the similar magnitude of their correlations with the smoking measure suggests that the other protective and risk factor components should not be disregarded in accounting for college student smoking.

The theoretical model also showed modest success in accounting for the likelihood of smoking initiation by college students in the early college years. Compared with nonsmokers who did not initiate smoking by Wave 3, those who became smokers were characterized, at Wave 1, by lower scores on several protective factors and higher scores on several risk factors—specifically, lower controls protection/social and controls protection/individual, higher models risk/peers and vulnerability risk/peers, lower frequency of attendance at religious services, and higher levels of problem drinking and marijuana use.

According to the present descriptive findings, no differences between male and female college students were observed in our sample with respect to either smoking prevalence or intensity of smoking involvement. More important, however, was the theoretical finding that the protection/risk model applied almost equally well to both genders. The relationships of the psychosocial and behavioral protective and risk factors with variation in smoking were similar for the college men and the college women in both the cross-sectional and the longitudinal analyses. At the level of theory, then, the model provided a significant account for men's and women's smoking.

The salience of controls protection in the present findings has implications for intervention efforts. Two individual-level regulatory domains—orientation to health and to academics—emerged as particularly important, and both are amenable to targeting by college-level interventions to prevent or reduce smoking. Ramsay & Hoffmann (2004), for example, reported the success of a college smoking cessation program that included exercise, nutrition, and stress management interventions. Equally salient was the social context risk factor, peer models for substance use in college. The importance of this psychosocial risk measure, taken together with the influence shown by the two behavioral risk measures, problem drinking and marijuana use, suggests the need for smoking prevention programs that target the larger pattern of peer substance use behavior, rather than each of the behaviors separately.

Among the limitations of the present research, perhaps the most important, from a theoretical perspective, was the limited number of social contexts of college student life assessed. Broader contextual assessment of protective and risk constructs needs to be undertaken in future research (e.g., models risk assessed in the family and media as well as in the peer group).

Another limitation is that the sample was drawn from a single university. Although levels of smoking were shown to be consonant with data from other universities (Johnston et al., 2005b; Moran, Wechsler, & Rigotti, 2004; Rigotti et al.,

2000; Wetter et al., 2004; Wortley, Husten, Trosclair, Chrismon, & Pederson, 2003), generalization of our findings to other universities is not warranted. Theory testing, however, can appropriately be carried out in a single setting. Third, although the sample was large and similar on demographic measures to the entire freshman class, generalization to the entire freshman class would not be warranted since the participants did not constitute a random sample. Sample attrition between Waves 1 and 3 (35%) is a fourth limitation. A fifth limitation is that the measures of cigarette smoking relied on self-reports; however, considerable evidence supports the validity of self-reports of risk behaviors (Freier, Bell, & Ellikson, 1991; Harrison, 1997; Huizinga & Elliott, 1986; Johnston & O'Malley, 1997). Sixth, although alpha reliabilities, at the scale level, were generally good, measurement of one psychosocial risk factor (opportunity risk) relied on a single item. Although three behavior measures (grade point average, church attendance, and marijuana use) also relied on single items, the validity of these measures has been demonstrated in numerous studies (e.g., Costa, Jessor, Fortenberry, & Donovan, 1996; Donovan & Jessor, 1985; Donovan, Jessor, & Costa, 1988). Finally, the Wave 1-Wave 3 longitudinal interval—14 months—was perhaps too brief to exploit the full possibilities for assessing change in smoking involvement.

The present study has shown that psychosocial and behavioral protective factors and risk factors play a significant role in cigarette smoking involvement and initiation in this sample of college students. A challenge for future research on college student smoking is to assess the conceptual framework more comprehensively, to engage more representative samples of college students, and to apply the model to longer segments of the developmental trajectory: before college, throughout college, and beyond the college years.

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Part V
Health-Related Problem Behaviors:
Delinquent Behavior

Chapter 19

Religiosity: A Personal Control Against Delinquency

John Rohrbaugh and Richard Jessor

The importance of religiosity as a cognitive dimension of personality has gained new emphasis from recent developments among youth in American society. The interest in the teachings of Eastern religions, the growth of the idea of personal religion and the practice of meditation, the quest after mystical experience, and the participation in alternative forms of organized religious activity, such as the Jesus Movement and the Divine Light Mission, have been widely noted. While these particular developments suggest an attenuation of conventional and institutionalized types of religious involvement and a search for something to replace them, they raise a more general question about the role played by religiosity in the lives and behavior of young people.

It is obvious that an orientation toward religion can serve multiple and diverse functions for an individual, from providing meaning to one's life, to yielding a sense of personal fulfillment, to securing access to social contacts and interpersonal relationships, to offering a set of standards against which to judge and guide one's actions. Our present concern was with one such aspect only, one that would be relevant to conventional as well as non-conventional religious involvement, namely, the function of religiosity as a personal (or personality) control against transgression, social problem behavior, or deviance. The aim of this paper is to present evidence of the relationship of religiosity to other personality variables, to attributes of the social environment, and to measures of problem behavior or deviance that will enable an appraisal of the role of religiosity as a personal control among youth.

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The complexity of the concept of religiosity has been reflected in the debates in the literature about its semantic reference and about its uni- versus multi-dimensionality. With regard to the former, religiosity has been defined in terms as disparate as the feeling of personal inspiration and as the frequency of attendance at religious services. The early scholars in the social psychology of religion (Starbuck, 1899; James, 1902; Durkheim, 1915; Leuba, 1929) were in agreement that the key element in religiosity was a personal belief in a transcendent reality such as a God, a world spirit, or an unseen order. More recent scholars have urged a multidimensional view of religiosity, one which acknowledges the centrality of religious beliefs or ideology but which encompasses other aspects as well—the consequential influence of religion on one’s daily, secular activities, the affective experience of involvement with religion, and the actual participation in religious ritual such as prayer or attendance at services (Glock & Stark, 1965).

Our own approach was to conceptualize religiosity as an attribute of personality referring to cognitive orientations about a transcendent reality and about one’s relation to it, orientations which are directly implicated by the impact they have on daily, secular life, and by participation in ritual practices. This conceptualization enables a linkage between religiosity and control against deviance which can be mediated in several different but converging ways. First, participation in religious rituals and observances, by embedding an individual in conventional activities and in an organized sanctioning network (see Jessor et al., 1968), can provide him with social controls which, in turn, can reinforce personal controls. Second, involvement with religious teachings can socialize a concern for and an awareness of moral issues and of standards for appropriate conduct. Third, religious ideology about the nature of the deity can have important implications for control—the God of wrath as a source of anticipated punishment for transgression, for example, and the God of love as a beneficent ideal to be emulated. Finally, emotional religious experience can generate a devoutness or reverence resulting in an obedience orientation or a “harmonious adjustment” (James, 1902) to the world. Whatever the operative mediation, all should serve to link greater religiosity with lesser engagement in deviance.

The general hypothesis that religiosity functions as a personal control against deviance has received some empirical support from our own previous work and the work of others, but the previous research has been vulnerable to one or both of two major criticisms—either the measure of religiosity was less than adequate in its coverage of the conceptual domain, e.g., relying on single items, such as church attendance frequency, or on the nature of religious beliefs alone (Lindenfeld, 1960; Blum et al., 1969); or else the variables to which religiosity was related were less than comprehensive, few in number, and not encompassing a sufficiently large network of personality, environmental, and behavioral variables to enable a compelling appraisal. In the present effort, we have sought to meet both of these criticisms. Despite the limitations of previous work, however, it should be noted that religiosity has been shown to be associated in youth with less sexual permissiveness (Ruppel,

1969; Cardwell, 1969), with less endorsement of militant activism (Eckhardt, 1970; Connors et al., 1968), and with less involvement with marijuana (Blum et al., 1969; Jessor et al., 1973).

The opportunity for a more systematic and comprehensive examination of religiosity was provided by an ongoing, longitudinal study of the socialization of problem behavior in high school and college youth, directed by the second author. Data in that study were collected on an annual basis and derive from a large number of measures of three major social-psychological systems: personality, the perceived social environment, and behavior. The personality system is constituted of three structures of variables: a motivational-instigation structure consisting of values and expectations of goal attainment in areas of affection, achievement, and independence; a personal belief structure consisting of general orientations and beliefs only indirectly linked to problem behavior, beliefs such as self-esteem, internal-external control, and social criticism; and a personal control structure consisting of attitudes and beliefs quite directly regulatory of engagement in problem behavior, e.g., attitudes toward the acceptability of various transgressions, beliefs about the appropriateness of premarital sexual relations, and perceptions of the negative consequences of drug use. It is to this personal control structure of the personality system that religiosity has been conceptually allocated in our framework.

The perceived environment system is constituted of a distal structure and a proximal structure: the former consists of social environment variables conceptually remote from deviance, such as the compatibility of parents and peers in the expectations they have for the subject, and the relative influence of parents versus peers on the views of the subject; the latter consists of variables conceptually proximal to deviance or to specific deviant behaviors, variables such as perceived peer controls against transgression, and perceived models and social support for activism or drug use or sexual intercourse. The behavior system is constituted of measures of engagement in a variety of problem behaviors ranging from general deviance (e.g., lying, stealing, aggression), to marijuana use, premarital sexual intercourse experience, and activism participation. This social psychology of problem behavior was elaborated initially and most fully in Jessor, Graves, Hanson, and Jessor (1968); more recent work employing this framework is reported in Jessor, Collins, and Jessor (1972); Jessor, R., and Jessor, S. L. (1973a, 1973b, 1975); Jessor, S. L., and Jessor, R. (1974, 1975); Jessor, Jessor, and Finney (1973); and Weigel and Jessor (1973). The basic concepts of the approach have their origin in Rotter's social learning theory of personality (Rotter, 1954; Rotter, Chance, & Phares, 1972).

Along with the regularly-collected measures of the variables mentioned, the ongoing study included a measure of religiosity but one that had some of the limitations noted earlier. For purposes of the present research, a special effort was made to devise and validate a more adequate measure of religiosity and then to examine its relations with the network of deviance-prone personality and environment measures and with the measures of deviant behavior. The conceptualization of

religiosity as a personal control logically implies the hypothesis that it will be negatively associated with measures of deviance proneness and of deviant behavior and that it will be positively associated with measures of conventionality and conformity.

Method

Participants

The participants in the current research were involved in two separate but parallel longitudinal studies, one of high school students and one of college students in a large state university, both studies being carried out in a small city in the Rocky Mountain region. For the high school study, a random sample of 2,220 students, stratified by sex and grade level, was initially designated from the enrollment of three junior and three senior high schools. The entire sample was contacted individually by letter and asked to participate for the next four years or until graduation in a study of personality and social development in youth. Parents of each designated student were also contacted by letter and asked for signed permission for their child's participation in the research. Of the original sample, an initial Year I (April, 1969) cohort of 949 students participated.¹ Of those who had not graduated in the interim, 83 percent ($N = 475$; 208 males and 267 females) of the original participants were retained through Year IV (April, 1972). The cross-sectional data reported in this paper were drawn from the Year IV testing.

The college study, begun a year after the initiation of the high school study, involved a random sample of 497 freshman students, stratified by sex, drawn from the registration list of the freshman class in the College of Arts and Sciences. Of the designated sample, 276 freshmen participated in the Year I (April, 1970) data collection. Of this initial cohort of students, 80 percent ($N = 221$; 105 males and 116 females) of the participants were retained through Year III (April, 1972). The cross-sectional data reported for the college study were drawn from the Year III testing; this is the same year, 1972, used for the high school cross-sectional data, and therefore comparisons between the two studies refer to the same point in historical time. In both studies, it should be noted, attrition was quite modest once the initial cohorts were established.

¹Although persistent follow-up efforts were made to gain the cooperation of the 2,220 respondents initially designated, the fact that parental permission was a necessity and the fact that participation required remaining after school for an hour and a half on a spring afternoon both contributed to the lower than desirable initial percentage of participation. The fact that only 42 percent of the originally-designated random sample of students ultimately participated in the research means that findings on the starting cohort cannot be generalized with confidence as descriptive of the school population. While this limitation is unfortunate, it does not preclude the testing of the research hypothesis.

Procedure

Data were collected by means of an elaborate questionnaire, approximately 50 pages in length, requiring about an hour and a half to complete. The questionnaire consisted largely of psychometrically-developed scales or indices assessing personality, environmental, behavioral, and demographic variables, including many concepts in addition to those discussed in this paper. The questionnaire had been pretested with samples of students not included in the final studies, and revisions in scale content had been made on the basis of the pretest findings.

Questionnaires were administered in small group sessions outside of class hours, and each participant was paid a token two dollars for his assistance each year. Instructions given at each session emphasized the importance of frank and honest answers and stressed that all responses would be held in strictest confidence. Participants signed their names to the final page of the questionnaires in order to permit annual, longitudinal follow-up, but all name sheets were removed from the questionnaires at completion and stored in a safe deposit vault of a bank, so that all data were subsequently analyzed by code number only. Students' written reactions to the questionnaire were solicited each year, and their comments indicated that they found the experience generally interesting and personally worthwhile.

Development of Measures

The measure of religiosity. The primary objective in constructing the present measure of religiosity was to cover systematically the various aspects of the domain of religious involvement. Our previous measure, while having adequate psychometric properties and validity, was deficient in that regard. In addition, despite the evidence that even single-item scales of religiosity can demonstrate useful validity (Gorsuch & McFarland, 1972), it was felt that a longer scale would yield greater reliability and be amenable to less ambiguous interpretation. Therefore, each of the four dimensions of religiosity conceptualized initially by Glock (1959)—ritual, consequential, ideological, and experiential—were operationalized in two—item subscales, yielding an eight-item, composite religiosity measure. This is the measure used in both the high school and college questionnaires in the 1972 testing from which the present data were drawn.

In constructing all of the items, attention was given to wording that would minimize reference to the doctrines of any specific religion² and would insure that actual

²No participant in the high school study reported religious affiliation other than with Judeo-Christian denominations. In the college study, somewhat less than 2 percent of the sample indicated non-Judeo-Christian affiliation (i.e., Hinduism and Buddhism). Since these latter respondents all scored more than one standard deviation higher on the composite religiosity scale than the mean response of their peers, their data provided some indication that the items are not limited in application only to traditional western religions.

affiliation with a religious institution was not necessary in order to attain a high religiosity score. Some of the items were reverse-worded, the order of item presentation was scrambled rather than systematic, and variation in question format was utilized so that agreement response set could be controlled and attention to item content could be maintained. In order to maximize discrimination between the dimensions, the two items which operationalized ideology were the only ones to include a stimulus word such as “believe”; the experiential items were the only ones that assessed the reported feeling of actual emotions; only the ritual items were directly behaviorally oriented; and only the consequential items focused on secular actions as influenced by religious commitment. The eight items and the dimensions they operationalize are:

Ritual religiosity

How often have you attended religious services during the past year?—times.

Which of the following best describes your practice of prayer or religious meditation? a) Prayer is a regular part of my daily life. b) I usually pray in times of stress or need but rarely at any other time. c) I pray only during formal ceremonies. d) Prayer has little importance in my life. e) I never pray.

Consequential religiosity

When you have a serious personal problem how often do you take religious advice or teaching into consideration? a) Almost always. b) Usually. c) Sometimes. d) Rarely. e) Never.

How much of an influence would you say that religion has on the way that you choose to act and the way that you choose to spend your time each day? a) No influence. b) A small influence. c) Some influence. d) A fair amount of influence. e) A large influence.

Ideological religiosity

Which of the following statements comes closest to your belief about God? a) I am sure that God really exists and that He is active in my life. b) Although I sometimes question His existence, I do believe in God and believe He knows of me as a person. c) I don't know if there is a personal God, but I do believe in a higher power of some kind. d) I don't know if there is a personal God or a higher power of some kind, and I don't know if I will ever know. e) I don't believe in a personal God or in a higher power.

Which of the following statements comes closest to your belief about life after death (immortality)? a) I believe in a personal life after death, a soul existing as a specific individual. b) I believe in a soul existing after death as a part of a universal spirit. c) I believe in a life after death of some kind, but I really don't know what it would be like. d) I don't know whether there is any kind of life after death, and I don't know if I will ever know. e) I don't believe in any kind of life after death.

Experiential religiosity

During the past year, how often have you experienced a feeling of religious reverence or devotion? a) Almost daily. b) Frequently. c) Sometimes. d) Rarely. e) Never.

Do you agree with the following statement? "Religion gives me a great amount of comfort and security in life." a) Strongly disagree. b) Disagree. c) Uncertain. d) Agree. e) Strongly agree.

Each item was scored from 0 to 4 (attendance at religious services was categorized according to meaningful breaks in the response distribution) yielding four subscales, each ranging from 0 to 8, and a composite religiosity measure with a score range from 0 to 32, higher scores indicating greater religiosity. Psychometric properties of the subscales and of the composite measure were similar in the high school and college and very satisfactory. Coefficient alphas (Cronbach, 1951) were over .90 indicating high internal reliability; Homogeneity Ratios (Scott, 1960) averaged .55 indicating item homogeneity to the point of some unnecessary redundancy; and response variance was broad, with an almost eight-point standard deviation on the composite scale.

Preliminary validation of the religiosity measure. Four different approaches were used to establish validity of the religiosity measure prior to its use in testing the main hypothesis. Known-groups validity was examined in relation to sex and age differences in religiosity scores, since an extensive review of the literature (Moberg, 1971) concluded that females were more religious than males and high school-age students were more religious than those of college-age. On the composite measure, both high school females (mean = 17.2) and high school males (mean = 15.2) scored significantly higher than their same-sex counterparts in college (college female mean = 12.7, college male mean = 12.5). Within the high school, the females were significantly higher than the males in religiosity, but there was no sex difference in composite religiosity at the college level. With respect to the four subscales, ritual religiosity showed the greatest age-related difference while consequential religiosity showed the least age or sex difference. Overall, these findings provide a degree of validity for the religiosity measure.

External validity was examined by prediction, from a multiple regression using the four subscales, to a 10-point, linear rating scale measure of self-reported religious commitment: "If you were to mark yourself on a scale of 0 to 10, how religious would you mark yourself?" The multiple R s were .78, .81, .83, and .84 for college males, college females, high school males, and high school females, respectively. It is of interest to note that, according to the beta weights, the consequential subscale was most predictive and the ritual and ideological subscales were least predictive of the self-rating of religious commitment. Although this external criterion is not totally unrelated to the items in the subscales, the multiple R s are very high and do contribute some external validity support.

Internal validity was examined by intercorrelating the four religiosity subscales in each of the four student groups. The average correlation in the four resulting matrices was .69, the Pearson r s between scales approximating and sometimes exceeding the reliabilities of the separate subscales. These data strongly support the unidimensionality of religiosity and, therefore, the validity of the composite scale.

Finally, an approach to discriminant validity was made by examining the relations of the four subscales to two separate measures of the perceived religious environment, a subscale of models for religious involvement among friends and

relatives, and a subscale of social support from peers and adults for religious involvement. The measure of perceived models, while significantly related to the religiosity subscales, correlated with them much more weakly (average $r = .42$) than they correlated among themselves, and the same was even more true of the measure of perceived support (average $r = .11$). These data indicate that measures of personal religiosity are not coterminous with measures of the religious environment.³

Together, these efforts provide converging support for the validity of the religiosity measure prior to its use in testing the hypothesis and in establishing its construct validity as a personal control. The data reported also support the unidimensionality of religiosity and the combination of the four subscales into a single, eight-item scale.

The measures of personality, perceived social environment, and behavior. The measures reported in this paper are selected ones focused on the interpretive concern with personal control and are illustrative rather than exhaustive. Most had been devised and validated in earlier research and have been shown to have adequate internal psychometric properties and validity. Further description, beyond what is briefly given below, may be found in Jessor (1969) and in the earlier cited publications.

Within the motivational-instigation structure of the personality system, three measures of values and three parallel measures of expectation for achieving those same values were used. The motivational areas were social love and affection, academic achievement, and independence, each assessed by ten items with responses checked along linear rating scales. In the value format, students responded to items such as, "How strongly do I like to be able to decide for myself how to spend my free time?" (value for independence); in the expectations format, items were phrased as, "How strongly do I expect to do well in the more difficult courses here?" (expectation for academic achievement). Within the personal beliefs structure of the personality system, three measures were used: a 17-item, Likert-type scale of belief in internal versus external control; a 13-item Likert-type scale of social criticism, the belief that society and its various institutions and intergroup relations are inadequate or should be changed; and a 10-item Likert-type scale of self-esteem covering a variety of areas of self-evaluation. Within the personal control structure of the personality system, there were also three measures: a 30-item rating scale of attitude toward deviance assessing the degree of intolerance of various transgressions such as lying, stealing, cheating on tests, or aggression against peers; a two-item measure of the acceptability of premarital sexual intercourse both when the partners have a close personal relationship and when they have no special feeling toward each other;

³The two subscales of the perceived religious environment, in addition to serving in this discriminant validation, were also correlated with the various personality, social, and behavioral measures later employed to test the main hypothesis about personal religiosity. While those environment subscale results will not be discussed in this paper, it can be indicated that their *pattern* of relations is not too discrepant from the pattern that obtains for the personal religiosity measure. The religious environment, it appears, may function as a social control, paralleling the function of religiosity as a personal control.

and a 10-item, Likert-type scale of the perceived negative functions associated with the use of marijuana, functions which reflect reasons for not using marijuana or for discontinuing its use.

Within the distal structure of the perceived social environment system, there were two measures: a three-item, Likert-type scale of the perceived agreement between parents and peers in their attitude toward the respondent and his goals in life; and a two-item, Likert-type scale assessing the relative influence of parents versus peers on the respondent's decision-making and general outlook on life. Within the proximal structure of the perceived environment, four Likert-type measures were employed: a two-item scale of perceived controls exercised by his peers over the respondent's behavior, that is, their strictness of standards and their efforts to dissuade transgression; a two-item scale of perceived peer support for engaging in activist protest; a one-item measure of perceived models among same-sex friends for having engaged in sexual intercourse; and a three-item scale assessing approval (or lack of disapproval) from peers and parents for respondent's use or anticipated use of marijuana.

Within the behavior system, assessment was made of reported participation in political activism including militant protest as well as peaceful demonstration; reported experience of premarital sexual intercourse; reported use of marijuana from none to heavy involvement; self-reported engagement in a variety of deviant behaviors such as lying, stealing, cheating, and aggression; and finally, grade-point average as an indirect indicator of involvement with the conventional area of school achievement behavior.

The 23 measures mentioned above provided the network for evaluation of religiosity as a personal control.

Results

The primary approach to testing the hypothesis that religiosity functions as a personal control against deviance or problem behavior was to correlate the religiosity measure with the various measures of the personality, perceived social environment, and behavior systems. The expectation was that religiosity would correlate negatively with measures of deviance-proneness and deviant behavior and positively with measures of conformity-proneness and conventional behavior. Since the four student samples vary in mean level of religiosity, the correlations were run within each sample separately, thereby providing four replications of the test of the general hypotheses. These correlations are presented in Table 19.1.

In general, the findings in Table 19.1 provide strong support for the personal control interpretation of religiosity. The strongest and most consistent relations are those with the three measures in the personal control structure of the personality system: religiosity is significantly related, in all four samples, positively to intolerance of deviance, negatively to the acceptability of premarital sex, and positively to the number and strength of reasons against marijuana use. Thus, the conceptual

Table 19.1 Pearson Correlations of Religiosity with Measures of Personality, Perceived Environment, and Behavior

	High school study		College study	
	Males (N = 208)	Females (N = 267)	Males (N = 105)	Females (N = 116)
<i>Personality system</i>				
Motivational-Instigation Structure				
Value on Social Love and Affection	.07	.21***	.10	.19*
Value on Academic Achievement	.17*	.24***	-.09	.01
Value on Independence	-.22**	-.14*	.00	-.06
Expectation of Social Love and Affection	.02	.09	.15	.24**
Expectation of Academic Achievement	.05	.07	-.21*	-.04
Expectation of Independence	-.19**	-.20***	.09	-.01
Personal Belief Structure				
Internal versus External Control	.17*	.08	.14	.14
Social Criticism	-.17*	-.32***	-.02	-.27**
Self-Esteem	-.12†	-.07	.07	.10
Personal Control Structure				
Attitude toward Deviance	.25***	.31***	.23*	.19*
Acceptability of Premarital Sex	-.45***	-.48***	-.37***	-.38***
Negative Functions of Marijuana Use	.25***	.38***	.32***	.37***
<i>Perceived social environment system</i>				
Distal Structure				
Parent-Peer Compatibility	.19**	.26***	.15	.26**
Parent Versus Peer Influence	-.14*	-.21***	-.12	-.19*
Proximal Structure				
Peer Control	.28***	.32***	.11	.27**
Peer Support for Activism	-.05	-.25***	-.18†	-.18*
Friends Models for Premarital Sex	-.23***	-.31***	-.22*	-.19*
Approval for Marijuana Usage	-.31***	-.44***	-.33***	-.38***
<i>Behavior system</i>				
Activism Behavior Report	-.15*	-.14*	-.03	-.10
Premarital Sexual Behavior Report	-.19**	-.22***	-.25*	-.24**
Marijuana Behavior Report	-.29***	-.31***	-.27**	-.23*
Deviant Behavior Report	-.16*	-.22***	-.03	.00
Grade-Point Average	.11†	.05	.04	.00

Note: Correlations significantly different from zero at the following two-tail probability levels: † $p \leq .10$; * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

allocation of religiosity to the personal control structure receives quite direct empirical support, especially since the other measures in that structure contain no item content that overlaps with the content of the religiosity measure and that could yield spuriously high correlations.

Turning next to the behavior system, it can be seen that religiosity functions as a personal control by regulating problem behavior as theoretically expected: in both high school samples, religiosity is negatively related to all four problem behavior measures—activism, premarital sex, marijuana use, and general deviant behavior; in the college samples, the behavioral results are also significant, but only for premarital sex and marijuana use. The anticipated positive correlation with grade-point average as an indirect indicator of conventional behavior did not appear in any sample. With regard to the perceived environment, the proximal structure shows, again as implied by the logic of the proximal-distal continuum (Jessor & Jessor, 1973a), a stronger and more consistent relation to religiosity than does the distal structure. Thirteen of the 16 correlations of religiosity with the proximal measures are significant at the .05 level or better, the more highly religious the person is, the greater the controls exercised by his peers, the fewer models they provide for sexual experience, and the less support or approval they offer for activism and drug use. The distal environment, while not related to religiosity for college males, does show for the other three samples that the more religious the youth the more parent rather than peer influence he acknowledges and the more agreement he perceives between his friends and parents.

Finally, in regard to the instigation and belief structures of the personality system, the findings are supportive for the high school samples while being essentially nonexistent for the college samples (except for the negative relation of religiosity and social criticism for the females, and their positive value and expectation for social love and affection correlations). Noteworthy for the high school students is the expected positive correlation with (conformity-prone) value on achievement and the expected negative correlation with (deviance-prone) value on independence, as well as the negative correlation with (deviance-prone) social criticism in both males and females. Neither internal versus external control nor self-esteem yielded consistent results. In overall summary, then, religiosity has been predictably connected, through these correlations, with diverse and far-separated portions of a nomological network dealing with problem behavior.

A secondary approach to assessing the personal control function of religiosity was to examine whether it varied with the length of time that the respondents were involved in a problem behavior; the longer the involvement the lower should be the personal control religiosity score. Because of the longitudinal nature of the research project, it was possible to establish, within each of our four samples, a group that was not involved in a particular problem behavior in *either* 1971 or in 1972, a group that was not involved in 1971 but *was* involved in 1972, and a group that was involved in *both* 1971 and 1972. These three groups represent, then, three different lengths of involvement, and they were constituted separately for the behavior of activism, for premarital sex behavior, and for marijuana use. The data relevant to this analysis appear in Table 19.2.

Table 19.2 Mean Religiosity Scores for Groups Differing in Length of Involvement with Three Problem Behaviors over a Two-Year Interval, 1971 and 1972

	None	One-year	Two-year	F ratio ^b
<i>Length of Involvement groups-activism status</i>				
High school males	16.1 (138) ^a	13.4 (10)	12.1 (18)	2.00
High school females	18.5 (186)	16.3 (19)	14.4 (17)	2.43
College males	13.6 (43)	12.2 (11)	13.7 (11)	.18
College females	14.0 (54)	16.8 (7)	10.8 (17)	1.66
<i>Length of Involvement groups-nonvirgin status</i>				
High school males	16.0 _a (149)	14.9 _{ab} (37)	9.2 _b (20)	5.30*
High school females	18.4 _a (163)	15.4 _{ab} (64)	14.9 _b (37)	4.79*
College males	15.4 (24)	11.9 (14)	11.0 (59)	2.98
College females	16.3 (20)	11.5 (14)	11.6 (74)	3.05
<i>Length of Involvement groups-marijuana use status</i>				
High school males	17.1 _a (118)	15.0 _a (25)	9.8 _b (45)	13.08**
High school females	19.2 _a (146)	17.0 _a (30)	13.4 _b (69)	13.82**
College males	19.7 _a (19)	12.3 _b (10)	10.1 _b (66)	14.13**
College females	15.5 (25)	14.3 (9)	11.3 (66)	3.05

Note: Subscripts within each row refer to mean religiosity scores which differ at $p \leq .05$ from scores in that row with different subscripts by Tukey's (a) test (Winer 1971, p. 198)

^aNumbers in parentheses are the *ns* for each group

^bSignificance of *F* ratios: * $p \leq .01$; ** $p \leq .001$

No significant differences in religiosity appear in relation to the length of involvement with activism, although in both high school groups there is a consistent trend, with higher religiosity scores among the two-year nonactivists, intermediate scores among the one-year activists, and lower scores among the two-year activists. With regard to length of involvement with sexual experience, there is a significant trend in the direction of lower religiosity scores within both high school samples, and a nonsignificant trend within the two college samples. Finally, longer involvement with marijuana is significantly associated with lower religiosity scores for high school males and females and for college males, with a nonsignificant trend for college females. These findings, while not always significant, are highly consistent and provide an additional type of empirical support for inferring the personal control function of religiosity.

Discussion

Perhaps the most important outcome of the present study was the clarification of the personal control function of religiosity.

The consistent and substantial correlations of the religiosity measure with other measures in the personal control structure of the personality system argue strongly for such a conceptual inference. The inference was strengthened by the negative

correlations of religiosity with attributes of the proximal environment conducive to deviance, such as models and support, and by the negative correlations with actual engagement in various problem behaviors. The relations of religiosity to a distal parent-peer environment tending to promote conformity, and to higher value on achievement, lower value on independence, and lower social criticism—a pattern supporting conventionality—all add to the coherence of the empirical findings. The four samples provided consistent replications of the results, and, while the relationships were strongest at the high school level, they were also significant at the college level, especially for the females.

Since the relations of religiosity to its correlates in this study could conceivably be a function of a “third variable,” especially background, social origin variables, it was deemed important to examine that possibility. Although our samples are predominantly middle-class and, therefore, restricted in socio-economic background variation, correlations were run between religiosity and a set of five measures of socio-economic status: father’s education and occupation, mother’s education and occupation, and the Hollingshead two-factor index of social position. Of the 20 possible correlations across the four samples, only two reached significance, both were for high school females, and neither accounted for more than three percent of the variance on the religiosity measure. Thus, socio-economic background, in our samples at least, was unrelated to variation in religiosity.

A more relevant background variable, perhaps, than socioeconomic status was denominational affiliation, especially when considered along a “fundamentalism” dimension. The various denominations to which students belonged had been earlier classified along a liberalism-fundamentalism scale by six local clergymen. Correlations between religiosity and this scale for our four samples averaged .45. In view of this, it seemed necessary to demonstrate that fundamentalism of denomination was not mediating the religiosity-personal control relationships. For this purpose, the denominations were split into a high and a low fundamentalism category, and the correlations of religiosity with the 23 variables in the network were run again, now within the high and within the low category, for all four samples. Of the 92 high fundamentalism-low fundamentalism pairs of correlations generated by this procedure, only six pairs were significantly different in magnitude. In short, the relation between religiosity and its correlates held, for the most part, within the high and the low fundamentalism categories, making fundamentalism of denomination incapable of accounting for or of limiting the interpretation of the major findings.

The salient characteristic of the religious person which has emerged from this study is a general conventionality: a relative acceptance of social institutions as worth conserving as they are, a set of values that sustain conformity and eschew self-assertion and autonomy, and a social context that minimizes both opportunity and support for departure from conventional norms. This is a somewhat different picture than the one drawn by Dittes (1971) in his review of research on religion and personality. A heavy emphasis was placed, in that review, on maladjustment, on the sense of personal inadequacy, and on “...desperate and generally unadaptive defense maneuvers. Here perhaps, are the sick souls and divided selves, two types of religious predispositions described by William James...” (Dittes, 1971, pp. 367–368). Our own data do not support this maladjustment emphasis; as can be seen in Table 19.1, religiosity

does not vary with low self-esteem nor with feelings of external control (in fact, the trend is toward a positive relation with internal control). Examining the correlation of a slightly different measure of religiosity with a 13-item measure of alienation in a slightly smaller sample of high school and college males and females, the correlations are all negative, with one, that for college females, reaching significance, $r = -.19$. Thus, although this is clearly not a systematic appraisal of the maladjustment thesis, the data that we have provide no support for it while providing, instead, consistent and substantial support for the conventionality thesis.

At least some of the problem behaviors we have examined, as well as others such as drinking, are obviously age-related, that is, more likely to occur or to be engaged in at older than at younger ages. Insofar as this is true, it suggests that personal controls, including religiosity, may well decline with age. The longitudinal nature of our research enabled us to examine this possibility although with our original measure of religiosity rather than with the one developed for this study, and with college and high school samples defined somewhat differently than, but overlapping with, the samples used in this paper. Those data do, indeed, reveal a developmental trend for a decline in religiosity. For the high school males and females, there is a difference between their religiosity scores in 1969 and in 1971, the latter means being significantly lower; for college males and females, there is a difference between their religiosity scores in 1970 and in 1972, significant at the $p < .10$ level for females but not for males. (These developmental trends for religiosity are, incidentally, paralleled by a similar developmental trend for attendance at church services; decline in church attendance is significant for all samples over a four-year interval.) The developmental decline in religiosity, thus, is consistent with the observable developmental increase in engagement in sex, marijuana use, drinking, and other age-related problem behavior.

If, as just indicated for religiosity (and as our other data show for another personal control measure, attitude toward deviance), there is a decline with growth and development, an interesting question is raised about the nature of the personal controls that may characterize later stages of development. It seems clear, reflecting on both religiosity and attitude toward deviance, that they are both conventional in content, referring to institutionalized standards and conventional ideas of right and wrong. It may well be that the process of development can lead to alternative kinds of personal controls, ones reflecting more abstract principles as a guide for action, what Kohlberg (1973) has termed post-conventional morality. Unfortunately, not initially anticipating this kind of issue, we did not develop measures that would enable us to go beyond mere speculation.

As noted earlier, the measurement of religiosity has been subjected to lively controversy around the issue of uni- versus multidimensionality. In the present study, the relationships that obtained among the four subscales were not too different from those reported by others (Clayton, 1971; Faulkner & Dejong, 1966; Gibbs & Crader, 1970; Cardwell, 1969). What seems apparent is that those arguing for multidimensionality on the basis of such data have failed to take note of the fact that relations between subscales are limited by the reliability of the individual scales. In our own data, the interrelations approached the scale reliabilities, providing a strong argument for unidimensionality. Further, when each subscale was correlated with our 23

other measures and these correlation sets were in turn correlated with each other, the correlations of correlations yielded Pearson r s between .89 and .99, indicating that the four subscales related in highly similar fashion to the 23 outside criteria. This, too, argues strongly for unidimensionality. At least at the measurement level, religiosity has emerged consistently as a unidimensional variable; in view of this, our own construction of a composite religiosity scale seems to have been the logical and appropriate strategy to follow.

The focus of our present work has, of course, been on just one aspect of religiosity, its function as a personal control. Our strategy of embedding religiosity in a network of personality, social, and behavioral attributes was a revealing one in garnering support for our hypothesis. But it must be clear from observation of contemporary variation in religious activity—and from even a cursory view of religious history—that there are other important and different functions that religious involvement must play in human life. Perhaps the application of a similar strategy to those other important functions of religiosity would be similarly revealing.

Summary

The hypothesis that religiosity functions as a personal control against transgression was examined in samples of high school and college males and females. A measure of religiosity, constructed to encompass its ideological, ritual, consequential, and experiential aspects, was correlated with other measures of personal controls as well as with a variety of personality, perceived environment, and behavioral measures of deviance and of deviance proneness. Religiosity correlated positively and significantly with other measures of personal controls (r s ranged from .19 to .48), and negatively with measures of deviance proneness and deviant behavior. The obtained relations were shown to hold when controls for differences in social origin variables, such as socio-economic status, or in religious fundamentalism were applied. The research also demonstrated that religiosity, as a cognitive attribute of personality, is best considered to be uni- rather than multidimensional in nature.

Note: The data reported here are part of a larger, six-year, longitudinal research project, “The Socialization of Problem Behavior in Youth,” supported by National Institute on Alcohol-Abuse and Alcoholism Grant No. AA-00232, R. Jessor, principal investigator. This paper is based upon a project research report by the first author (Rohrbaugh, 1973).

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Part VI
Health-Related Problem Behaviors:
Risky Driving

Chapter 20

Adolescent and Young Adult Risky Driving: The Role of Problem Drinking

Richard Jessor, John E. Donovan, and Frances Costa

Introduction

An important development in research on traffic safety has been the renewed attention to a psychosocial understanding of impaired and risky driving, especially among youth (Jessor, 1987b; Wilson & Jonah, 1988; Beirness & Simpson, 1988; Swisher, 1988; DiBlasio, 1986; Williams, Lund, & Preusser, 1986). This recent work is characterized by much greater reliance on social-psychological theory, by a perspective in which impaired and risky driving are seen as aspects of a larger organization of problem behavior, and by an effort to link psychosocial attributes—both in the person and in the social environment—with variation in impaired and risky driving. In this paper, we extend such work with findings from three different studies of youth, all of them guided by a particular psychosocial framework, namely, Problem Behavior Theory (Jessor & Jessor, 1977).

Developed over the past three decades, Problem Behavior Theory was formulated to account for a variety of problem behaviors among adolescents and young adults, including drinking and problem drinking, illicit drug use, delinquency, tobacco use, and precocious sexuality (Donovan & Jessor, 1978; Jessor, 1987a; Jessor, Donovan, & Widmer, 1980; Jessor, Costa, Jessor, & Donovan, 1983). More recently, the theory has been extended to the area of health behavior, including eating, exercise, and safety practices (Costa, Jessor, & Donovan, 1989; Donovan, Jessor, & Costa, 1991) as well as to risky driving behavior (Jessor, 1987b). In the theory, the various behaviors are considered to constitute a system and, therefore, to

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be functionally related and to covary within individuals. In short, the theory posits that involvement in any particular problem behavior, e.g., risky driving, should be associated with involvement in others, e.g., illicit drug use or delinquent behavior.

Psychosocial explanation of problem behavior is provided by two other systems in Problem Behavior Theory: the personality system, and the perceived environment system. The variables in the personality system have to do with values, expectations, beliefs, attitudes and other such socio-cognitive concepts. More particularly, they include values on and expectations for achievement, alienation, social criticism, tolerance of transgression, and religiosity. The variables in the perceived environment system include perceived controls against, approval of, and models for problem behavior among friends. All of the variables contribute to the sovereign theoretical concept of “problem-behavior proneness,” the disposition toward involvement in normative transgression. A general schema of the conceptual framework is shown in Fig. 20.1.

In applying the theory to driving behavior, we have invoked the concept of “risky driving.” Risky driving refers to intentional or unintentional behaviors that increase the objective risk of accidents or injuries during driving. The use of alcohol in conjunction with driving is well established as a major and frequent source of impairment that elevates driving risk. Indeed, social policy has focused almost exclusively on this particular aspect of risky driving. In addition to alcohol use, however, there are other driving behaviors that also increase the risk of traffic crashes, e.g., the use of other drugs, speeding, failure to observe warning signals, etc. Finally, nonuse of seatbelts can be seen as increasing the likelihood of injury in relation to traffic crashes. The various behaviors subsumed under the rubric of risky driving all involve some degree of legal or normative transgression.

In exploring the contribution of Problem Behavior Theory to understanding risky driving, we have focused on drinking-driving (DUI) and on risky driving more generally, that is, on the overall pattern of driving behavior that encompasses other risk-enhancing behaviors in addition to and including DUI.

Method

Three different sets of data, derived from three different studies, will be reported. The first data set comes from our Young Adult Follow-Up Study, a six-wave longitudinal study that has followed participants from adolescence or youth into young adulthood (see Jessor & Jessor, 1977, 1984). Two separate and independent cohorts have been involved: one is the High School Sample, first tested in junior high school in 1969 when participants were 13, 14, and 15 years of age; the other is the College Sample, first tested in 1970 when participants were college freshmen aged 19. Both samples were last tested in 1981, and it is the 1981 data that we will be reporting in this paper; at that time, members of the High School Sample were young adults, aged 25–27, and members of the College Sample had reached the age of 30.

The second data set comes from our more recent Health Behavior Study in which nearly 1600 junior and senior high school youth were tested in 1985 on a variety of

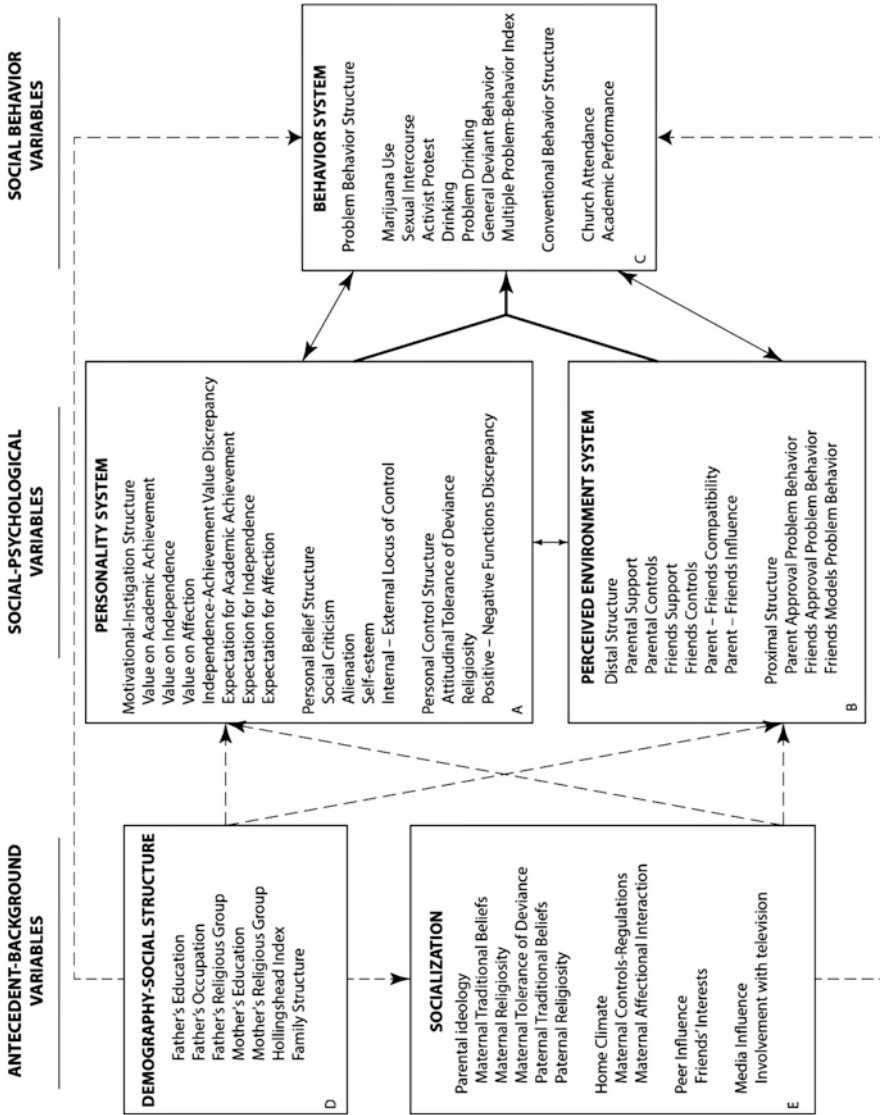


Fig. 20.1 The conceptual structure of Problem Behavior Theory (Jessor & Jessor, 1977)

psychosocial and behavioral measures, including DUI and several other components of risky driving. The third and final set of data is from a just-completed pilot study of a small number of senior high school youth in which a more elaborated Risky Driving Scale was employed. Because the scale is of conceptual interest, the data, though only preliminary and tentative, are worth attention.

All of the data are self-reported and based on lengthy questionnaires that include well-established psychometric measures of the key variables in Problem Behavior Theory (see Jessor & Jessor, 1977; Donovan, Jessor, & Costa, 1991; Costa, Jessor, & Donovan, 1989).

Results

The 1981 data from the Young Adult Follow-Up Study permit us to examine one key component of the risky driving concept, namely, driving under the influence of alcohol (DUI). Respondents were asked the following question: "In the past six months, how many times have you driven when you've had a good bit to drink?" Response categories ranged from "Never" to "Six or More Times." Though only a single item, the DUI measure has good stability over time. Correlations between the 1979 and the 1981 DUI measures are all significant at $p \leq .001$: .63, .59, .69, and .54 for the High School Sample men and women and the College Sample men and women, respectively. Over a two-year interval in young adulthood, such stability coefficients are impressive, and they suggest a substantial degree of continuity for this risky driving behavior. Correlations between this DUI measure and a second measure of impaired driving behavior, namely, driving after marijuana use, provide evidence supporting their convergent validity. The correlations between these measures are .33, .22, .13, and .49 for the same four groups as above; all but the .13 correlation, for the College Sample males, are statistically significant.

Of major interest here is the relationship of DUI with other measures of problem drinking and with measures of other problem behaviors. These correlations can be seen in Table 20.1. The pattern is consistent and coherent: DUI is clearly linked to a larger structure of problem behavior in young adulthood. The correlations of DUI with measures of alcohol consumption, heavy drinking, and drunkenness, and with classification as a "problem drinker" (based on frequency of drunkenness and of negative social consequences associated with drinking) are all substantial. DUI is, as expected, an element in a broader pattern of drinking behavior. What is perhaps more interesting, theoretically, are the positive correlations in Table 20.1 between DUI and *other* kinds of problem behaviors, including illicit drug use and deviant behavior (aggression, stealing, lying, etc.), and the negative correlations of DUI with a conventional behavior, church attendance. These data argue strongly for viewing DUI as part of a larger syndrome of problem behavior, a lifestyle, rather than as a unique or isolated activity.

The explanatory capability of Problem Behavior Theory in accounting for variation in DUI was assessed at both the bivariate level and the multivariate level for the

Table 20.1 Correlations of “Driving Under the Influence” (DUI) with other Measures of Drinking and Problem Drinking and with Measures of Other Problem Behaviors. Young Adults Follow-Up Study, 1981^a

“Driving Under the Influence” Measure					
	Measures of Other Problem Behaviors	High School Sample			College Sample
		Men (N = 145)	Women (N = 188)	Men (N = 82)	Women (N = 94)
A.	Alcohol-Related Behaviors				
	Average Daily Alcohol Intake	.52***	.57***	.59***	.50***
	Frequency of Drinking Five or More Drinks	.70***	.7***	.66***	.59***
	Frequency of Drunkenness/6 Months	.63***	.72***	.67***	.70***
	Problem vs. Non-Problem Drinkers	.57***	.60***	.57***	.44***
B.	Other Problem Behaviors				
	Frequency Marijuana Use/30 Days	.37***	.24***	.16 [†]	.16 [†]
	Other Illicit Drug Use/6 Months	.50***	.42***	.41***	.43***
	No. Cigarettes Per Day/30 Days	.31***	.18**	.13	.24**
	Deviant Behavior/6 Months	.38***	.22***	.02	.47***
	Multiple Problem Behavior Index	.48***	.41***	.29**	.31***
C.	Conventional Behavior				
	Frequency Church attendance/Year	-.26***	-.20**	-.12	-.21*

^aCurrent drinkers only
 ****p* ≤ .001; ***p* ≤ .01; **p* ≤ .05; [†]*p* ≤ .10 (one-tail test)

personality system and the perceived environment system. At the bivariate level, the measures in the personality system that relate most consistently to DUI across the four groups in the High School and College Samples are Alienation, Attitudinal Intolerance of Deviance, Moral Attitude, and Religiosity; the correlations are modest in magnitude, generally reaching about .20. In the perceived environment system, Friends Approval of Drug Use and Friends Models for Drug Use were the most consistent predictors; their correlations ranged around .25. It is these systems as a whole, however, that are the focus of Problem Behavior Theory, and that focus requires a multivariate appraisal. Multiple correlations of the various explanatory systems with DUI are presented in Table 20.2.

The findings for the High School Sample, especially for the men but also for the women, are strongly supportive of Problem Behavior Theory as an explanatory framework for DUI. The Overall System, combining 15 measures of personality, the perceived environment, and behavior, accounts for about 40% of the variance in DUI for the men, and for about 30% for the women. The personality system alone and the perceived environment system alone also account for significant portions of

Table 20.2 Multiple Correlations (*R*s) of the Explanatory Systems of Problem Behavior Theory with the Measure of Driving Under the Influence (DUI) Young Adult Follow-Up Study, 1981^a

Explanatory Systems	High School Sample		College Sample	
	Men (<i>N</i> = 140)	Women (<i>N</i> = 160)	Men (<i>N</i> = 74)	Women (<i>N</i> = 81)
Personality System	.49*	.42*	.46 [†]	.46*
Perceived Environment System	.52*	.29*	.32	.39*
Combined Systems	.59*	.46*	.49	.56*
Behavior System	.52*	.45*	.31*	.33*
Overall System	.64*	.54*	.54	.58*

^aCurrent drinkers only* $p \leq .05$; [†] $p \leq .10$

the variance, and they account for even more of the variance when they are combined and when the behavior system measures are added. For the College Sample, the findings are equally strong for the women but not as strong for the men. These results, taken together, clearly indicate that psychosocial factors are directly relevant to variation in DUI in young adulthood.

The data from the Health Behavior Study, collected in 1985, and based on high school adolescents rather than young adults, enable us to enlarge the inquiry about risky driving in two directions: first, the measure of DUI can now be examined in relation to several health-related behaviors; and second, it is possible to include DUI as a component of a larger Risky Driving Scale criterion measure.

Among current drinkers and current drivers (115 males and 178 females over 16.5 years of age), it was possible to correlate the DUI measure with a variety of other behaviors (see Table 20.3). DUI correlates significantly for both males and females with measures of Frequency of Drunkenness/6 Months, Frequency of Marijuana Use/6 Months, Involvement with Smoking, and Deviant Behavior/6 Months. Multiple correlations (*R*s) of the Overall System of personality, perceived environment, and behavior measures with the DUI measure were .52 for the males and .43 for the females, both reaching $p < .001$. These results constitute an independent replication among adolescents of the findings from the preceding Young Adult Follow-Up Study. Once again, DUI is established for both genders as part of a larger organization of problem behavior; and once again, variation in DUI is significantly accounted for by the psychosocial attributes—personality, perceived environment, and behavioral—in Problem Behavior Theory.

With respect to the measures of health-related behavior assessed in this study, DUI correlated modestly with Attention to Healthy Diet, Exercise, Adequacy of Sleep, Safety Practices, and Use of Contraception in the expected direction, and all were significant with just two exceptions (see Table 20.3). These findings are of considerable theoretical interest; they add to the diversity of behaviors with which DUI has been shown to be linked, and they elaborate the scope of the lifestyle in which it occurs.

Table 20.3 Correlations of “Driving Under the Influence” (DUI) with Measures of Other Problem Behaviors and with Measures of Health-Related Behaviors: Health Behavior Study, 1985^a

		High School	
		Males (<i>N</i> = 115)	Females (<i>N</i> = 178)
A.	Other Problem Behaviors		
	Frequency of Drunkenness/6 Months	.50***	.51***
	Frequency of Marijuana Use/6 Months	.41***	.33***
	Involvement with Smoking	.24**	.20**
	Deviant Behavior/6 Months	.36***	.33***
B.	Health-Related Behaviors		
	Attention to Healthy Diet	-.15 [†]	-.14*
	Exercise	-.14 [†]	.05
	Adequacy of Sleep	-.19*	-.25***
	Safety Practices	-.16*	-.24***
	Use of Contraceptives	-.20 [†]	-.03

^aCurrent drinkers only

*** $p \leq .001$ (one-tailed); ** $p \leq .01$; * $p \leq .05$; [†] $p \leq .10$

In addition to the measure of DUI, the Health Behavior study included three other items that, taken together with DUI, could be constituted as a Risky Driving Scale. The three items were: “In the past six months, how often have you taken some risks when driving in traffic because it makes driving more fun?”; “How many times in the past six months have you driven after you had used marijuana?”; and “When you ride in a car, do you use a seat belt?” This four-item Risky Driving Scale was used as a criterion measure for both bivariate and multivariate analysis with the psychosocial variables in Problem Behavior Theory (see Jessor, 1987b). All that needs mention here is that the multiple correlations (*R*s) for the Overall System were .56 and .49 for the adolescent males and females, respectively, thereby accounting for about 25% of the variance in this operationalization of risky driving.

Encouraged by the latter findings, we attempted to elaborate further the concept of risky driving and to articulate in more detail its various components. A new, twelve-item scale of risky driving was developed and used in a recent pilot study with 30 males and 27 females who had been driving for six months or more. The items are shown in Table 20.4. Cronbach's alpha reliability is .82 for males, .72 for females, and .80 for the total pilot study sample. This approach to risky driving is similar to the notion of “basic driving behavior” elaborated earlier by Biecheler-Fretel (1988).

Despite the small sample size, the findings from this pilot study are quite consistent with the findings from the preceding investigations that used DUI as a separate measure and that used the four-item Risky Driving Scale. The present twelve-item Risky Driving Scale correlates with other problem behaviors as follows for the combined male and female sample: .54 with Frequency of Riding with an Impaired Driver, .43 with Frequency of Drunkenness, .39 with Use of Marijuana at School, .53 with Deviant Behavior, .50 with Risk-Taking Behavior, -.25 with Attention to

Table 20.4 Items Included in the 1988 Risky Driving Scale

During the past 6 months, how often have you:				
1. Driven after you've had one or two drinks?	Never	Once or twice	3–5 times	6 or more times
2. Driven much faster than the speed limit?				
3. Driven through a stop sign without stopping?				
4. Driven after you've had three or more drinks?				
5. Passed another car in a no-passing zone?				
6. Driven too close to the car in front of you ("tailgated")?				
7. Had a traffic accident because you were being reckless?				
8. Driven after you had used marijuana?				
9. Driven through a red light?				
10. Raced another car on city streets?				
11. Taken some risks while you were driving in traffic because it makes driving more fun?				
12. When you're going somewhere in a car, do you use your seatbelt?				
	Hardly Ever	Some of the Time	Most of the time	Almost always

Healthy Diet, $-.20$ with Adequacy of Sleep, and $-.22$ with Grade-Point Average in School. Correlations of selected psychosocial measures with the Risky Driving Scale include: $-.30$ with Expectations for Academic Achievement, $-.22$ with Intolerance of Deviance, $.26$ with Friends Models for Problem Behavior, and $-.21$ with Friends Models for Conventional Behavior. Although a small and selected set, the pattern of these correlations is as expected theoretically, and although varying in magnitude from small to substantial, the correlations all attain statistical significance.

Discussion

In a recent review (Vegega & Klitzner, 1988), the authors state that "The social, psychological, and behavioral correlates of youthful drinking/driving and associated crashes are still not well understood" (p. 203), and conclude from their findings that one of the reasons for this may be that "...social-psychological and sociological theory...[is] not widely used..." (p. 212). Our own effort in the present paper has been to try to enhance precisely that kind of understanding and to do so by applying social-psychological theory. Data presented from three different studies have shown the contribution that Problem Behavior Theory can make to understanding youthful drinking-driving and risky driving more generally. In agreement with theoretical expectation, DUI and risky driving were shown to relate positively to a variety of other problem behaviors, and negatively to health-enhancing and conventional behaviors. These findings make clear that DUI and risky driving are elements of a more general lifestyle that implicates many other areas of activity, not just those related to motor vehicles. Also in agreement with theoretical expectations, variation

in DUI and risky driving could be accounted for to a significant degree by psychosocial characteristics, especially personal controls against and perceived models for problem behavior among friends.

These findings suggest that approaches to prevention/intervention may need to be broadened beyond a focus on alcohol use and on the driving situation alone. Interventions at the level of lifestyle—the larger pattern of problem behavior—may be promising and effective, and interventions targeted at some of the psychosocial risk factors for DUI and risky driving may well be apposite. Given the linkage of these behaviors with health-related behavior, an intervention strategy based on health promotion (see Perry & Jessor, 1985) would certainly have logical relevance.

The research reported has a number of limitations ranging from reliance on a single-item measure of DUI to employing an as-yet-unvalidated measure of risky driving. We have tried to overcome the limitations of the separate studies by showing the consistency and coherence of results across the three studies. Such robustness can help to provide a counterbalancing compellingness of inference. Beyond measurement limitations, however, none of our studies actually engages traffic accidents or the probabilistic consequences of DUI and risky driving. Fortunately, that gap in our own work has recently been filled by Wilson and Jonah (1988) in a study, also relying on Problem Behavior Theory, that shows its predictiveness for traffic accidents, traffic violations, and license suspensions.

Given the mortality and morbidity associated with traffic crashes, and given the overrepresentation of youth in such events, there is great urgency to the effort to achieve an understanding of risky driving. By invoking a social-psychological perspective, we have sought in this research to contribute, albeit modestly, to that objective.

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Chapter 21

Developmental Change in Risky Driving

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Motor vehicle crashes, a major public health problem in the United States, are the most common cause of death for people under 34 years of age (National Committee for Injury Prevention and Control, 1989). Among 16- to 19-year-olds, the crash rate is four times as great as the rate for all other ages combined, and motor vehicle injuries account for more than 40% of all deaths in this age group (Williams, 1993, 1996).

Although alcohol use is associated with a large proportion of these crashes, “young drivers are least likely to have been drinking yet are at higher risk of crash involvement than older drivers at all blood alcohol concentrations” (Simpson & Beirness, 1993, p. 77). The relative contributions of alcohol use, age-related alcohol effects, driving skills and experience, risky driving practices, and “more stable, enduring aspects of personality or lifestyle” to risk for motor vehicle accidents remain obscure (Simpson & Beirness, 1993, p. 77). This study has as its focus factors that may account for one of these intermediary influences on the motor vehicle crashes of young drivers: risky driving practices.

A number of researchers have emphasized the need to separate alcohol- and non-alcohol-related factors that may be linked to high-risk driving practices, such as speeding and control signal violations, that increase the likelihood of involvement in motor vehicle crashes (Donovan, Marlatt, & Salzberg, 1983; Hedlund, 1994; Yu & Williford, 1993). Studies of drinking, driving, and traffic accidents suggest that drink driving is only one manifestation of a larger pattern of high-risk driving practices (Donovan et al., 1983; Donovan, 1993; Hedlund, 1994). Because drinking drivers are similar to high-risk drivers and crash-involved drivers on numerous demographic

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characteristics (e.g., younger men) and personality characteristics (e.g., impulsiveness, aggressiveness), it is likely that some proportion of motor vehicle crashes would still occur if high-risk drivers did not drink but still drove (Hedlund, 1994).

Elsewhere, we have encouraged broadening the nearly exclusive focus in the road safety field on one type of behavior (drink driving) to include a wider range of behaviors (risky driving) that can compromise safe driving (Jessor, 1989). Risky driving refers to those patterns of driving behavior that place drivers at risk for morbidity and mortality and that involve legal violations, but do not involve alcohol or drug use. Risky driving practices include speeding, passing violations, tailgating or following other vehicles too closely, lane-usage violations, right-of-way violations, illegal turns, and control signal violations, among others.

In earlier work, it was established that risky driving is indeed one component of a larger class of problem driving behaviors, which also includes drink driving and drug driving (Donovan, 1993). The correlations of risky driving with drink driving and drug driving in that study were .46 and .24, respectively, indicating that risky driving is related to alcohol-impaired and drug-impaired driving. Nevertheless, the magnitude of those correlations is low enough to suggest that the role of risky driving as an independent factor in motor vehicle crashes merits direct investigation.

Risky driving has been found to be more prevalent among younger drivers than among older drivers. Cross-sectional data from observational studies (Evans & Wasielewski, 1983; Wasielewski, 1984), official driving records (Peck, 1985), and survey research (Jonah, 1990; Jonah & Dawson, 1987; Yu & Williford, 1993) indicate that speeding, following too closely, passing violations, and control signal violations are more common among younger drivers. There is reason to expect, then, that as drivers progress from youth through young adulthood, many should discontinue or “mature out” of risky driving behavior.

Risk behavior while driving is positively linked to involvement in other norm-violating or “problem” behaviors in adolescence, including delinquent behavior, problem drinking, and marijuana use (Beirness & Simpson, 1988; Jessor, 1987), and to personality and perceived social environmental characteristics that reflect greater psychosocial unconventionality: greater tolerance of deviance, less traditional values (i.e., lower value on academic achievement, less compatibility with parental values, and lower religiosity), and greater susceptibility to peer influence (Beirness & Simpson, 1988). These findings are consistent with findings from other problem-behavior research, which has established a negative association between psychosocial conventionality and such problem behaviors as marijuana use, problem drinking, and delinquent or deviant behavior in adolescence and young adulthood (Bachman, Johnston, & O’Malley, 1981; Jessor, Donovan, & Costa, 1991; Jessor & Jessor, 1977; Kandel, 1984; McLaughlin, Baer, Burnside, & Pokomy, 1985; Newcomb & Bender, 1988). This same body of research has also shown that involvement in other problem behaviors plays a significant role in accounting for involvement in any specific problem behavior (see, for example, Jessor et al., 1991; Jessor & Jessor, 1977). Furthermore, as adolescents enter young adulthood, they become both more conventional and less involved in problem behaviors (Jessor et al., 1991). These cross-sectional and developmental findings suggest that risky driving should vary with variation in psychosocial conventionality and with involvement in other problem behaviors.

The assumption of marital, parental, and employment roles has also been associated with the diminution or discontinuation of involvement in problem behaviors, including criminal activity (Sampson & Laub, 1993) and the use of alcohol, marijuana, and other illicit drugs (Bachman, O'Malley, & Johnston, 1984; Temple et al., 1991; Yamaguchi & Kandel, 1985). The inhibiting effect of adult social-role occupancy on involvement in deviant or problem behavior may reflect new role demands, new social ties to individuals and institutions (family, community, workplace), and, therefore, changes in self- and social expectations and increases in informal social controls.

Role socialization processes are expected to decrease involvement in problem behavior because it is incompatible with or interferes with conventional role performance (Chassin, Presson, Sherman, & Edwards, 1992; Yamaguchi & Kandel, 1985). Assumption of conventional adult roles may also involve "a heightened degree of self identification as an 'adult' expected to behave in the culturally prescribed manner" and a lower likelihood of associating with people who are either involved in or encourage participation in problem behaviors such as substance use (Bachman et al., 1984, p. 630). Declines in various nonnormative or problem behaviors from adolescence to young adulthood may also be attributed partly to the social controls that the conventionalizing roles of marriage, work, and parenthood entail (Jessor et al., 1991). Involvement in deviant and conforming behavior is "mediated by social bonds to key institutions of social control" (Sampson & Laub, 1993, p. 18), and variation in behavioral development from adolescence into adulthood is expected to be at least partially attributable to the "social ties embedded in adult transitions" (p. 249).

In this study we examine whether variation in risky driving can be accounted for by variation in social role status and psychosocial and behavioral conventionality. The occupancy of conventional adult roles (e.g., spouse, parent, and employee) and greater psychosocial and behavioral conventionality should be related to less involvement in risky driving. Furthermore, the assumption of conventional adult roles and a developmental increase in psychosocial and behavioral conventionality should eventuate in a decline in risky driving behavior over time. Developmental analyses presented in this paper examine factors associated with change in risky driving and change in a subset of the riskiest drivers in the sample as well.

Method

Procedure

This paper is based on data from a three-wave (1990–1992), annual mail survey of drink driving and risky driving among young adults in the State of Colorado. A stratified random sample of 18- to 25-year-old licensed drivers was selected by the Colorado Division of Motor Vehicles (DMV) from their driver history database, which is public information. A total of 5,545 drivers with Class C (passenger car)

licenses was selected, stratified by sex, age (18–20 vs. 21–25), area of the state (metro Denver, northeast, southeast, west), and violation status. The four violation-status strata were as follows: no moving violations in the previous year (zero to two points), three or more points in the previous year for traffic violations not involving alcohol or other drugs, a Driving While Ability Impaired (DWAI) conviction in the previous year ($.05 < \text{BAC} < .10$), and a Driving Under the Influence (DUI) conviction ($\text{BAC} \geq .10$) in the past 3 months. (A 3-month period was selected to ensure that the convicted driver's year-long driving suspension would not have been in effect for much of the previous year.)

Twice as many men as women were selected for the study to reflect the sex differences in involvement in drinking and driving. Because only a small number of women in this age range had been convicted of DUI, no DUI stratum could be constituted for them. Within sex strata, the stratum sizes for age and for area of the state were proportional to the numbers in the state driving population. Drivers with no traffic violations were undersampled (33% of the sample vs. 86% of the population). Drivers with nonalcohol-related traffic violations were oversampled (42% of the sample vs. 14% of the population). Nearly all drivers in this age range who had alcohol-related violations were invited to participate in the study (25% of the sample vs. 0.4% of the population).

Letters requesting participation in the study were mailed to all 5,545 selected drivers. Nineteen percent (1,069) were returned as undeliverable, with no forwarding address. Signed consent forms were returned by 2,943 drivers (66% of those initially contacted [not undeliverable]; 53% of the total potential sample).

In 1990, the Young Adult Driving Questionnaire (YADQ) was mailed to the 2,943 drivers who gave consent. Completed questionnaires were returned by 2,720 young adult drivers (92% of those providing consent; 61% of those initially contacted; 49% of the total sample). Each participant was mailed a check for \$15. Approximately a year later, in 1991, a follow-up questionnaire was sent. A check for \$25 was sent to each respondent who returned the second questionnaire. The third questionnaire was mailed about a year after the second questionnaire was returned. In this third wave, completed questionnaires were returned by 1,879 participants (69% of the Wave 1 participants; 42% of those initially contacted at Wave 1; 34% of the total sample drawn). A \$25 check was mailed to each Wave 3 respondent.

The Wave 1 participants were compared with the total sample drawn to assess selection bias. Geographic areas were represented in the same proportions as in the total sample, plus or minus 1%. Whereas 60% of the total sample were 21 to 25 years old, 57% of the participants were in that age bracket. Sixty-four percent of the participants were men, versus the intended oversampling of 67%. Percentages of participants in each violation category versus the intended percentages in the total sample are as follows: no moving violation, 36% versus 33%; traffic violation(s), 44% versus 42%; DWAI, 14% versus 15%; and DUI, 6% versus 10%. Thus, men, and particularly men with DUI, were oversampled with respect to the state population, but not quite as much as we had intended.

Description of the Sample

Data from participants who completed both Waves 1 and 3 of the study were analyzed for this paper. These participants had the following characteristics at Wave 1: 62% were men, 38% were women; 37% were 18 to 20 years old, 29% were 21 to 22 years old, 34% were 23 to 25 years old; 15% were married, and 3% had been divorced; 51% were from metropolitan Denver, 17% were from western Colorado, 16% were from northeastern Colorado, and 17% were from southeastern Colorado. Ethnic composition of the sample, available only from the Wave 3 questionnaire, is 84% White, 11% Hispanic, and 2% each Black, Native American, and Asian. At Wave 1, 38% had zero to two points for traffic violations; 44% had three or more points for nonalcohol and nondrug-related traffic violations, 13% had a DWAI conviction, and 5% had a DUI conviction. With respect to employment, 57% were working full time, 22% were working part time, 2% were homemakers not working outside the home, 11% were unemployed full-time students, and 9% were unemployed. Forty-seven percent were enrolled in an educational program, from General Education Development (GED) to postgraduate.

To test for the possibility of bias due to attrition from the Wave 1 sample, we compared participants who completed Wave 3 with those who did not, using their data from Wave 1. Small but significant ($p < .05$) mean differences were found between the two groups on only 3 out of 10 representative measures from the questionnaire. Those who completed Wave 3, on average, were less aggressive, had fewer friends as models for problem behavior, and attended church more often. No difference was found in intolerance of deviance, impulsiveness, perceived agreement between parents and friends, influence from parents relative to friends, risky driving, percentage married, or percentage with fulltime jobs.

Despite these mean differences on three measures between participants lost to attrition and those who completed Wave 3, intercorrelations among the various measures were essentially the same within the two groups. A comparison of covariance structures in the two groups tested the goodness of fit between observed data from the 10 representative measures from the Wave 1 questionnaire and a model that equated each covariance between the two groups (Jöreskog & Sörbom, 1989). The goodness of fit index was .999, indicating an excellent fit to that model, and the chi-square statistic for lack of fit ($df = 45$) was 31.9, *ns*. The absence of evidence of bias in relations among the measures makes it unlikely that the results of regression analyses will be biased due to attrition from the initial, participating sample.

These analyses are based on data from 1,659 young adult drivers (1,025 men and 634 women) who had no missing data in Waves 1 and 3 for the risky driving criterion scores and for the social role and conventionality scores to be used as predictors (37% of those who were initially contacted, 61% of the Wave 1 participants, 88% of the Wave 3 participants).

Description of the Questionnaire

The 20-page YADQ includes a number of personality, perceived social environment, and self-reported behavior measures originally developed to test Problem Behavior Theory among high school and college students (Jessor & Jessor, 1977) and later modified for use with young adults in their middle to late twenties (Jessor et al., 1991). It also includes a variety of scales developed specifically for this study, as well as adapted versions of several measures developed by others (e.g., measures of competitive speed, driving aggression, and tension reduction from D. M. Donovan, Queisser, Salzberg, & Umlauf, 1985).

Measurement of driving behaviors. Risky driving, drink driving, and marijuana driving were assessed by 28 items that asked how many times in the past year the respondent had engaged in each behavior. The open-ended responses were recoded into the following 14 categories: never, 1 time, 2 times, 3 times, 4 times, 5 times, 6 to 9 times, 10 to 14 times, 15 to 19 times, 20 to 24 times, 25 to 29 times, 30 to 49 times, 50 to 99 times, and 100 or more times in the past year.

Risky driving was measured by a 20-item summative scale ($\alpha = .95$) whose item content is as follows: speeding (3 items), unsafe passing (3 items), following too closely (2 items), unsafe lane changes (4 items), failure to yield right of way (2 items), illegal turns (3 items), and running a stop sign or stop light (3 items). Drink driving was assessed by five items ($\alpha = .93$), which asked about frequency in the past year of the following behaviors: driving within an hour of having one or two drinks, driving within an hour of having three or more drinks, driving when high or light-headed from drinking, driving when coordination was already affected, and drinking while driving. Marijuana driving was assessed by three items ($\alpha = .88$), which asked about frequency in the past year of driving while a little high on marijuana, driving while very high on marijuana, and smoking marijuana while driving. Differential exposure to opportunity for risky driving was measured by a single item asking for the total number of miles driven during the past year.

Measurement of social role statuses. Social role status measures included three items that asked whether the respondent is married, has children, and is working full time (≥ 30 hours a week).

Measurement of conventionality. Psychosocial conventionality was represented by two personality measures and three perceived environment measures. The personality measures include attitudinal intolerance of deviance, a 10-item scale (range = 10–40, $\alpha = .79$) involving ratings of the “wrongness” of a variety of normative violations, including theft, lying, aggression, and property damage; and religiosity, a 5-item scale (range = 5–20, $\alpha = .90$) assessing the personal importance placed on religious beliefs, religious counsel, and religious activities. The perceived environment measures include parent-friends compatibility, a 3-item scale (range = 3–12, $\alpha = .80$) of perceived agreement between parents and friends regarding what is important in life, the kind of person one should become, and what one should be doing with one’s life; parent-friends influence, a 3-item scale (range = 3–9, $\alpha = .70$) assessing the relative influence of parents and friends on the participant in

making important decisions and in general outlook on life (higher score means more influence from friends); and friends as models for problem behavior, a 2-item scale (range = 2–10, $\alpha = .58$) reflecting exposure to friends who model involvement in drinking and in marijuana use. Behavioral conventionality was represented by two measures. Delinquent-type behavior was measured by a 10-item scale (range = 10–50, $\alpha = .68$), including reported frequency in the past 6 months of shoplifting, taking things that do not belong to you, giving fake excuses for missing meetings, lying to cover up something you did, starting fights and arguments, and intentionally damaging property that belongs to others. Church attendance was measured by a single multiple-choice item (range = 1–7) asking how many times in the past year the respondent attended religious services.

Correlations among the conventionality measures and among the social role measures had absolute magnitudes ranging from .05 to .70 ($p < .05$ for all), with an average of .22 and a median of .18. Correlations between conventionality measures and social role measures were smaller in magnitude, with a range of .00 to .15 (one third of them nonsignificant), average .07, and a median of .08. Thus, there appears to be more homogeneity within the two constructs than between them, and they may be considered relatively independent of each other.

Establishing the Risky Driving Criterion Measure

The 20-item risky driving scale is the principal criterion measure used in this study. It has an alpha reliability of .95, indicating very high internal consistency. Correlations between annual data waves indicate high stability of the risky driving measure from one year to the next. Correlations between Waves 1 and 2 were .67 and .72 for men and women, respectively; .75 and .75 between Waves 2 and 3; and .62 and .64 between Waves 1 and 3.

The official driving records of the participants provide some support for the validity of their self-reported driving behaviors. The mean risky driving score was significantly higher for those participants with recorded traffic convictions (59.8) than for those with no convictions (53.1), $t(1,439) = 2.9$, $p < .01$. Furthermore, in a previous paper on drink driving based on this same dataset, J. E. Donovan (1993) reported a significant correlation between the self-reports of drink driving and the number of alcohol-related traffic offenses in the DMV records ($r = .21$, $p < .001$).

Construct validity of the risky driving measure is supported by the pattern of its relations with other measures, a pattern that is consistent with expectations derived from theory and from previous empirical work. Women reported fewer instances of risky driving ($M = 48.6$) than did men ($M = 64.5$), $t(1590) = 8.0$, $p < .001$. This sex difference is consistent with the relative risks of collision among young adult drivers shown by national crash involvement data (Williams, 1996).

Risky driving scores showed strong negative correlations with three measures that refer to safe driving practices, one behavioral and two attitudinal. (All correlations reported in this paragraph are significant at $p < .001$). Risky driving had a

correlation of $-.59$ with a 7-item scale of safe driving habits ($\alpha = .74$), such as obeying speed limits and stop signs, and driving defensively to leave a margin of safety. Risky driving correlated $-.52$ with a 5-item scale of attitudinal intolerance of risky driving ($\alpha = .77$), which asked how “wrong” it is to speed, run stop signs, follow too closely, and take risks for fun while driving. In addition, risky driving correlated $.50$ with a 5-item scale of competitive driving attitude ($\alpha = .89$), a measure of the extent to which the respondent enjoys outmaneuvering other drivers.

Results

Results are organized into three sections. First, we examine the cross-sectional relations of social role status and conventionality with risky driving at Wave 1. Second, we describe developmental change in risky driving in this young adult sample over the 2-year interval from Wave 1 to Wave 3. Third, we predict change in risky driving between Wave 1 and Wave 3 based on change in social role status and in conventionality. In the multivariate analyses, the effects of age, ethnicity, miles driven in the past year, drink driving, and marijuana driving were partialled out. All analyses were done separately for men and for women.

Correlates of Risky Driving: Cross-Sectional Analyses

Bivariate analyses. Before examining multivariate relations with risky driving, we examined how each of the control measures and the measures of theoretical interest is related to risky driving (see Table 21.1). Nearly all the correlations between the control measures and risky driving are significant, highlighting the importance of controlling for these variables in the multivariate analyses. Most of the theoretical measures are significantly correlated with risky driving. These correlations indicate that occupancy of conventional young adult social roles and greater conventionality are associated with lower levels of risky driving for both men and women. The relations of marital status and parenthood with risky driving, however, are quite small, especially for men. The weakness of the relation between full-time employment and risky driving (not significant for women) may be due to the added exposure to driving that is involved in going to work every day.

With respect to psychosocial conventionality, greater attitudinal intolerance of deviance, greater religiosity (men only), more compatibility between parents and friends (men only), more influence from parents relative to friends, and fewer friends who model problem behavior were linked to less risky driving. With respect to behavioral conventionality, greater involvement in delinquent-type behavior was significantly correlated with risky driving, but church attendance was not.

Table 21.1 Correlations of Control, Social Role, and Conventionality Predictor Measures with the Risky Driving Measure

Measure	Men	Women
<i>Control</i>		
Age	-.08**	-.09*
Ethnicity (Non-White) ^a	-.15***	-.05
Miles Driven, Past Year	.19***	.18***
Drink Driving	.39***	.42***
Marijuana Driving	.19***	.25***
<i>Social Role</i>		
Married	-.06*	-.14***
Parent	-.07**	-.19***
Full-Time Job	-.05*	-.04
<i>Psychosocial Conventionality</i>		
Intolerance of Deviance	-.31***	-.28***
Religiosity	-.07**	.00
Parent-Friends Compatibility	-.06*	.05
Parent-Friends Influence	.13***	.10**
Friends Models, Problem Behavior	.15***	.16***
<i>Behavioral Conventionality</i>		
Delinquent-Type Behavior	.45***	.50***
Church Attendance	.00	.05

Note: Data are from Wave 1 (1990); men, $n = 1025$; women, $n = 634$
^a0 = White, 1 = non-white
 * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Interestingly, the delinquent-type behavior scale, which has no driving-related content, was more strongly correlated with the risky driving scale (.45 for men, .50 for women) than were the control measures of driving after drinking (.39 and .42), $t(1,022) = 2.0$ and $t(631) = 2.2$, respectively, $p < .05$, or driving after using marijuana (.19 and .25), $t(1,022) = 7.72$ and $t(631) = 6.02$, respectively, $p < .001$. This suggests that the risky driving score reflects a tendency to violate norms and rules, more than a substance-related impairment of driving.

In general, measures of conventionality are more strongly associated with risky driving than are social role measures, especially for men. The strongest relations with risky driving are for scales that refer to problem behaviors—intolerance of deviance, friends models for problem behavior, and delinquent-type behavior.

Multivariate analyses. The multivariate relations of all of the social role and conventionality measures with risky driving were assessed by hierarchical multiple regression analysis. The effects of age, ethnicity, miles driven in the past year, drink driving, and marijuana driving were partialled out by entering those control

measures at Step 1 of the regression. Because there were so few non-White participants, the ethnicity measure was merely dummy coded as 0 for White and 1 for non-White. Measures of social role statuses, psychosocial conventionality, and behavioral conventionality were then entered at Steps 2, 3, and 4, respectively. The analyses yield an account of the improvement in prediction (increase in amount of variance accounted for) at each step, as each predictor set is entered.

As shown in Table 21.2, the measures of social role statuses and of psychosocial and behavioral conventionality accounted for a significant proportion of the variance in the risky driving measure, 12% for men and 15% for women, over and above that accounted for by the control measures. With the entry of the social role measures at Step 2, there is a small, significant increment in the amount of variance explained (1% for men, 2% for women). A larger increment (an additional 4% for each sex) was added by the measures of psychosocial conventionality entered at Step 3, and a still larger increment (an additional 8% for men, 9% for women) was provided by the measures of behavioral conventionality entered at Step 4. With all of the predictor measures entered in the analysis, significant regression weights (betas) were obtained for delinquent-type behavior and church attendance for the men, and for parenthood, intolerance of deviance, delinquent-type behavior, and church attendance for the women. (Because church attendance was unrelated to risky driving at the bivariate level, it can be interpreted as a suppressor variable.)

The increase in the squared multiple correlation at the final step in the hierarchical regression analysis reflects variance accounted for uniquely by the behavioral conventionality measures, over and above the variance accounted for by all other predictors combined. To determine whether social role statuses or psychosocial conventionality can account for variance in risky driving that is not accounted for by other predictors, we reordered the steps of the analysis to enter either the social role measures or the psychosocial conventionality measures at the final step (not tabled). Each set of measures, when entered at the final step, accounted uniquely for 1% of the variance, a significant increment ($p < .05$), but substantially less than the variance uniquely accounted for by behavioral conventionality.

The Wave 1 analyses were replicated using the parallel data from Waves 2 and 3. The same pattern of results was found (not tabled) with similar proportions of variance accounted for. Again, after controlling for age, ethnicity, exposure, and driving after substance use, social roles accounted for a small proportion of variance in risky driving; psychosocial conventionality contributed a larger increment; and behavioral conventionality accounted for the most variance, even after all other predictors had been entered.

Developmental Change in Risky Driving: Descriptive Findings

Our second major aim in this paper is to describe the developmental course of risky driving over time. In the 2-year interval between Wave 1 and Wave 3, the average level of risky driving in this sample declined. The men's mean risky driving scores

Table 21.2 Cross-Sectional Hierarchical Regression Analysis Predicting Wave 1 Risky Driving Measure from Wave 1 Social Roles and Conventionality, Controlling for Age, Ethnicity, Miles Driven, Drink Driving, and Marijuana Driving

Step	Measures Entered	Men ^a			Women ^b		
		β at Final Step ^c	R^2	R^2 Change	β at Final Step ^c	R^2	R^2 Change
1	<i>Controls measures</i>		.21***			.21***	
	Age						
	Ethnicity (non-White)	-.09**					
	Miles driven	.17***			.12***		
	Drink driving	.27***			.23***		
	Marijuana driving				.09*		
2	<i>Add social role measures</i>		.22***	.006		.23***	.020**
	Married						
	Parent				-.11**		
	Full-time job						
3	<i>Add psychosocial conventionality measures</i>		.25***	.036***		.27***	.038***
	Intolerance of deviance				-.08*		
	Religiosity						
	Parent-friends compatibility						
	Parent-friends influence						
	Friends models, problem behavior						
4	<i>Add behavioral conventionality measures</i>		.33***	.077***		.36***	.093***
	Delinquent-type behavior	.33***			.36***		
	Church attendance	.11**			.13**		

Note: Sample sizes are slightly reduced due to missing data on control measures

^a $n = 949$

^b $n = 585$

^cNonsignificant beta coefficients are omitted

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

in Waves 1, 2, and 3, respectively, were 64.5, 60.4, and 57.6, $F(2,972) = 17.7$, $p < .001$. The women’s mean scores were 48.6, 47.1, and 45.0, $F(2,616) = 4.9$, $p < .01$. Furthermore, male and female drivers at each age level showed this pattern

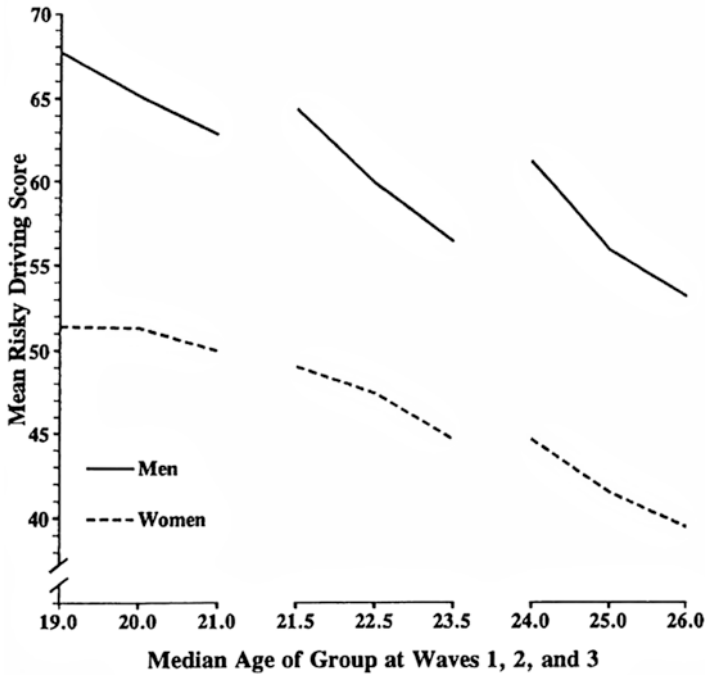


Fig. 21.1 Change in mean risky driving score, Wave 1 to Wave 2 to Wave 3, by sex and three age groups

of declining scores. The developmental decline in risky driving is illustrated in Fig. 21.1, by sex, for three groups defined according to their ages at Wave 1: ages 18 to 20 (median age = 19), ages 21 and 22 (median age = 21.5), and ages 23 to 25 (median age = 24).

The figure illustrates, for each sex, a decline in average scores across data waves within each of the three age groups. This decline is statistically significant ($p < .05$) for all but the youngest female group. The figure also illustrates the cross-sectional differences noted above between sexes and among age groups at Wave 1 (the left hand point in each curve), at Wave 2 (the middle point), and at Wave 3 (the right-hand point).

The Wave 3 mean of any group can be compared to the Wave 1 mean of the next older, same-sex group, which represents drivers at approximately the same age level two years earlier. There is no significant difference between the two groups in any of these comparisons. In other words, those drivers who were age 20 to 22 at Wave 3 (1992) reported about the same average frequency of risky driving as those who had been age 21 and 22 at Wave 1 (1990), and the 23- and 24-year-old drivers at Wave 3 reported about the same amount of risky driving as those who had been age 23 to 25 at Wave 1. Thus, the cross-sectional age differences in risky driving, as well

as the longitudinal declines in risky driving, can be seen as developmental changes rather than cohort differences reflecting historical change.

Because social role statuses and conventionality are associated cross-sectionally with risky driving, the observed decrease in risky driving with age suggests corresponding changes in social roles and conventionality with age (Jessor et al., 1991). The data provide some support for those expectations. From Wave 1 to Wave 3, participants reported average increases in occupancy of the three young adult social role statuses and increases in conventionality as measured by parent-friends compatibility and by delinquent-type behavior ($p < .05$ for all). There was no significant mean change in religiosity, parent-friends influence, or friends as models for problem behavior. One measure of conventionality, church attendance, showed an average decrease in both sexes, as did intolerance of deviance among the men. In sum, half of the predictor measures showed significant mean changes that were theoretically consonant with the observed decline in risky driving over time.

Developmental Change in Risky Driving: Longitudinal Prediction

Although involvement in risky driving declined, on average, from Wave 1 to Wave 3, many respondents reported no change, and some even reported an increase in risky driving. Our third major aim in this study, therefore, is to try to account for these individual differences in change in risky driving over time—that is, to predict variation in developmental change in risky driving. Our main hypothesis is that the observed changes in risky driving can be accounted for by change in young adult social roles and change in conventionality.

One method for predicting change with a regression approach is to enter the Time 1 score as a control measure and use the Time 2 score as the criterion measure (Dalecki & Willits, 1991). Change in risky driving from Wave 1 to Wave 3 was operationalized by entering the Wave 1 risky driving score at Step 1 of a hierarchical multiple regression predicting risky driving at Wave 3. Similarly, change in social role statuses and change in conventionality were established by entering the Wave 1 measures of those variables as controls at Step 3, after the other control measures had been partialled out at Step 2. Regression weights for the Wave 3 measures of social roles and psychosocial and behavioral conventionality, entered at Steps 4, 5, and 6, respectively, then represent the effect of Wave 1-Wave 3 change in those predictors on Wave 1-Wave 3 change in the risky driving criterion measure. The analyses presented in Table 21.3 show that change in social role statuses and change in psychosocial and behavioral conventionality do, indeed, provide a significant account of change in risky driving.

The substantial stability of risky driving scores across the three data waves was noted earlier. As can be seen in Table 21.3, Wave 1 risky driving, entered at Step 1, accounts for 38% and 42% of the variance in Wave 3 risky driving for men and

Table 21.3 Longitudinal Hierarchical Regression Analysis Predicting Change in Risky Driving, Wave 1 to Wave 3, From Change in Social Roles and Change in Psychosocial and Behavioral Conventinality

Step	Measures Entered	Men ^a			Women ^b		
		β at Final Step ^c	R^2	R^2 Change	β at Final Step ^c	R^2	R^2 Change
1	Wave 1 risky driving measure	.45***	.38***		.54***	.42***	
2	Wave 3 control measures		.49***	.110***		.48***	.057***
	Age	-.05*					
	Ethnicity (non-White)						
	Miles driven	.15***			.09**		
	Drink driving	.26***			.16***		
	Marijuana driving				-.06*		
3	Wave 1 predictors as controls		.50***	.012*		.49***	.012
	Social role measures						
	Married						
	Parent						
	Full-time job	-.06*					
	Psychosocial conventionality measures						
	Intolerance of deviance						
	Religiosity						
	Parent-friends compatibility						
	Parent-friends influence						
	Friends models, problem behavior	-.05*			-.10**		
	Behavioral conventionality measures						
	Delinquent-type behavior						
	Church attendance						
4	Wave 3 social role measures		.50***	.001		.50***	.013**
	Married				-.08*		

(continued)

Table 21.3 (continued)

Step	Measures Entered	Men ^a			Women ^b		
		β at Final Step ^c	R^2	R^2 Change	β at Final Step ^c	R^2	R^2 Change
	Parent						
	Full-time job						
5	Wave 3 psychosocial conventionality measures		.51***	.012***		.51***	.010*
	Intolerance of deviance	-.06**					
	Religiosity						
	Parent-friends compatibility						
	Parent-friends influence						
	Friends models, problem behavior						
6	Wave 3 behavioral conventionality measures		.57***	.053***		.54***	.025***
	Delinquent-type behavior	.28***			.21***		
	Church attendance						

Note: Sample sizes are slightly reduced due to missing data on control measures

^a $n = 965$

^b $n = 595$

^cNonsignificant beta coefficients are omitted

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

women, respectively. At Step 2, the other five control measures account for an additional 11% of the variance for men and 6% for women. These percentages are based on the total variance in Wave 3 risky driving. Our interest in these analyses is in the variance in change in risky driving—that is, in the residual variance after the Wave 1 risky driving score has been entered. Subtracting the variance accounted for at Step 1 from the total variance, the residual can be considered the variance in change in risky driving left to be explained (Cohen & Cohen, 1975). The 11% and 6% accounted for at Step 2, expressed now as a percentage of the residual variance, yield 18% and 10%, respectively, of the variance in change in risky driving accounted for by the five controls.

At Step 3, the entire set of Wave 1 measures of social roles and conventionality was entered to partial out the variance related to their initial levels (about 1%),

thereby allowing us to assess the effects of change in those measures in subsequent steps. When the Wave 3 social role measures were entered at Step 4, there was no improvement in prediction for men, but there was a significant increment in R^2 for the women of 1% of the variance in risky driving, which converts to 2% of the variance in change in risky driving. Change in social roles is minimally predictive of change in risky driving, but the lone significant regression weight among the Wave 3 social role measures does indicate that, for women, getting married between Wave 1 and Wave 3 is linked to a decrease in risky driving. This significant effect of getting married, for women, can be illustrated by the differential change in average risky driving scores for women who married after Wave 1 versus women who did not marry: For the former, the average risky driving score decreased (from 48.1 at Wave 1 to 35.8 at Wave 3); for women who did not marry, the average score showed essentially no decrease (from 48.7 at Wave 1 to 47.5 at Wave 3).

When the Wave 3 psychosocial conventionality measures were entered at Step 5, they accounted for an additional 1% of variance in risky driving for both men and women, or 2% of the variance in change in risky driving. Change in psychosocial conventionality, like change in social role status measures, accounts for only a small, although significant, amount of variation in change in risky driving. It is change in the behavioral conventionality measures, entered at Step 6, that accounts for a more substantial increment of 5% of variance in risky driving for men and 3% for women; those convert to 9% and 4%, respectively, of the variance in change in risky driving. Change in behavioral conventionality, therefore, has a larger impact on change in risky driving than either change in social role statuses or change in psychosocial conventionality. The importance of behavioral conventionality was seen earlier in the cross-sectional analyses as well. Overall, then, the data in Table 21.3 indicate that change in social role statuses, psychosocial conventionality, and behavioral conventionality together account for a significant amount of the variance in change in risky driving—11% for the men and 8% for the women.

These same analyses of change were replicated over the Wave 1 to Wave 2 interval with very similar findings (not tabled). Change in behavioral conventionality was again the strongest predictor for each sex.

It is plausible that the Wave 3 measures of social roles and psychosocial conventionality are weak or are not significant in these longitudinal predictions due to multicollinearity, which would inflate the standard errors of coefficients for those measures. One rule of thumb is that variance inflation factors greater than 10 may cause poorly estimated coefficients (Myers, 1990). When we examined the variance inflation factors associated with all predictors in the model, most of them were less than 2, with the largest being 3.4. We therefore conclude that small or nonsignificant coefficients in the present analyses are not due to multicollinearity.

Predicting change in risky driving among risky drivers. The analyses thus far have been concerned with predicting change in risky driving for the entire sample of drivers. But a key concern remains: What happens developmentally to the risky drivers making the transition to young adulthood? Can their change also be predicted? To examine developmental change in that subgroup, we defined a group of risky drivers based on their Wave 1 risky driving scores being at or above the 66th

percentile of the distribution for each sex (score of 79 for men, 58 for women). That cutoff score was chosen because it seemed sufficiently extreme to represent hazardous driving behavior, but was low enough to give adequate group sizes for analysis ($n = 319$ men, 199 women). The analyses sought to predict, among the Wave 1 risky drivers, which ones would still be risky drivers by Wave 3—that is, have a score at or above 79 for men or 58 for women—and which would no longer be in the risky driver group—that is, have risky driving scores below these levels.

Again, changes in social roles and in conventionality were used as predictors. The criterion measure was whether a person was in the group that continued as risky drivers (chronic risky drivers) or not (matured out of risky driving). (It may be argued that a logistic regression is more appropriate for this dichotomous criterion measure, but results from logistic regressions showed the same significance levels for the unique contributions of the various predictor types. Results from the ordinary hierarchical regressions are presented to allow the increments in variance accounted for to be compared with the preceding analyses.) The results of these analyses (see Table 21.4) indicate that the theoretical measures are indeed relevant for accounting for maturing out of risky driving.

After all the control measures were entered in Steps 1, 2, and 3, the effects of changes in the theoretical predictors were assessed in Steps 4, 5, and 6. For the women, changes in social role statuses predicted maturing out of risky driving. For the men, change in behavioral conventionality predicted maturing out of risky driving. Total variance in risky driver status accounted for by change in social roles, change in psychosocial conventionality, and change in behavioral conventionality, over and above the control measures, was 10% for the men and 11% for the women. Change in social role statuses, at Step 4, accounted for a significant 7% of variance for the women, but no significant variance for the men. Change in psychosocial conventionality, at Step 5, did not significantly improve prediction for either sex. Change in behavioral conventionality at Step 6, however, significantly improved prediction for the men (an additional 8% of variance accounted for). There was no improvement for the women. These findings indicate an important sex difference in those factors that facilitate development out of risky driving among initially risky drivers during the transition to young adulthood. Significant predictors of maturing out of risky driving for the men were change in intolerance of deviance, change in religiosity, and change in delinquent-type behavior. (Change in church attendance also had a large coefficient, but as a suppressor variable). For the women, the significant predictors of maturing out of risky driving were different—getting married and getting a full-time job.

We replicated these analyses over a briefer interval; maturing out of risky driving by Wave 2 was regressed on changes in the predictors between Waves 1 and 2 (not tabled). In predicting change in risky driver status over this 1-year period, change in social roles did not account for significant variance for either sex; change in psychosocial conventionality accounted for a significant increment of 3% of variance in risky driver status for the men and a nonsignificant 3% for the women. As was found in the 2-year change analysis, change in behavioral conventionality was the strongest predictor for the men, but was not significant for the women.

Table 21.4 Longitudinal Hierarchical Regression Analysis Predicting Change of the Riskiest Driver Group, Wave 1 to Wave 3, from Change in Social Role and Change in Psychosocial and Behavioral Conventinality

Step	Measures Entered	Men ^a			Women ^b		
		β at Final Step ^c	R ²	R ² Change	β at Final Step ^c	R ²	R ² Change
1	Wave 1 risky driving measure	.22***	.09***			.06***	
2	Wave 3 control measures		.19***	.094***		.12***	.061*
	Age						
	Ethnicity (non-white)						
	Miles driven						
	Drink driving	.29***			.17***		
	Marijuana driving						
3	Wave 1 predictors as controls		.23***	.043		.14*	.019
	Social role measures						
	Married						
	Parent						
	Full-time job						
	Psychosocial conventionality measures						
	Intolerance of deviance						
	Religiosity						
	Parent-friends compatibility						
	Parent-friends influence						
	Friends models, problem behavior						
	Behavioral conventionality measures						
	Delinquent-type behavior						
	Church attendance						
4	Wave 3 social role measures		.23***	.001		.21***	.071***
	Married				-.27**		
	Parent						

(continued)

Table 21.4 (continued)

Step	Measures Entered	Men ^a			Women ^b		
		β at Final Step ^c	R ²	R ² Change	β at Final Step ^c	R ²	R ² Change
	Full-time job				-.16*		
5	Wave 3 psychosocial conventionality measures		.25***	.018		.24***	.032
	Intolerance of deviance	-.11*					
	Religiosity	-.19*					
	Parent-friends compatibility						
	Parent-friends influence						
	Friends models, problem behavior						
6	Wave 3 behavioral conventionality measures		.33***	.076***		.25**	.004
	Delinquent-type behavior	.25***					
	Church attendance	.29***					

^a*n* = 319

^b*n* = 199

^cNonsignificant beta coefficients are omitted

p* ≤ .05; *p* ≤ .01; ****p* ≤ .001

In the change analyses presented in Tables 21.3 and 21.4, Wave 1 measures of social roles and psychosocial and behavioral conventionality were entered at Step 3 to control for their initial levels. That step also serves to show how poorly Wave 1 social role statuses and conventionality predict change in risky driving. The increment in variance accounted for at that step was small and, with one exception, nonsignificant. In the next three steps, changes in those predictors from Wave 1 to Wave 3 provided significant prediction of changes in risky driving over the same time period. Thus, measures of developmental change in social roles and in conventionality predicted change in risky driving, whereas the initial levels of those predictors did not.

Discussion

In this study we established a linkage between participation in conventional social roles and psychosocial and behavioral conventionality, on the one hand, and involvement in risky driving, on the other. The nature of that linkage is consonant with linkages that have been established for other adolescent and young adult problem behaviors: the greater the participation in conventional social roles and the greater the psychosocial and behavioral conventionality, the less the involvement in problem behaviors (Jessor et al., 1991; Jessor & Jessor, 1977; Sampson & Laub, 1993). That those same variables now also account for risky driving suggests that it may be part of a larger syndrome of problem behavior in adolescence and young adulthood. To ensure that the relations of the theoretical variables with risky driving are not merely due to their associations with driving after drinking or drug use, measures of those variables were partialled out of the risky driving criterion measure.

The developmental pattern of risky driving in youth and young adulthood—a linear decline in average levels of risky driving as age increased from 18 to 25 in this study—is consistent with findings from other studies (Evans & Wasielewski, 1983; Jonah, 1990; Jonah & Dawson, 1987; Peck, 1985; Wasielewski, 1984; Yu & Williford, 1993). Changes in young adult social role statuses and in some of the measures of psychosocial and behavioral conventionality that were theoretically consonant with that decline also were observed. Thus, young adults in this sample exhibited the “return to conventionality” that was noted in an earlier study of the transition to young adulthood (Jessor et al., 1991), and that is one explanation of the “maturing out” process observed with respect to several other adolescent problem behaviors.

Also important, we have shown that it is *changes* in social roles and in psychosocial and behavioral conventionality, rather than initial levels, that are predictive of changes in risky driving. Changes in the same variables that accounted cross-sectionally for variation in risky driving accounted for variation in change in risky driving, demonstrating consistency in the cross-sectional and longitudinal relations. The changes in social roles and in conventionality appear to reflect a developmental process that involves the adoption of more conventional attitudes, values, beliefs, and behaviors with the approach to and entry into young adulthood. The direction of change toward more conventionality has implications not only for maturing out of risky driving, but for a lifestyle characterized by less involvement in problem behaviors in general.

The observed developmental decline in risky driving is consistent with crash data that show that rates of crashes are very high for 16-year-olds and then decline sharply across the next 9 years (Williams, 1993, 1996). The changes in psychosocial factors that are associated with decreases in risky driving behavior would have implications, albeit indirect, for those decreases in crashes and would help to explain why older drivers experience fewer traffic crashes than do teenagers and young adults.

Clear differences emerged in the relative importance of the different sets of theoretical predictors for explaining risky driving. Behavioral conventionality is the strongest predictor of risky driving cross-sectionally, followed by psychosocial conventionality and then social roles. There was also an important sex difference: The social role statuses that we assessed are more strongly correlated with risky driving for women than for men. Among the riskiest drivers, entry into conventional young adult social roles is the strongest predictor of change in risky driving for women, whereas it is change in behavioral conventionality that is the strongest predictor for men.

Perhaps of most practical or applied interest from a traffic-safety perspective is the finding that changes in social roles and in conventionality can predict change or maturing out of risky driving for those initially in the group of riskiest drivers. It suggests that established patterns of risky driving, even among the riskiest, can be deflected, and that those drivers need not remain chronic threats to traffic safety.

These data cannot establish causal direction, despite being longitudinal. It may be that changes in conventionality lead to changes in both social roles and risky driving, or that changes in social roles prompt changes in psychosocial conventionality and in a wide range of behaviors. There also may be reciprocal causation. Sadava & Pak (1993) showed a negative association between involvement in a committed relationship and alcohol consumption, but “both directions of causality are shown to be operative” (p. 39). Yamaguchi and Kandel (1985) found that marijuana use is associated with postponement of marital and parental roles and that marriage and parenthood are associated with subsequent reduction in marijuana use. They also argued that causality may operate in both directions through the processes of role selection and role socialization. Because these kinds of processes are obviously not amenable to control or experimentation, achieving more precise measurement of the timing of onset of change in each predictor might be helpful in clarifying causal directions in change in risky driving.

These results need to be evaluated in the context of several limitations. First, the analyses are based on self-reports, including driving behavior and involvement in other problem behaviors. Although assurance of confidentiality was given to participants in an effort to minimize inaccurate reporting, it is possible that participants understated their actual involvement in these behaviors. However, the consistency between self-reports and official driving records does support the validity of the self-reports.

Second, the theoretical measures accounted for a relatively modest proportion of variance in risky driving. Including the control measures, the predictors used in the cross-sectional analyses accounted for about one third of the variance in risky driving. In the longitudinal analyses, 29% of the variance in change in risky driving for the men and 21% for the women was accounted for. Part of the unexplained variance is most likely due to other, unmeasured influences, such as driving experience, proportion of driving done at night, proportion of driving for recreation versus for work, vehicle characteristics, and driving-related attitudes. Another part of the unexplained variance may be due to inadequacies in the measures used. For psychosocial and behavioral conventionality, we did borrow well-established measures

from our own previous work, but our measures of social role statuses lack the known reliability and validity of well-developed measures. For example, the social role measures only assessed role occupancy, whereas there are many complex dimensions to social roles and to the contexts associated with roles (Bachman et al., 1984). The qualities of role occupancy, rather than simple role occupancy itself, may better explain the relations between social roles and nonnormative behavior (Chassin et al., 1992). More than the mere occurrence of role transitions, it may be the quality or strength of the social ties provided (for example, marital attachment or job stability) that can be expected to increase informal social control and thereby reduce problem behavior (Sampson & Laub, 1993). Despite these limitations in the measurement of social roles, however, the measures did show the expected mean differences between sexes and across age groups, as well as the expected relations with problem behavior.

A third limitation of the study is the relatively homogeneous nature of the sample. Although possible effects of race and ethnicity were controlled, the small number of non-White participants precluded more detailed analysis, and the present results speak essentially to the White population. An important direction for future research, therefore, would be to examine these relations among racial and ethnic minority populations.

The lower than desired initial participation rate and the attrition from the Wave 1 sample are additional limitations of this study. Nevertheless, the participants were quite representative of the original sample strata, and we were not able to detect any meaningful bias in the data due to the attrition.

Overall, the results of this study support a theoretical account of variation in risky driving and in change in risky driving. Risky driving in young adulthood, like other problem behaviors, seems to be embedded in a larger, more unconventional lifestyle. Because it is very likely that risky driving is a significant cause of crashes, changes in lifestyle—in social roles and in psychosocial and behavioral conventionality—may be important targets for interventions to reduce the morbidity and mortality associated with youthful driving. Efforts to educate young drivers about safe driving practices are likely to be ineffective without attention to these other psychosocial and behavioral aspects of their lives (see Williams, 1993). Continued social policy attention to drink driving alone would continue to elide what seems to be another important influence on driving-related crashes.

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Part VII
Health Behaviors

Chapter 22

Problem Behavior Theory and Behavioral Health in Adolescence

Richard Jessor

Unbroken in continuity and seamless as time, the life course has nevertheless been subject throughout history to differentiation and partitioning of one sort or another. The divisions have reflected literary fancy, biological regularities, arrangements of the social order, and even the phenomenology of subjective awareness. Whatever the number of stages or periods described, however, their nature has always been somewhat problematic and their boundaries ambiguous and uncertain. Adolescence, as a relatively new emergent in the history of ideas about developmental stages, exemplifies all the difficulties associated with attempts to segment the trajectory of lives. Dissatisfaction with it as a single stage, for example, continues to be expressed in proposals to differentiate it further into early and late adolescence or to create yet another life stage, youth, to lie between adolescence and adulthood.

It has become quite clear by now that no absolute or univocal criteria can be invoked to demarcate periods of the life course—including the adolescent period. The criteria employed usually stem from the discipline or the interest of the developmentalist: an interest in physical growth might direct attention to the calcification of the bony epiphyses, the onset of the menses, or the volume of the testicles; an interest in social growth might focus on the shift toward peer orientation, the initiation of dating, or the assumption of certain role obligations; and a concern with organizing educational arrangements might give prominence to certain characteristics of the thought processes, especially the attainment of formal operational thinking. In short, the criteria that can be used to bracket the adolescent period will vary according to a number of considerations, including the population of young people being dealt with, the social and cultural setting in

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Jessor, R. (1984). Adolescent development and behavioral health. In J. D. Matarazzo, S. M. Weiss, J. A. Herd, N. E. Miller & S. M. Weiss (Eds.), *Behavioral health: A handbook of health enhancement and disease prevention* (pp. 69–90). New York: John Wiley & Sons.

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which they are located, the aim, purpose, or interest of the inquiry, and the time in history in which the inquiry takes place. Obviously, multiple and converging criteria are required for conviction that adolescence as a life stage has in fact been specified.

Despite such cavils about varying criteria and uncertain boundaries, it is apparent that adolescence is widely perceived in contemporary society as a period in the life span that is of key developmental significance. Accompanying this perception is a steadily growing awareness that the time of adolescence has special relevance for health. Not only is it distinctive in itself as a period of relatively high risk for compromising health, but, equally important, it is a developmental period that has long-range implications and reverberating consequences—both positive and negative—for health at later stages of the life span.

Adolescence in the Life Span

The adolescent period has experienced a major renewal of interest over the last decade or two, and there has been a burgeoning of research focused on it. Some of the impetus for greater attention to adolescence seems to have come from societal concern about the new patterns of behavior, especially those involving drug use and sexual activity, that were embedded in the youth movement of the 1960s and 1970s and that constituted an unanticipated and disconcerting challenge to established norms. Some of the impetus derives from an entirely different quarter—the enhanced awareness within the developmental sciences that plasticity and change are not confined to the earliest years alone and that the course of subsequent development is not already set by the events of infancy and early childhood. Indeed, the emergence of the life span perspective in developmental psychology (Baltes, Reese, & Lipsitt, 1980) and the elaboration of the life course emphasis in sociology (Elder, 1975; Riley, Johnson, & Foner, 1972) were based in large part on the premise that significant developmental change occurs throughout the entire life span. The characteristic pervasiveness and rapidity of change in adolescence has made that period an especially relevant stage for life span or life course research. Finally, recent years have seen the formulation of various theoretical positions (e.g., the Problem Behavior Theory of Jessor and Jessor, 1977) in which the adolescent period is allocated a pivotal role in the shaping of personality and behavior; this, too, has provided impetus for greater attention to adolescence.

As noted earlier, the absence of clear-cut boundaries around the adolescent period makes it difficult to segregate it from the stages that precede and follow it. When chronological age is relied on to delimit adolescence, the range usually extends from a rough lower bound of 10 to 12 years old to a rough upper bound of 18 to 20 and even beyond. Although it is helpful in locating adolescence as a segment along the life trajectory, chronological age remains a very unsatisfactory criterion for several reasons. First, there is enormous interindividual variation in the relation of age to the various other criteria—biological, psychological, social, and institutional—that must be invoked to bracket the adolescent stage more precisely.

Furthermore, there have been long-term, secular changes in the relationship of several of these other criteria to age: the increasingly earlier age of menarche; the earlier age of entry into the secondary school system; and the initiation of sexual activity at increasingly younger ages. Finally, the timing of appearance of the various indicators of adolescence is likely to be asynchronous for a given child; thus, the onset of puberty as an indicator may occur at an earlier age than other indicators, for example, before entrance into junior high or before the assumption of autonomy in personal decision making.

The difficulties that arise from relying on chronological age have led to efforts to focus on alternative criteria on which to map developmental age. Anatomical and physical criteria, such as those used in Tanner staging, can be helpful in specifying a biological age, but children equated in those terms will vary enormously, not only in chronological age, but also on a large number of psychosocial and educational indicators whose convergence is required to implicate adolescence as a full-fledged stage. An additional limitation of reliance on any sort of biological age notion is that there are really no biological criteria that can be used to denote the upper bound of adolescence in a way that parallels their use in establishing the lower bound. Social norms and institutional regularities need to be invoked for that purpose—for example, completion of secondary schooling; entry into the full-time work force; attaining an age that is legally defined as adult, such as the age to vote or drink; living in a committed relationship with a partner; or deciding to start a family. These indicators reflect a social rather than biological definition of the end of adolescence or the beginning of young adulthood.

There are two further problems in dealing with adolescence as a single, delimited life stage. One of these is that adolescence entails a long period of time, an age range that covers at its conclusion nearly half the life span to that point. Over such an extended period of time, the events, experiences, and processes that characterize the earlier portion of adolescence are almost necessarily different from those that characterize the later portion. It is this fact that has prompted proposals to differentiate adolescence into more than a single stage in an effort to capture better the developmental variation that it encompasses. Given the sheer length of the adolescent period and the growth that takes place over those years, accounting for development, transition, and change within adolescence remains as much of a challenge as accounting for development into and out of that period.

Another problem in considering adolescence as a delimited life stage lies in the abundant evidence for continuity rather than discontinuity between adolescence and the stages that precede and follow it. Continuity on the antecedent side has been demonstrated in Kellam's work, for one example: classroom shyness and aggressiveness among first-grade black children was linked to their involvement with drugs a decade later during adolescence (Kellam, Brown, & Fleming, 1982). Continuity on the consequent side has been demonstrated in our own work in the Young Adult Follow-Up Study (Jessor & Jessor, 1984), which provides evidence of how adolescent personality, social, and behavioral attributes predict variation in those same domains later in young adulthood. Such continuity between life stages argues against any sharp separation and disjunction of developmental stages, including the stage of adolescence.

Adolescence is best treated, therefore, as a stage that is internally heterogeneous and only roughly delimited, with the criteria of its onset—especially pubertal change—being more consensual than the criteria for its termination. For its full specification as a life stage, multiple and diverse criteria are required. In the final analysis, adolescence can be seen as a biologically marked, socially organized, and personally defined time in the life span. Encompassing nearly all the teenage years, and certainly the years in junior and senior high school, adolescence serves as a bridging period between childhood and young adulthood, and it functions as something of a crucible for the shaping of later life.

Adolescence and Change

The hallmark of the adolescent years is change. Extending from the transitions that are organized around the passage out of childhood to those that are concerned with the entry into adulthood, change tends to be pervasive across a wide variety of domains and to take place rapidly relative to its rate in nearly all other life stages. Beyond the more obvious changes in physical size and shape associated with the adolescent growth spurt and the onset of puberty, there are social and psychological changes that are equally transformative in magnitude. Some of these are rather direct reverberations and reflections of the physical changes—for example, elaboration of a new body image, attainment of greater athletic skill, or arrival at a sexually attractive appearance; and some are consequences of entry into new socially defined roles—exposure to new models and opportunities and the exploration of new self-definition and social identity occasioned by the social organization of adolescent life itself.

The developmental changes that are characteristic during adolescence can be approached in different ways. The focus can be on the major directions of overall growth or, alternatively, it can be on the acquisition of specific behaviors or the assumption of specific roles. The former approach has been exemplified by White's (1975) attempt to codify the main developmental trends he discerned in his case studies of late adolescence and early adulthood: the stabilizing of ego identity; the freeing of personal relationships; the deepening of interests; the humanizing of values; and the expansion of caring. Without having to assume that such trends are developmental invariants over history and across societies, we can still appreciate them as illuminating some familiar directions of adolescent psychosocial growth.

In a somewhat similar vein, Havighurst (1972) has proposed the concept of "developmental task." He lists a number of tasks or objectives the socially organized pursuit of which tends to structure change and transition in the adolescent period. These include such objectives as establishing autonomy and separation from family, completing one's education, choosing an occupation, establishing a sense of self, and developing a personal value system. Erikson (1963) has also pointed out several trends that are central to the adolescent stage, including the coming to terms with physical intimacy and the establishment of identity. Finally, our own work suggests

additional directions of developmental growth—for example, the trend toward nonconventionality during adolescence and the opposite trend toward greater conventionality and conformity during young adulthood (Jessor, 1983b). Our work also suggests other developmental tasks that nearly all contemporary American adolescents are now having to deal with, such as coming to terms with the use of alcohol and other drugs (Jessor, 1983a).

When change at a more specific level is considered, the emphasis shifts to those key behaviors and nodal experiences that occur for the first time in adolescence—starting to drink or to use other drugs, beginning to work, moving away from home, becoming a nonvirgin—specific events that can have far-reaching effects on the young persons involved and on how they see themselves and come to be seen by others. A focus on specific behavioral changes calls attention to the major role that peers play in adolescence as models and as sources of information and reinforcement.

These comments about change during the adolescent stage in the life course are meant to serve as general background for the elaboration of theoretical issues and findings more closely related to our concern with behavioral health. Before concluding this section, it is worth bringing together several implications for health that seem to be inherent in the adolescent life stage.

First, it is apparent that adolescence is a period in which a variety of behaviors relevant to health are initially learned and tried out—both those that are potentially health-compromising, such as drug use or precocious sexual activity, and those that are likely to be health-enhancing, such as regular schedules of exercise or limiting the intake of calories in the diet. Second, many of the psychosocial attributes that influence and regulate the occurrence of health-related behaviors—values, beliefs, attitudes, motivations, personal controls, self-concept, general lifestyle—are also acquired or consolidated during adolescence. These first two points emphasize the key significance of adolescence as a pivotal time for health-related learning and socialization. Third, the changing environment of adolescence has its own implications for health in several important ways. Peers come to play a greater role at this stage relative to the role of parents or other adults, thus increasing the likelihood of nonconventional and health-compromising behavior; there is greater access at this stage to potentially health-compromising materials—drugs, alcohol, automobiles, and motorcycles—and to opportunities to use them; and the environment of adolescence is itself changing and developing, which results in major shifts in norms, in prevalence of behavior models, and even in legislative regulations, all of which can create uncertainty about appropriate behavior and can impose new demands for adaptation. Fourth, the sheer pervasiveness and rapidity of the personal and social changes that take place during adolescence may be a source of adaptation pressure—especially if multiple changes are under way simultaneously—and may require coping with feelings of inadequacy and expectations of failure. Fifth, the asynchrony of changes during adolescence is also likely to be stressful and problematic for health—for example, the asynchrony between the attainment of reproductive maturity and sexual interest, on the one hand, and societal relaxation of its norms and controls proscribing sexual activity, on the other.

The organization of adolescence around the accomplishment of temporally ordered developmental tasks and the key role that adolescence appears to play in the learning of health-relevant behaviors and orientations suggest one more implication for health. Adolescence may well be a critical period for a particularly significant health-promoting intervention, one involving the societal definition of a new developmental task for all adolescents to master—namely, the assumption and management of personal responsibility for their own health and social responsibility for the health of others.

Adolescence as a Relatively High-Risk Stage of Life

Although it may seem to be obvious, the concept of health risk, in adolescence as elsewhere, is complex. Its employment requires the articulation of a number of different dimensions and qualifications. The prior concept of health, itself problematic, also remains refractory to any simple specification, whether it be the absence of disease on the physical level, the sense of competence and self-actualization at the psychological level, the minimal involvement in nonnormative activities at the behavioral level, or the successful enactment of role requirements at the social level. The complexity of the health risk notion can readily be seen in the elaboration of some of the dimensions along which it varies.

Health risk in adolescence can refer to risk that is immediately consequential within adolescence (e.g., the risk from driving after consuming alcoholic beverages); to risk that has consequences for the post-adolescent period—that is, for adulthood and later life (e.g., the risk from obesity, or from a diet high in saturated fats); or to risks that include both present and remote consequences (e.g., the risk from becoming pregnant). It can refer to risk deriving from behavior (e.g., from cigarette smoking or from not using seat belts); to risk deriving from personality characteristics (e.g., risk from the sense of powerlessness or from having a strong need for independence and rebelliousness); to risk related to aspects of the environment (e.g., risk from access to automobiles, from exposure to peer models for drinking, or from opportunities for sex); or to the interactions of all of these kinds of risks. Health risk can refer to risks that are relatively universal and invariant in their consequences for health (e.g., the risk from contracting a sexually transmitted disease or from having adolescent hypertension) or to variable risks that depend for their consequences on the presence of certain situational factors (e.g., the risk from using marijuana just before driving), on gender (e.g., the risk from heavy drinking when pregnant), on body size and weight (e.g., the risk from a high rate of alcohol intake), or on age (e.g., the risk from insufficient hours of sleep in early adolescence). Finally, health risk can also refer to a particular threshold level of intensity of involvement with a behavior or activity; lesser involvement in that behavior need not be risky and, in some instances, may even be health-enhancing (e.g., the risk from overeating, whereas eating lesser amounts of food is actually health-enhancing; or the risk from drinking alcohol, whereas intake of moderate amounts may be health-protective, while both abstinence and heavier drinking may be health-compromising).

When used to characterize an individual's life as a whole, the concept of health risk should reflect the balance that obtains between the health-compromising and the health-enhancing activities in which the person engages. Thus, the risk to health of engaging in health-compromising behaviors should probably be seen as variable; its magnitude will often depend on the extent, the variety, and the intensity of the health-enhancing behavior engaged in by the adolescent at the same time.

In documenting that adolescence is, indeed, a relatively high-risk stage of life for health, it would be entirely appropriate to consider such distal and macro health risks for adolescents as the impending possibility of nuclear devastation or the malignant consequences of poverty and unemployment. My focus here, however, will remain more proximal. I will refer briefly to a few of the major risks that characterize this particular stage of the life span and that can be consequential for the approximately 40 million adolescents in the American population.

It turns out that the primary causes of death and disability at this life stage are behavioral in origin. Most sobering is the fact that some form of violence—traffic accidents, suicides, and homicides—constitutes the leading cause of death among adolescents and youth in the 15 to 24 age range (NCHS, 1982). From 1950 to 1979, the number of deaths per 100,000 from motor vehicle accidents in this age group rose from about 34 to about 47. For white males between age 15 and 24, automobile accidents showed a death rate of 77 per 100,000, accounting for more than 40% of the deaths among this segment of the population. Such figures are even more compelling when we consider that they refer only to mortality and that the prevalence of motor vehicle-related morbidity and disability still has to be taken into account. Furthermore, in any appraisal of the risk associated with accidents, especially motor vehicle accidents, it is essential to recognize the important role played by alcohol and drug use—other key adolescent risk behaviors. Suicide, the third leading cause of death for young white people and fourth for young black people in this age group, implicates a whole other set of risk factors—the psychosocial processes of stress, depression, and coping failure that may surround the developmental tasks confronting young people.

Exposure to and involvement with alcohol, marijuana, and other drugs can be considered another facet of health risk during the adolescent period, with potential consequences for later stages of the life course as well. The fact is that some involvement with alcohol, tobacco, and marijuana is now statistically normative by late adolescence in American society, with 9 out of 10 high school seniors having tried alcohol, 7 out of 10 having tried smoking, and 6 out of 10 having used marijuana.

The most widely used drug, of course, is alcohol, with 71% of a national sample of graduating high school seniors—the class of 1981—reporting use in the preceding month and 6% reporting daily use during that same period (Johnston, Bachman, & O'Malley, 1982). Of considerably more health risk concern than the frequency of use, however, is the evidence about quantity of use per drinking occasion. Johnston et al.'s (1982) same Monitoring the Future report on the class of 1981 indicates that fully 41% of the 17,500 respondents had consumed five or more drinks on at least one occasion during the preceding 2-week interval (an increase, incidentally, from the 37% figure reported by the class of 1975). The consumption of five or more drinks at a single occasion is a level of intake that often leads to drunkenness, loss

of control, deficit in perceptual-motor coordination, and accident proneness, the mortality and morbidity potential of which was noted earlier. In addition to the prevalence of such heavy use of alcohol in adolescence, its risk is probably compounded by the fact that most adolescents have their initial experience with alcohol before reaching tenth grade—that is, before age >15. Analyses of the data from another national sample study, this one involving nearly 13,000 junior and senior high school students in 1974 (Rachal, Williams, Brehm, Cavanaugh, Moore, & Eckerman, 1975), found that nearly a third of the adolescents in that sample who drank could be classified as problem drinkers, based on the frequency of reported drunkenness and the negative social and personal consequences associated with their use of alcohol (Donovan & Jessor, 1978).

With respect to marijuana, the most widely used illicit drug among adolescents, 32% of the class of 1981 reported some use in the preceding month, and 7% reported daily use in that period; the latter figure is still substantial, even though reported daily use has been declining from its peak of 11% in the class of 1978. Of particular interest from a health risk perspective is the evidence for significantly earlier onset of marijuana use over the last seven annual measurements made by the Monitoring the Future project. Using retrospective reports by the graduating seniors regarding the school grade in which they first used marijuana, Johnston et al. (1982) show a significant increase in earliness of onset; for the class of 1975, only 17% reported marijuana use prior to tenth grade, whereas for the class of 1981, that percentage had doubled, with 34% reporting some use before tenth grade. When experience with any illicit drug is considered, the data show that 37% of the class of 1975 had used some illicit drug prior to tenth grade, whereas the comparable figure for the class of 1981 was 51%, fully half of the more recent graduating seniors having already had experience with an illicit drug by about the age of 15. The association of marijuana use with traffic crashes has been increasingly noted, as has the tendency to combine marijuana use with alcohol use, both facts pointing to further aspects of the risk potential of marijuana use.

The health risk associated with cigarette smoking is probably best established in relation to cancer and cardiovascular disease, issues that are of greater concern for later stages in the life span than for adolescence. It is in adolescence, however, that initiation to smoking generally takes place, and once there is a commitment to it in adolescence, smoking turns out to be an exceedingly difficult behavior pattern to abandon (however, for a very provocative report about voluntary cessation, see Schachter, 1982). Referring again to the most recent Monitoring the Future report, we find that, in the class of 1981, 20% have smoked one or more cigarettes per day in the preceding month and 13.5% have smoked half a pack or more per day over that same period. In terms of time of onset, nearly two-thirds of those who ever smoked on a regular daily basis began smoking by ninth grade or earlier. Although the data from this project indicate that daily use of half a pack of cigarettes or more declined from 19.4% to 13.5% between 1977 and 1981, the encouragement to be taken from that trend should be mitigated by the fact that the 1981 figure remains substantial and by our awareness of the tenacity of the smoking habit once it is established.

Sexuality is another behaviorally mediated area of potential health risk for adolescents—risk deriving largely from the unintended and often unanticipated consequences of becoming sexually active, primarily pregnancy and contracting a sexually transmitted disease. Recent information about sexual activity among teenagers residing in metropolitan areas is available from a 1979 national survey (Zelnik & Kantner, 1980). Among women aged 15 to 19 who have never married, 46% reported having had intercourse; the comparable figure for a 1976 survey was 39%, and for a 1971 survey it was 28%. The mean age of first intercourse remained stable between 1976 and 1979 at 16.2 years. Chilman's (1978) extensive review of the literature on adolescent sexuality indicates that the major increase in incidence of sexual intercourse among teenagers has occurred among females, making the prevalence of adolescent nonvirginity much more similar for both sexes in recent years than it ever was before.

In the Zelnik and Kantner (1980) survey, over 25% of the sexually active women aged 15 to 19 reported never using contraception. Among all the sexually active women in this age range, the proportion who became pregnant rose from about 28% in 1971 to 30% in 1976 and to 32.5% in 1979. With regard to the total population of women aged 15 to 19, the 1979 data indicate that over 16% of them became pregnant, with an increasing rate of pregnancy at the younger adolescent ages. Pregnancy implicates health risk related to both abortion and child bearing and, of course, to the long-term consequences of adolescent motherhood. On the latter issue, Hardy's (1982) longitudinal studies indicate: "Adolescent mothers experienced high risks of family instability, low educational attainment, inadequate work experience, lower income, greater welfare dependency, and higher fertility than older women" (p. 263). With regard to the other major area of risk associated with sexual activity, 75% of those who have a sexually transmitted disease fall into the 15 to 24 age range, and the rate of rise in incidence of venereal disease, particularly gonorrhea, is highest in the adolescent age range.

Other areas of health-compromising behavior among adolescents involve the potential risk for cardiovascular disease in later life. Among the behaviorally mediated risk factors that have been implicated—aside from smoking—are obesity or overweight; dietary consumption of saturated fat, salt, and sugar; lack of regular aerobic exercise; stress; and certain coping styles referred to as Type A behavior. Although such behaviors are widely prevalent in adolescence, considerable research is still needed to establish just how characteristic they are and whether their initiation and consolidation take place in adolescence or earlier in childhood.

The data cited thus far are intended to make a case for adolescence as a relatively high-risk life stage for health. The risk areas selected for mention are illustrative rather than exhaustive, with the emphasis placed on behaviors that are usually initiated in adolescence and are seen as central to the process of development during that period. Recent trends in several of the behaviors mentioned portend an exacerbation of their risk potential. One trend is the sheer increase in prevalence of potentially health-compromising behavior (e.g., driving after heavy alcohol use); another trend is toward earlier onset or a younger average age of initiation of such behaviors (e.g., marijuana use); and a third trend is the growing homogenization of the sexes, with

young women showing an increased prevalence of experience (e.g., in sexual intercourse and especially in cigarette smoking) and thereby “catching up” with the rates for young men. Each of these trends implies greater future health risk for the adolescent age period.

A real lacuna in evaluating overall health risk in adolescence is, of course, the lack of information about health-enhancing behaviors, behaviors that may serve to balance the negative consequences of at least some of the health-compromising behaviors so widely prevalent at this stage. Data are needed concerning such behaviors as seat belt and helmet use, adequate hours of sleep, following a weight control regimen, engaging in regularly scheduled aerobic exercise, nutrition monitoring, stress minimization, cultivation of enduring life interests, and elaboration of a general sense of competence, if a more adequate appraisal of risk in adolescence is ultimately to be achieved.

The Interrelatedness of Health Risk Behaviors in Adolescence

A further consideration about the risk behaviors just reviewed warrants attention. A large body of research has shown that many of the behaviors are interrelated and tend to covary systematically. Indeed, the intraindividual linkages among them—their tendency to co-occur within the same adolescent—are such as to suggest that they may constitute a *syndrome*, an organized constellation of behavior, rather than being a collection of independent, discrete activities. Insofar as this is the case, it has important implications for understanding the origin and nature of such behavior as well as for planning intervention and change programs.

The kind of evidence that can be brought to bear in support of this generalization can be illustrated by using the example of adolescent drug use behavior. First, research on adolescent drug use shows that involvement with any drug, such as alcohol, is associated with a higher likelihood of involvement with other drugs, such as marijuana or tobacco. Analyses of the 1978 Research Triangle national survey data (Rachal, Guess, Hubbard, Maisto, Cavanaugh, Waddell, & Benrud, 1980) indicated that frequency of drunkenness was positively correlated with marijuana involvement ($r > .60$) and cigarette smoking ($r > .40$ for males and $r > .30$ for females) among more than 5,000 senior high school youth (Jessor, Donovan, & Widmer, 1980). Second; the use of drugs is associated with a higher likelihood of involvement in other types of risk behavior, such as precocious sexual activity, aggression, and delinquency. Thus, in our longitudinal sample of high school youth (Jessor & Jessor, 1977), 61% of the marijuana users were sexually experienced—that is, nonvirgins—by the end of their senior year as compared to only 18% of the nonusers. With respect to alcohol, 41% of those who drank were sexually experienced, as compared to only 4% of those who were still abstainers. These figures represent major differences in rates of involvement in other health-related behaviors, in this case precocious sexual activity—differences that are linked to involvement with drugs.

Third, the greater or the heavier the involvement with drugs, the greater the likelihood of involvement with other problem behaviors; thus, heavy marijuana users or problem drinkers have higher rates of nonvirginity than do lighter marijuana users or nonproblem drinkers. Fourth, it is clear that various health risk behaviors can be engaged in simultaneously. Thus, continuing with our drug use illustration, 29% of the senior high school students in the 1978 Research Triangle survey reported that they sometimes used marijuana and alcohol together (Rachal et al., 1980). A fifth kind of evidence in favor of a risk-behavior syndrome is the negative relationship that obtains between various health-compromising behaviors, on the one hand, and what we have called conventional or conforming behaviors, on the other. In that same 1978 Research Triangle survey, marijuana use was negatively correlated with church attendance ($r = -.29$ for females and $r = -.24$ for males); the greater the involvement was with marijuana, the less was the involvement with church. Sixth, and finally, there is substantial evidence that the pattern of psychosocial correlates associated with a number of the different risk behaviors—both personality and social environmental correlates—is essentially the very same pattern. This similarity in psychosocial correlates has been shown to apply to alcohol use, marijuana use, cigarette smoking, and sexual intercourse experience for adolescents (Bachman, Johnston, & O'Malley, 1981; Jessor, Chase, & Donovan, 1980; Jessor, Costa, Jessor, & Donovan, 1983; Jessor, Donovan, & Widmer, 1980).

Interrelatedness among risk behaviors for adolescents has also been reported in research outside the United States. In a study of senior high school adolescents in Israel, significant relations were found between cigarette smoking, alcohol use, marijuana use, and sexual experience (Tamir, Wolff, & Epstein, 1982). Also, in a longitudinal study of Finnish adolescents, Pulkkinen (Note 1) reports a correlation of .64 between regular smoking and the use of alcohol at age 14.

The evidence cited thus far has dealt primarily with a subset of adolescent risk behaviors that can be termed problem behaviors (Jessor & Jessor, 1977), behaviors that depart from the regulatory norms of the adult society. A key question that has yet to be addressed systematically in research is the linkage between such behaviors and other health risk behaviors, such as insufficient sleep, lack of exercise, inadequate nutrition, or excess calorie intake—behaviors that, though not involving transgression of societal norms, may nevertheless be risk factors for health during adolescence or later. In short, what is important to establish empirically is how broadly the perimeter needs to be drawn in order to circumscribe the syndrome of risk behaviors among adolescents.

Research bearing on this issue is exceedingly limited. In a follow-up study of adults, Mechanic (1979) has shown significant negative correlations (about $-.20$) between smoking and both engaging in physical exercise and using seat belts when driving. Within a senior high school sample of 15- to 18-year olds, Hays, Stacy, and DiMatteo (Note 2) report a significant negative correlation between meal regularity (eating breakfast and not skipping other meals) and drug use and a significant positive correlation between meal regularity and greater hours of sleep for both men and women. Rimpelä (Note 3, cited in Pulkkinen, Note 4) found smoking to be related to lack of physical activity, heavy use of sugar, and coffee drinking among Finnish

youth. Although they are suggestive and intriguing, these studies only make clearer the need for systematic research into the degree to which the larger set of health risk behaviors tends to covary in adolescence.

The evidence in support of the syndromal nature of adolescent risk behavior is important to note for several reasons. First, it suggests that the various risk behaviors may already be linked in the social ecology of youth, with socially organized opportunities to learn and to practice them together. Second, it suggests that the different behaviors may be serving similar psychological functions and, despite their diverse topography, may have common social and personal meanings. Third, it raises a serious question about whether intervention and change efforts should remain focused on specific behaviors, as they generally are, or should be oriented, instead, toward the syndrome as a whole. Finally, it alerts us to the potential utility of the concept of lifestyle, a notion given wide currency in the health field. The key meaning of lifestyle pertains to an organized pattern of interrelated behaviors, and that is exactly what the evidence for a risk-behavior syndrome suggests is the case. It may be useful, therefore, to conceive of adolescence as a developmental period in which choices are being made among various alternative lifestyles rather than just among behaviors, and in which subsequent development involves the consolidation and integration of the health-related behaviors that the particular lifestyle happens to encompass. Such an emphasis on lifestyle choice is not at all alien to ideas about identity formation in adolescence, such as those elaborated by both White (1975) and Erikson (1963).

The Psychological Meanings of Health Risk Behaviors in Adolescence

If the behaviors discussed here constitute risk factors for health and, in at least several instances, can elicit negative sanctions from society (e.g., for illicit drug use), criticism from parents and friends (e.g., for drunkenness or for precocious sexuality), and even self-rejection (e.g., for obesity or for excessive smoking), what accounts for their occurrence and their wide prevalence during adolescence? A comprehensive reply to such a query requires presentation of a social-psychological theory relevant to risk behavior, a task that will be postponed until the following section of this chapter. For present purposes, however, a beginning answer can come from an understanding of the important personal meanings, symbolic significance, and psychological functions that such behaviors can serve for adolescents. Rather than being arbitrary or fortuitous or reflecting some kind of youthful perversity, risk behaviors—like all learned behavior—are purposive, goal-directed, and capable of fulfilling multiple goals that are central to adolescent life. The goals these behaviors can attain and the meanings they may represent are not, of course, intrinsic to the behaviors but depend on larger processes of sociocultural definition and on an adolescent's unique learning and socialization experience.

A listing of some of the major functions, purposes, or goals of engaging in risk behavior can help clarify their likely importance to adolescents and can also illustrate the fact that such goals are not really different from those associated with other kinds of behavior. Engaging in certain risk behaviors in adolescence can serve the following functions:

1. An instrumental effort to attain goals that are blocked or seem otherwise unattainable. Thus, engaging in precocious sexual intercourse and becoming pregnant can be a way of attaining independence from parental control and regulation and taking personal control of one's life.
2. A means of expressing opposition to adult authority and the conventional society whose norms and values are not shared by the younger generation. Much of young people's drug use during the Vietnam era was a symbolic way of repudiating the war by engaging in precisely the behavior that the larger society was trying to proscribe.
3. A coping mechanism for dealing with anxiety, frustration, inadequacy, and failure or with the anticipation that failure is likely—whether in relation to school performance, the expectations of peers, or the high standards of parents. Heavy involvement with alcohol, for example, or even overeating, can be a way of dealing with poor academic achievement, with a sense of social rejection, or with the perception of parental disappointment.
4. A way of gaining admission to the peer group, of expressing solidarity with peers, or of demonstrating identification with the youth subculture. Cigarette smoking or the sharing of a "joint" are well-established and widely recognized marks of membership in the peer group.
5. A confirmation of important attributes of personal identity. Drinking and smoking, and driving after drinking, are readily learned as ways of showing that one is "macho," "cool," or "experienced" or has some other characteristic that is valued in adolescent culture.
6. A transition marker—that is, a symbol of having made a developmental transition, of having gone from a less mature to a more mature status, or of placing a claim on a more mature status. This function of risk behavior is an especially important one for adolescents. It derives from the fact that certain adolescent behaviors tend to be age-graded—that is, considered by society as appropriate only for those who have reached a certain age or age-related status. The use of alcohol is a good example, since it is proscribed for those below the legal age but permitted for those beyond it. When behaviors are age-graded, engaging in them earlier than is defined as appropriate can be a way of affirming maturity or of marking a developmental transition from adolescence to young adulthood.

This listing is admittedly a partial one; for example, a function frequently emphasized by young people is pleasure or fun, and it is clear that many of the risk behaviors can be seen as providing intrinsic enjoyment and excitement or as serving as a counterpoint to boredom and routine. The aim of the listing has been to show that the motivations for adolescent risk behavior are not only broad-ranging and salient but are, for the most part, the very same motivations that are involved in so much of

the rest of adolescent behavior. Clearly, a great deal of additional information is needed about the psychological functions of health-compromising behaviors, especially those, such as overeating or sedentariness, that do not involve transgression of societal norms or of age-graded appropriateness. An understanding of the functional nature of health-compromising behaviors not only helps explain their prevalence but is crucial for yet another reason. If we want to design intervention programs that make available to young people alternative or substitute behaviors that are less health-compromising, we will need to be sure that the alternatives proposed are capable of fulfilling the same or similar functions as the risk behaviors that they are intended to displace.

A Theoretical Framework for Health Risk Behaviors in Adolescence

The unsatisfactory state of theory in the field of adolescent health may well be the most serious obstacle to progress in understanding the nature of adolescent risk behavior and in devising effective approaches to reducing risk and enhancing adolescent health. Theoretical contributions such as Bandura's (1977) ideas about modeling and Fishbein and Ajzen's (1975) notions about attitudes and behavioral intentions have been significant and useful. Yet a more general and comprehensive theory—one that can encompass the broad range of health-related behaviors, can specify the psychosocial factors that instigate and sustain them, and can illuminate their role in the process of adolescent development—is still to be achieved. Because the issue of theory is deemed so crucial to progress in the health field, it is worth giving brief attention to a framework that, though obviously limited, has already demonstrated its relevance for at least some of the risk behaviors that have been discussed thus far.

The social-psychological framework is one we have called "Problem Behavior Theory" (Jessor & Jessor, 1977). It was initially formulated, almost 25 years ago, to guide a study of deviance—especially excessive alcohol use—in a tri-ethnic community in the southwestern United States (Jessor, Graves, Hanson, & Jessor, 1968). Over the years, it has been modified and extended to accommodate a cross-cultural study of drinking behavior among Italian and Italian-American youth (Jessor, Young, Young, & Tesi, 1970), to provide the theory for two national sample surveys of alcohol and drug use among junior and senior high school students (Donovan & Jessor, 1978, 1983; Jessor, Chase, & Donovan, 1980; Jessor, Donovan, & Widmer, 1980), and, most fundamentally, to constitute the framework for a longitudinal study of problem behavior—alcohol use, problem drinking, drug use, sexual activity, aggression, delinquency—in cohorts of adolescents being followed from junior high school through young adulthood (Jessor & Jessor, 1977). The concepts and measures developed in Problem Behavior Theory have now been used in a large number of studies by other researchers in the United States and elsewhere (e.g., DiTecco & Schlegel, 1982) and have been applied to other risk behavior areas, such

as cigarette smoking (e.g., Chassin, Presson, Bensenberg, Corty, Olshavsky, & Sherman, 1981; Rooney & Wright, 1982).

Although the theory has focused primarily on problem behaviors—behaviors that constitute transgressions of societal and/or legal norms and that tend to elicit some sort of social control response—its potential relevance to adolescent health risk behavior derives from several considerations. First, a number of the so-called problem behaviors that have been dealt with by the theory are the very same behaviors that have been referred to as health risk behaviors in this chapter—for example, alcohol use, marijuana use, precocious sexual intercourse, and driving after drinking. Thus, there is at least an area of overlap where the two domains of problem behavior and health risk behavior intersect. Second, some of the health risk behaviors that do not constitute transgressions of societal or legal norms, such as overeating or sedentariness, may nevertheless represent departures from more informal social norms, such as those of the peer group, or even from an individual's personal norms about what is appropriate behavior in these areas. Insofar as departure from any norm may be involved, the formulations of Problem Behavior Theory would remain apposite. Third, Problem Behavior Theory has maintained the perspective that to account for variation in problem behavior is to account simultaneously for variation in conventional behavior. Thus, the theory has also attempted to explain—with the same set of concepts—behavior that conforms to the norms and expectations of the larger society and of its institutions, such as school and church involvement. In this sense, the theory may well have relevance not only for health risk behavior, but simultaneously for variation in health-enhancing behavior as well, at least to the extent that the latter can usefully be conceptualized as conventional. Finally, the potential relevance of Problem Behavior Theory derives from the fact that it includes a developmental formulation about the role of problem behavior (or health risk behavior) in the process of adolescent transition and change, a role already alluded to in the preceding section.

Problem Behavior Theory rests on the social-psychological relationships that obtain within and between each of three major systems: the personality system, the perceived environment system, and the behavior system. Within each of the systems, the structures of the variables they encompass are interrelated and organized so as to generate a theoretical resultant, a dynamic state called *proneness*, that summarizes the likelihood of occurrence of problem behavior (or, in the present case, health risk behavior). Thus, it is theoretically possible to speak of personality proneness, environmental proneness, and behavioral proneness, and of their combination as psychosocial proneness toward problem behavior. The sovereign concept of psychosocial proneness is the key theoretical basis for predicting and explaining variations in youthful behavior.

The conceptual structure of Problem Behavior Theory is schematized in Fig. 22.1. Since the rationale for each variable in the figure has been elaborated in detail in Jessor and Jessor (1977), only a brief description will be presented here; attention will be restricted to the three boxes of variables labeled A, B, and C: the personality system, the perceived environment system, and the behavior system, respectively. In the personality system, the main characteristics of theoretical proneness to problem

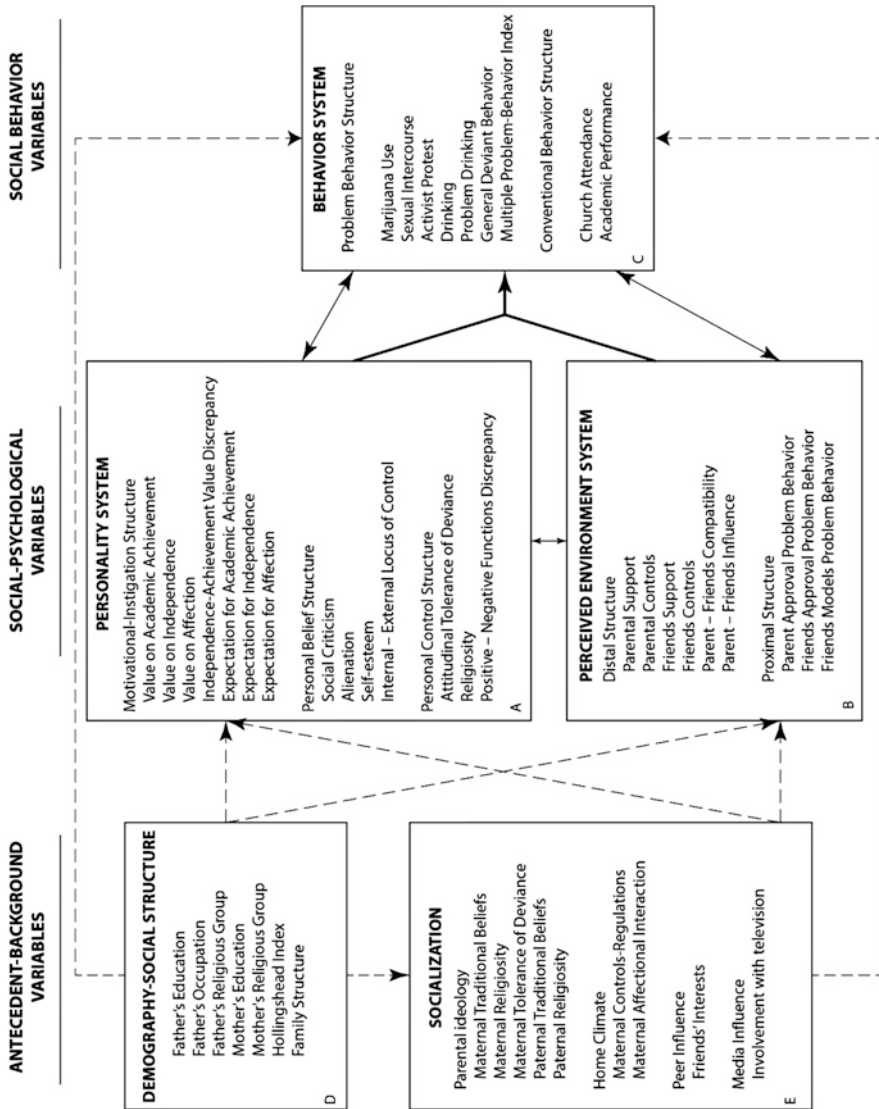


Fig. 22.1 The conceptual structure of Problem Behavior Theory (Jessor & Jessor, 1977)

behavior include lower value on academic achievement, higher value on independence, greater value on independence relative to value on achievement, lower expectations for academic achievement, greater social criticism and alienation, lower self-esteem, orientation to an external locus of control, greater attitudinal tolerance of deviance, lesser religiosity, and more importance attached to positive

functions of problem behavior relative to negative functions. The more these personality characteristics obtain for a person at a given time—that is, the more they constitute a coherent pattern or constellation—the more they theoretically convey personality proneness to problem behavior.

Within the perceived environment, an important distinction is drawn between regions or structures in terms of their proximal, versus distal, relation to behavior. Proximal variables (e.g., peer models for marijuana use) directly implicate a particular behavior, whereas distal variables (e.g., the degree of normative consensus between parents and peers) are more remote in the causal chain and therefore require theoretical linkage to behavior. Problem-behavior proneness in the distal structure of the perceived environment system consists of low parental support and controls, low peer controls, low compatibility between parent and peer expectations, and low parent influence relative to peer influence. In the proximal structure, problem-behavior proneness includes low parental disapproval of problem behavior and high friends models for, as well as high friends approval of, engaging in problem behavior.

The behavior system is differentiated into a problem-behavior structure and a conventional-behavior structure. The possibility that phenotypically very different problem behaviors (e.g., smoking marijuana or engaging in sexual intercourse) may serve the same social-psychological function (e.g., overt repudiation of conventional norms or expression of independence from parental control) is what underlies the notion of a structure of problem behavior. The conventional-behavior structure is concerned with behavior that is socially approved, normatively expected, and codified and institutionalized as appropriate for adolescents—for example, involvement with school work and with religious activities. Problem-behavior proneness in the behavior system directly reflects the degree of involvement in both the problem-behavior and the conventional-behavior structures and also reflects the balance that obtains between those involvements.

The usefulness of Problem Behavior Theory has been demonstrated and repeatedly replicated in relation to a variety of adolescent risk behaviors and to a specially constructed composite multiple problem-behavior index. Multiple correlations of the variables in the three systems reach beyond .70 for male and female adolescents in relation to the composite index and to such separate risk behaviors as marijuana use and delinquent-type behavior. The multiple correlations are somewhat lower for problem drinking and for sexual intercourse experience. Thus, the theory has been able to account for between a third and a half of the variance in adolescent problem behavior, providing reasonable evidence for its explanatory relevance.

Nevertheless, even accounting for half the variance in problem behavior means that half remains to be explained. It seems clear by now that other variables, not yet encompassed by the theory, will need to be brought to bear, and this is especially true if the theory is to be extended to deal with health risk behaviors more generally. Variables such as the value of health and fitness, the sense of competence and control in health-related activities, the repertoire of skills for health maintenance and risk avoidance—if measured well—might enlarge the scope of application of the theory as well as increasing its effectiveness.

Problem Behavior Theory and Adolescence Development

The discussion of Problem Behavior Theory to this point has emphasized its usefulness in accounting for variations in cross-sectional data on risk behavior. There are also logical implications in the theory for adolescent development and for behavior change over time. Much of what has been discussed as problem behavior is, of course, only a “problem” relative to age-graded norms; that is, the behavior may be permitted or even prescribed for those who are older while being proscribed only for those who are younger. Drinking, as one example, is a behavior that is proscribed for those under legal age but permitted and even institutionally encouraged for those who are beyond that age; sexual intercourse, a normatively acceptable behavior for adults and even for older adolescents, is a normative departure for a young adolescent, one that is likely to elicit social controls. Awareness among youth of the age-graded norms for such behaviors carries with it the knowledge that occupancy of a more mature status is characterized by engaging in those very behaviors. Thus, engaging in age-graded behaviors for the first time can serve to mark a transition in status from “less mature” to “more mature,” from “younger” to “older,” or from “adolescent” to “youth” or “adult.”

Many of the important transitions that mark the course of adolescent development do involve behaviors, such as precocious sexual intercourse, that depart from the regulatory age norms that define appropriate or expected behavior for that age or stage in life. Since behavior that departs from regulatory norms is precisely what Problem Behavior Theory is meant to account for, this provides the rationale for systematic application of the theory to developmental change in adolescence. By mapping a new developmental concept, *transition proneness*, onto the already available theoretical concept of problem-behavior proneness, it becomes possible to use Problem Behavior Theory to specify the likelihood of occurrence of developmental change—change that takes place through engaging in age-graded, norm-departing, transition-marking behaviors such as beginning to drink, becoming sexually active, and the like.

The usefulness of the concept of transition proneness has been tested in relation to the onset of drinking (Jessor, Collins, & Jessor, 1972; Jessor & Jessor, 1975a, 1975b), the onset of marijuana use (Jessor, 1976), and the initiation of sexual intercourse (Jessor & Jessor, 1975a, 1975b; Jessor, Costa, Jessor, & Donovan, 1983) among samples of adolescents who had had no prior experience with those behaviors. In each case, multivariate analyses have demonstrated that there is, indeed, a psychosocial pattern that obtains prior to engagement in the behavior and that is predictive of its later occurrence and of variation in the time of its subsequent onset. With regard to predicting the time of first intercourse, as one illustration, it was possible to establish that 142 boys and 204 girls in our junior high school cohorts were still virgins as of the 1970 testing year. Since these adolescents were followed into young adulthood, it was also possible to determine from the follow-up data just when, in the subsequent time period between 1970 and 1979, initial sexual intercourse occurred and the transition to nonvirginity was made. The findings show that variation in time of onset of sexual intercourse across this 9-year interval was

already signaled by the prior pattern of Problem Behavior Theory measures in 1970, when all the participants were still virgins. The multiple correlations ($R = .55$ for males and $R = .53$ for females) are significant and provide support for the predictive role of the concept of transition proneness.

Proneness toward transition, in this case to nonvirginity, was apparent on measures in each of the three systems of Problem Behavior Theory. Virgins who were to engage in sexual intercourse earlier, relative to those virgins whose onset took place later, were already higher in value on and expectation for independence, lower in value on and expectation for academic achievement, more socially critical in their beliefs about society, more tolerant of deviance, and lower in religiosity. They also perceived less compatibility between the expectations their parents held for them and those their friends held, less influence of their parents relative to that of their friends, and more social approval for and models of problem behavior, including sexual behavior. Finally, they were more involved in other (non-sex-related) problem behavior and less involved in conventional behavior, such as church attendance (Jessor, Costa, Jessor, & Donovan, 1983).

The importance of such findings does not lie only in the support they provide for Problem Behavior Theory and for its developmental implications. The findings also make clear that the onset of adolescent risk behaviors is neither arbitrary nor fortuitous but is, rather, a systematic outcome of characteristics of the adolescent and of the adolescent's perceived environment that precede onset. These characteristics represent a pattern of psychosocial risk factors—a pattern we have termed transition proneness—conveying differential readiness to engage in health-compromising, problem, or risk behavior. The fact that such a pattern exists in advance of the onset of risk behaviors and is also predictive of onset makes it possible to think of early identification of adolescents at risk and of the feasibility of early intervention to promote health-enhancing alternatives.

The pattern of transition proneness that has emerged in our studies of the onset of problem behavior is very much the same in psychosocial content as the pattern of problem-behavior proneness we have found in our cross-sectional studies; the factors that are effective cross-sectionally are the same or similar to those that are effective longitudinally. The term that best captures the content of the dimension underlying psychosocial proneness is *conventionality-unconventionality*, and that dimension is equally appropriate for characterizing the three explanatory systems in Problem Behavior Theory. Indeed, it is possible to conceive of personality unconventionality (e.g., high value on independence, greater social criticism, more tolerance of deviance), perceived environment unconventionality (e.g., lower parent and friends controls, more approval, models, and opportunities for risk behavior), and behavioral unconventionality (e.g., greater involvement in risk behavior and lesser involvement in conforming behavior). One of the main generalizations that can be drawn from the research on Problem Behavior Theory is that the conventionality-unconventionality dimension is central in accounting for variation in problem or risk behavior in adolescence. Achieving an understanding of the role that dimension plays in regulating adolescent health turns out to be an objective of primary importance to the field of behavioral health.

The Continuity of Health Risk between Adolescence and Young Adulthood

Achieving an understanding of the conventionality-unconventionality dimension in adolescence gains even greater importance when the linkage and continuity between adolescence and later life stages, especially young adulthood, are taken into consideration. Insofar as the characteristics referred to as psychosocial proneness to risk behavior in adolescence carry over to or are consequential for post-adolescence, it would mean that the degree of risk that obtains in adolescence needs to be multiplied or weighted to take that into account.

Two kinds of data are germane to the issue of continuity or carry-over of health risk from adolescence to young adulthood. One type of data involves the degree to which the components of psychosocial proneness in adolescence are in fact stable over time and do track into young adulthood. Since we were able to measure many of the variables in Problem Behavior Theory in both adolescence and young adulthood, it was possible to examine their stability directly by correlational analysis. Table 22.1, adapted from Jessor (1983b), presents the stability coefficients for a number of measures between 1972, when our participants were adolescents in the 10th, 11th, and 12th grades, and 1979, when they had reached young adulthood and were 23, 24, and 25 years old.

The data in Table 22.1 are raw Pearson correlations between the 1972 measure and the 1979 measure of each variable. Such correlations are obviously attenuated by the unreliability of the measures and are therefore conservative estimates of stability over time. Correcting for attenuation yields the correlations shown in parentheses for the multi-item scales whose internal reliability can be determined.

Although change has clearly taken place, it has been systematic, and the overriding impression to be gained from the data in the table is that there is a considerable degree of stability across time for nearly all of the measures drawn from Problem Behavior Theory. In nearly all cases, the correlations are statistically significant; in a number of instances, they are substantial in magnitude. When it is kept in mind that the time interval involved—7 years—is a very long one, that this portion of the life trajectory is considered to be one of major growth and transformation, that the environmental context of life during this period is itself likely to have changed markedly, and that the general social and historical background has also shifted, the stability represented by these correlations is even more impressive. It is worth emphasizing, also, that there is significant stability on measures from all three of the systems of Problem Behavior Theory—personality, the perceived environment, and behavior. These coefficients, taken together, would therefore seem to suggest some stability of individuality across this segment of the life span. They would also suggest, it follows, that there should be continuity and carry-over of health risk between adolescence and young adulthood.

The second type of data that bears on this issue involves the degree to which psychosocial proneness in adolescence is predictive of engagement in risk behavior later in young adulthood. Again, the issue could be examined empirically because

Table 22.1 Stability Coefficients between 1972 and 1979 Psychosocial Measures, Young Adult Follow-Up Study

Measure	High School Sample	
	Males (<i>N</i> = 172)	Females (<i>N</i> = 231)
<i>Personality System</i>		
Value on achievement	.08 (.12)	.10* (.15)
Value on independence	.22*** (.59)	.23*** (.74)
Value on affection	.25*** (.42)	.22*** (.36)
Expectation for achievement	.24*** (.32)	.12** (.15)
Expectation for independence	.22*** (.43)	.10* (.29)
Expectation for affection	.29*** (.46)	.22*** (.32)
Self-esteem	.46*** (.66)	.42*** (.60)
Internal-external control—political	.32*** (.68)	.25*** (.46)
Internal-external control—general	.15** (.38)	.02 (.05)
Social criticism	.24*** (.47)	.29*** (.52)
Alienation	.37*** (.57)	.42*** (.62)
Tolerance of deviance	.33*** (.41)	.37*** (.47)
Religiosity	.53*** (.61)	.45*** (.51)
<i>Perceived Environment System</i>		
Relative parent vs. peer influence	.12* (.17)	.23*** (.32)
Parental approval of drug use	.20***	.27***
Friends' approval of drug use	.27***	.21***
Friends models for drug use	.28***	.20***
<i>Behavior System</i>		
Deviant behavior/past year	.30*** (.47)	.29*** (.45)
Church attendance/past year	.40***	.42***

Source: Jessor, R. (1983b). The stability of change: Psychosocial development from adolescence to young adulthood. In D. Magnusson & V. Allen (Eds.), *Human development: An interactional perspective*. New York: Academic Press

Note: Correlations in parentheses have been corrected for attenuation for those multiple-item scales whose reliability can be ascertained

**p* < .10

***p* < .05

****p* < .01

*****p* < .001, two-tailed test

of the availability of psychosocial proneness measures in adolescence and of problem-behavior measures in young adulthood within our longitudinal follow-up study. For the example of problem drinking, the findings show that variation in psychosocial proneness in adolescence is modestly predictive of whether a participant is classified as a problem drinker or as a nonproblem drinker 7 years later, in young adulthood. The multiple correlations reach .53 for the males and .45 for the females, with both correlations being statistically significant at the .001 level. Problem

drinker status in young adulthood was shown to be significantly linked to a number of Problem Behavior Theory variables in adolescence: lower value on academic achievement, higher value on independence relative to value on achievement, lower expectations for academic achievement, greater tolerance of deviance, lower religiosity, greater perceived approval for and models of problem behavior, greater actual involvement in problem behaviors such as use of marijuana, and less involvement with conventional behavior related to church and school (Donovan, Jessor, & Jessor, 1983). This pattern of psychosocial proneness once again reveals the underlying dimension of adolescent unconventionality, and the pattern is also predictive of other risk behaviors in young adulthood, such as involvement with smoking and with marijuana use.

Taken together, these two types of time-extended data make clear that there is continuity of adolescent health risk beyond the adolescent stage of life. Although evidence for continuity and carry-over is sobering in regard to the relatively enduring consequences of adolescent health risk, there is some consolation, at least, in the obvious corollary of such findings—that there should also be continuity and carry-over of health-enhancing dispositions and behaviors from adolescence to later life.

Some Implications for Health Promotion and Risk Reduction in Adolescence

It has been stressed throughout this chapter that adolescence is a life stage of relatively high risk for health and that in some areas, such as motor vehicle accidents, and for some groups, such as women, risk seems to be on the increase. Risk has been considered in terms not only of behavior but also of personality attributes and environmental supports. What singles out adolescence as a time of relatively high risk is that it is a key stage in which risk-related learning takes place—learning of new risk behaviors, of risk-prone personality dispositions, and of risk-enhancing opportunities in the environment. Recognition of this fact focuses attention on adolescence as a potentially critical period for the implementation of strategies to reduce health risk and to enhance health. In this final section, some considerations that may be relevant to those topics are briefly touched upon.

Although explanatory, analytic, or theoretically oriented research—research of the sort just reviewed—can be very useful for devising intervention strategies or for guiding change-oriented efforts, it should be kept in mind that it is not research that tells us how best to change things. Thus, what follows is simply an attempt to draw out some general and tentative implications from the perspective and content of the preceding discussion about adolescence and health.

The research showing that psychosocial proneness to risk behavior consists of a coherent pattern of personality, environmental, and behavioral attributes suggests one important implication—namely, that efforts at prevention, risk reduction, or health promotion should not be limited to a focus on behavior alone. Health risk clearly derives from personality proneness and environmental proneness, and attention

to attributes in those two systems should logically influence the occurrence of health-related behavior, both health-compromising and health-enhancing. The point here is that intervention efforts might well assume a broader purview than has been characteristic of such efforts, whether the aim has been cessation of cigarette smoking or improvement of nutritional choices. Since any behavior is influenced by all three of the systems comprising Problem Behavior Theory, advantage should accrue to those programs that intervene simultaneously in all three systems.

The linkage of personality to health-related behavior warrants even further emphasis. Beyond our own focus on the relevance of the conventionality-unconventionality dimension, other attributes of personality have already received special attention in relation to health, such as the sense of personal autonomy or control (Seeman & Seeman, 1983; Wallston & Wallston, 1982). Others should merit special attention in the future, such as personal value on well-being and health or concept of self as competent and fit. Personality attributes of this sort, being central and general, carry relevance for a large variety of behavior choices and lifestyle alternatives; interventions that influence or shape them, therefore, should have broad and reverberating consequences for health as a whole.

Where the focus still needs to remain on behavior, as in cessation or inoculation programs, I have stressed here the necessity to understand the meanings, purposes, functions, or goals the behavior can represent or serve. Such understanding is crucial to any strategy that seeks to provide and reinforce alternative behaviors—lower in risk or even health-promoting—as substitutes for adolescent risk behaviors. Nonproblem or health-promoting behaviors are likely to be successful as substitutes or alternatives only if they serve functions similar to or more highly valued than those served by the original risk behaviors. Although that seems entirely feasible to accomplish in relation to many of the functions listed earlier for risk behaviors—such as demonstrating peer group identity, affirming independence from adults, or coping with failure—certain of the functions—such as establishing a claim on a more mature status or marking the transition out of adolescence—may be more refractory to substitution. To the extent that health-promoting behaviors—e.g., taking personal responsibility for one's health or following a regular schedule of exercise—could become institutionalized as representing or symbolizing adult status, adolescent transition-marking behavior could become more benign than it is at present, when beginning to drink or engaging in sexual intercourse precociously are what seem to be required.

The research findings in support of the syndromal nature of adolescent problem behavior also have implications for health-related change efforts. With a few exceptions, intervention programs with adolescents have tended to be behavior-specific. Prevention programs, especially those based in schools, are usually designed as separate units—for example, programs on drinking as a problem, or on drug use, or for sexually active adolescents—as if these behaviors occurred in isolation from one another. In fact, not only are they associated, but they often occur at the same occasion. Given this knowledge, intervention programs could consider enlarging their scope to accommodate multiple risk behaviors simultaneously and to deal with their common functions and the linkages between them. This implies interventions that,

in addition to specific, behavior-relevant information, attitudes, and skills, would orient toward the lifestyle organization of the separate risk behaviors and, therefore, toward alternative lifestyle choice. The general emphasis of such programs would be on health-promoting lifestyles that are relatively incompatible with the syndrome of risk behavior.

Whatever the success of programs for substituting health-enhancing behaviors for health-compromising behaviors and healthy lifestyles for those that incorporate health risk, it seems obvious that most adolescents will sooner or later engage in some behaviors that constitute a risk to health. The prevalence figures for drinking, smoking, marijuana use, and sexual experience among contemporary American adolescents describe an epidemiologic context of almost inexorable insistence. The psychological goals involved are generally central to adolescent life; the representation of such behaviors in adult models and in the media enhances their attractiveness; and since they are, for the most part, age-graded behaviors, it is recognized that they ultimately will be permitted once a particular age or status has been reached. From this perspective, the rhetoric of prevention seems no longer to be entirely apposite. Efforts to promote or enhance health will have to adopt alternative strategies that have somewhat different objectives—objectives that assume that experimentation and exploration of risk behavior are going to occur as part of normal adolescent development.

One such alternative strategy might be called *minimization*. The objective of such a strategy would be not to prevent but to limit or confine involvement in risk behavior to exploration or to a controlled, moderate, or “responsible” level. Indeed, moderation and responsibility may well be the touchstone for minimizing risk to health, since, for most of the behaviors of concern, risk derives largely from heavy, frequent, and chronic involvement.

A second alternative strategy might be called *insulation*. Here the focus would be on insulating the exploration of risk behavior from serious, irreversible, or long-term negative consequences. Strategies that protect a drunken teenager from driving a car or that lessen the likelihood of pregnancy or venereal disease among sexually active adolescents are examples of insulating interventions.

A third alternative strategy to prevention, finally, would be *delay of onset*. The object of this strategy is postponement of the initiation of risk behavior. Postponement for even a year during adolescence can mean greater maturity and skill for dealing more responsibly with risk behavior. There is even some evidence to suggest that the later the onset, the less intense the involvement, at least for drinking, cigarette smoking, and marijuana use (Jessor, 1982).

It has been argued that adolescence is a pivotal stage in the life span for the development of health-related behavior. Not only is it a period of heightened health risk, but what happens in adolescence is consequential for health in later life. The major aim of this chapter has been to show that health risk in adolescence is a systematic outcome of personality, environmental, and behavioral factors that account for variation in prevalence and in time of onset. Such factors can also have relevance for the design of intervention efforts to reduce risk and to enhance health. If the discussion here has increased awareness of the potential contribution of theory to

such efforts, then the result for the field of behavioral health should be—in the literal sense—salutary.

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Chapter 23

Value on Health and Fitness in Adolescent Behavioral Health

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This paper reports the development of a measure of value on health and its construct validation within the social-psychological framework of Problem Behavior Theory (Jessor, 1987; Jessor & Jessor, 1977). The construct validation process includes an examination of the relationship of the new scale to measures of other health-related psychosocial variables and to measures of health behavior, and its linkage to measures of conventionality-unconventionality as specified by the theory.

An important issue for research on adolescent health behavior is to identify those psychosocial factors that prevent or postpone involvement in behaviors that compromise health as well as those that promote involvement in behaviors that protect and enhance health. The aim of this paper is to explore one such psychosocial factor, namely, value on health.

Although the potential influence of values, attitudes, and beliefs on health-related behavior has long been recognized, personality attributes of this sort have been relatively neglected in contemporary health research (Green, Wilson, & Lovato, 1986; Jessor, 1982; Peele, 1987). In particular, the limited attention given to values is noteworthy. Personally-held values would seem to be important, conceptually, as a source of influence on the adoption of and continuing involvement in health-related behaviors.

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Our own concern with the concept of value on health emerged from the extension of Problem Behavior Theory to account for variation in health-related behaviors (Jessor, 1978, 1982, 1984). The social-psychological framework of Problem Behavior Theory had been used extensively to account for adolescent involvement in problem or norm-violative behavior (e.g., delinquent behavior, problem drinking, illicit drug use, and precocious sexual activity) as well as involvement in conventional behavior (e.g., church attendance and academic achievement). In this framework, the likelihood of involvement in problem behavior is a function of “psychosocial proneness” within each of three systems of explanatory variables: the Personality System, the Perceived Environment System, and the Behavior System. Psychosocial proneness for problem behavior refers to a pattern of personality, perceived environment, and behavior variables (including values, attitudes, beliefs, social models, and social controls) that reflects an underlying dimension of conventionality-unconventionality—an orientation toward, commitment to, and involvement with the prevailing values, standards of behavior, and established institutions of American society.

The extension of Problem Behavior Theory to cover the domain of health-related behaviors was predicated on several considerations, including the overlap between the domains of problem behavior and health-compromising behavior, e.g., cigarette smoking and unprotected sex, and the characterization of health risk behaviors as departures from informal social norms. These considerations are discussed elsewhere at greater length (see Jessor, 1984, p. 80). The concept of value on health was conceived of as implicating the dimension of conventionality-unconventionality: maintaining good health is a value supported and disseminated by conventional social institutions, e.g., family and school; fulfilling that value entails avoidance of various socially-disapproved behaviors, such as precocious sexual activity, alcohol abuse, and other drug use. Examination of this anticipated association between value on health and the dimension of conventionality-unconventionality in Problem Behavior Theory is a key component of the construct validation of the new measure.

Despite the conceptual importance of value on health for the explanation of health behavior, few studies have investigated its role in that regard, and measurement of the concept has been relatively unrefined. Other personality attributes have received greater attention in the health literature, including hardiness (Kobasa, Maddi, & Kahn, 1982), religiosity (Comstock & Partridge, 1972; Graham et al., 1978), health beliefs (see, e.g., Becker, 1974; Janz & Becker, 1984), and health locus of control (see, e.g., Seeman & Seeman, 1983; Wallston & Wallston, 1981, 1984). Although a motivational variable similar to value on health—the personal salience of health and illness—was used in early versions of the Health Belief Model (Becker, 1974), more recent presentations of the model seem to omit any consideration of the concept of value on health (Janz & Becker, 1984). Value on health has also been used to condition hypotheses linking health locus of control to variation in health behavior, but findings have been mixed. In some studies, internal health locus of control was related to greater involvement in preventive health behaviors only among those individuals with a high value on health (Abella & Heslin, 1984; Lau, Hartman, & Ware, 1986); other studies suggest, however, that

irrespective of variation in health locus of control, higher value on health is related to greater preventive health behavior (Wurtele, Britcher, & Saslawsky, 1985).

In the few studies that have assessed the linkage of value on health to health behavior, modest levels of relationship have generally been reported. Correlations between measures of value on health and summative indexes of preventive health behavior range between .2 and .3 (Abella & Heslin, 1984; Kristiansen, 1985; Wurtele et al., 1985). These associations may have been attenuated by the measures of value on health that were employed. The Rokeach Value Survey (or modification thereof), which assesses value on health as a single item rank-ordered against a number of other value items, describes health only generally by the phrase “physical and mental well-being” (Abella & Heslin, 1984; Kristiansen, 1985; Ware & Young, 1979). The reliability of that approach to values assessment has been called into question (Ware & Young, 1979), as has its dependence on a single-item measure (Braithwaite & Law, 1985). The multiple-item measures of value on health that have been used thus far have their own limitations as well. Lau, Hartman, and Ware (1986) employ a measure that, while having adequate empirical properties, fails to capture the multidimensionality of health, e.g., fitness, resistance to illness, endurance. In the study by Kristiansen (1985), an index of health motivation (Seeman & Seeman, 1983) was used as the measure of value on health, but some of the items in that measure seem only indirectly related to the importance attached to health, and health is treated largely as the absence of illness.

Despite the relative absence of empirical support, there is a compelling logical and theoretical basis for retaining a focus on value on health and for exploring it further. With better measurement of the concept, with examination of its relation to a broader variety of health behaviors—both health-compromising and health-enhancing—and with the integration of the concept into a larger theoretical framework, it may be possible to establish more clearly the role that value on health plays.

Method

Study Design and Procedures

A cross-sectional survey of 7th- through 9th-grade junior high school and 10th-through 12th-grade senior high school students was carried out in the fall of 1985 in 11 secondary schools in a single school district in northeastern Colorado. The school district serves a number of urban and rural communities with a total population of about 72,000 residents and 7,000 secondary school students.

A stratified sampling frame was used to select a sample of students on the basis of school attended and grade in school. Active parental consent was requested for students' participation in the research. Of the 3,010 parents contacted by mail, 1667 (55%) returned signed consent forms. This level of response is similar to that achieved in other studies where active consent was sought from parents (see Jessor & Jessor, 1977; Lueptow, Mueller, Hammes, & Master, 1977; Severson & Ary, 1983).

Data were collected between mid-November and mid-December of 1985. Anonymous questionnaires were filled out in large-group situations, e.g., in the cafeteria. The questionnaires were distributed and collected by members of the research team. Each student was given a token payment of \$5.

A total of 1588 students completed questionnaires, constituting 95% of those who had received parental permission to participate, and 53% of those originally sampled.

Description of Participating Students

Of the 1588 participants, 438 were junior high school males, 465 were junior high school females, 296 were senior high school males, and 389 were senior high school females.

With respect to ethnic/racial identification, 83% reported they were white; 8% were Hispanic, 5% were Native American, 2% were Asian American, and 0.4% were Black. The majority of the students came from middle class backgrounds, and most (70%) lived in intact families.

The Questionnaire

The 1985 Health Questionnaire was 29 pages long and printed so that it could be computer scanned and scored. Average time to complete the questionnaire was about 45 minutes for the junior high school sample and about 42 minutes for the senior high school sample.

Many of the measures in the questionnaire had been used extensively in earlier research. The measures of problem behavior and of psychosocial conventionality-unconventionality were originally developed to test the explanatory usefulness of Problem Behavior Theory (Jessor & Jessor, 1977). These measures were abridged and modified for use in the present research. Measures of the new health behaviors were developed specifically for the present research.

Measurement of Value on Health

The Value on Health scale was designed to assess the value on, preference for, or personal importance of several aspects of health: fitness or being in good physical condition, a sense of energy or vigor, endurance or stamina, maintaining an appropriate weight, and resistance to illness. These selected aspects attempt to capture a concept of health that entails the *presence* of vitality or well-being, as well as the *absence* of sickness or disease.

The Value on Health scale is a five-item Likert-type scale. Each item maps one of the aspects of health described above. Items were prefaced with the query “How important is it to you...” and employed four response categories: “Not Important At All,” “Somewhat Important,” “Important,” and “Very Important” (scored from 1 to 4, respectively). The items comprising the scale, in order of appearance, are:

- “To be in good shape and to feel physically fit?”
- “To feel you have plenty of energy for the way you’d like to live your life?”
- “To know that your weight is right about where it should be?”

“To know that you have the endurance to participate in vigorous physical activities?”

- “To stay in the best of health, whatever the season?”

Measurement of Other Health-Related Psychosocial and Behavioral Variables

Four other new Personality System measures were developed that were also expected to account for variation in health-related behavior. These include: *Health Self-Description*, a five-item scale measuring the degree to which the adolescent sees himself or herself as actually being healthy and in good physical condition ($\alpha = .80$; items parallel those used in the Value on Health scale); *External Health Locus of Control*, a four-item scale assessing beliefs that factors outside of one’s control (luck, genetic background, parents, doctors) are responsible for one’s health ($\alpha = .70$); *Internal Health Locus of Control*, a two-item scale measuring beliefs that good health is contingent on personal behavior ($\alpha = .40$);¹ and *Positive Functions of Exercise*, a nine-item index of the number of different positive outcomes, such as relaxation, mood modification, and social integration, that are anticipated by the respondent as consequences of engaging in exercise.²

Three Perceived Environment System psychosocial measures relevant to health were also included: *Maternal Modeling of Health Behavior*, an eight-item scale assessing adolescent perceptions of mother’s attention to her own diet, exercise, sleep, and safety ($\alpha = .77$); and two analogous measures—*Paternal Modeling of Health Behavior* ($\alpha = .79$), and *Friends Modeling of Health Behavior* ($\alpha = .78$).

In the Behavior System, eight new measures of health behavior were developed. The new measure of health-compromising behavior is *Sedentary Behavior/Hours*

¹ Although the reliability of this measure is low, these items do relate more strongly to one another than they do to the items assessing external health local of control.

² Because this measure is not a scale but rather an index of number of functions associated with exercise, no reliability is reported.

TV,³ a two-item scale reflecting average number hours of television watched per day ($\alpha = .66$). The new measures of health-enhancing behaviors include: *Physical Activity*, a three-item scale assessing amount of time that adolescents spent exercising on their own or participating in organized sport or exercise programs outside of school physical education classes ($\alpha = .72$);⁴ *Adequacy of Sleep*, i.e., how much sleep the adolescent gets on weekday nights; a single-item measure of *Regular Toothbrushing*; a single-item measure of regular *Seatbelt Use*; *Healthy Food Preferences*, a sixteen-item measure of the extent to which foods lower in sodium and saturated fat, and higher in complex carbohydrates are preferred in comparison to less healthy foods ($\alpha = .61$); and *Attention to Healthy Diet*, an eight-item scale of the amount of attention to healthy dietary practices, such as limiting salt and not overeating ($\alpha = .82$). Six of these measures of health behavior were combined to form an overall Index of Health Behavior (Adequacy of Sleep was excluded).

Measurement of Other Psychosocial and Behavioral Variables in Problem Behavior Theory

The 1985 Health Questionnaire also included the traditional measures of the major variables in the three systems of the Problem Behavior Theory framework. Detailed descriptions of these variables are provided elsewhere (Jessor & Jessor, 1977). The measures and their reliabilities are listed in Table 23.1. As may be noted, all of these measures have satisfactory psychometric properties.

Results

This section is organized into three main parts. The first part examines the relation between Value on Health and other health-related psychosocial measures. The second part examines the relation of Value on Health to measures of health behavior. The third part examines the linkage of Value on Health to the Problem Behavior Theory measures of psychosocial and behavioral conventionality-unconventionality.

The psychometric properties of the Value on Health scale and group differences on this measure are presented first. The Value on Health scale has an α

³Recent work (Tucker, 1987) supports the designation of average amount of daily television viewing as a sedentary and health-compromising behavior. Results from that research indicate that more frequent viewing is associated with poorer physical, psychological, and social health among adolescent males.

⁴Sedentary behavior and physical activity are, as would be expected, negatively and significantly correlated ($r = -.10$ in the junior high sample, $p < .05$; $r = -.17$ in the senior high sample, $p < .001$). The correlations are low enough to indicate that these measures are tapping separate behavior areas.

Table 23.1 Measures of Psychosocial and Behavioral Variables in Problem Behavior Theory

	No. of items	Alpha reliability
Personality System		
Value on academic achievement	5	.82
Value on independence	5	.70
Independence-achievement value discrepancy ^a	–	–
Expectations for academic achievement	5	.87
Expectations for independence	5	.73
Attitudinal intolerance of deviance	10	.87
Religiosity	5	.89
Perceived Environment System		
Parent-friends compatibility	3	.74
Parent versus friends' influence	2	.55
Parent disapproval of adolescent drinking	1	–
Friends models for problem behavior ^b	3	.79
Behavior System		
Times drunk in past 6 months	1	–
Problem drinking	2	.91
Involvement with smoking	2	.76
Involvement with marijuana	4	.81
Frequency of marijuana use in past 6 months	1	–
Delinquent-type behavior in past 6 months	10	.82
Multiple problem behavior index ^c	6	.76
Church attendance frequency in past year	1	–
School performance	1	–

^aThis measure is a derived index calculated by subtracting the value on academic achievement score from the value on independence score, adding a constant to eliminate negative scores. ^bThis measure has four items in the senior high school sample; alpha = .75. ^cThis measure has seven items in the senior high school sample; alpha = .77

reliability (Cronbach, 1951) of .77; its homogeneity ratio (Scott, 1960) is .40 (an optimal level of homogeneity is .33; higher ratios indicate some degree of redundancy among the items, while ratios much lower than this raise questions about the unidimensionality of the scale).⁵ There was little variation in scale properties as a function of grade; even in a younger sample of 25 6th-grade students, the properties of the scale remained good ($alpha = .69$; H.R. = .32).

Correlations of the component items with the overall scale score (item-total correlations with each item deleted in turn) are generally excellent, in the .5 to .6 range in both the junior high school and the senior high school samples. Inter-item correlations are generally in the range of .4 to .6.

⁵Because this was a cross-sectional study, stability reliability data for the scale are not available. The average one-year temporal stability of similar five-item measures of other values, e.g., value on achievement and value on independence, in our earlier research was .5 to .7 uncorrected for attenuation (see Jessor & Jessor, 1977, Appendix 2).

Table 23.2 Pearson Correlations of Value on Health with Other Health-Related Psychosocial Measures

	Value on Health	
	Junior High (<i>n</i> = 903)	Senior High (<i>n</i> = 685)
Other Health-Related Psychosocial Measures		
Personality System		
Self-rated health status	.45	.48
Health self-description	.47	.53
Positive functions of exercise	.30	.33
Internal health locus of control	.38	.27
External health locus of control	-.15	-.13
Perceived Environment System		
Maternal modeling of health behavior	.23	.15
Paternal modeling of health behavior	.17	.12
Friends modeling of health behavior	.18	.17

Note: All correlations are significant at $p < .001$, one-tailed test of significance

There are no significant mean differences in scores on the Value on Health scale between genders or across school levels. Although a few of the grade-level differences in Value on Health are significant, there is no meaningful or coherent ordering of mean scores, suggesting that those differences may be due to chance rather than developmental or age-related change.

Several of the individual items do show significant and expectable differences between genders. Males value being physically fit (item #1) and having endurance (item #4) significantly more highly than do females, and females place a significantly higher value on maintaining an appropriate body weight (item #3) than males do. Also, the senior high school adolescents place a significantly higher value on having sufficient energy (item #2) than do the junior high students.

I. The Relationship of Value on Health to Other Health-Related Psychosocial Measures

To determine convergent validity, the Value on Health scale was correlated with measures that can also be conceptualized as reflecting attention paid to health (including self-rated health status, self-description of health, positive functions of exercise), and with measures of social models (parents and friends) for health-promoting activity. Discriminant validity was examined by correlating Value on Health with two measures of health locus of control; it is important to show that the correlations are not so high as to raise questions about the independence of the two constructs. Because the results for males and females at each school level were generally quite similar, findings are reported in Table 23.2 for the genders combined.

All of the correlations relevant to establishing the convergent validity of the measure are significant and in the expected direction: higher value on health is linked to better self-rated health status, to a more positive self-description of personal health and fitness, to the use of exercise to fulfill a larger number of positive functions, and to greater prevalence of social models for health-enhancing behavior. In general,

Table 23.3 Pearson Correlations of Value on Health with Health-Related Behavior Measures

Health-Related Behavior Measures	Value on Health	
	Junior High (<i>n</i> = 903)	Senior High (<i>n</i> = 685)
Sedentary behavior/hours TV	-.10***	-.09**
Physical activity	.34***	.50***
Number of hours and sleep, weekday nights	.02	.02
Regular toothbrushing	.12***	.13***
Seatbelt use	.14***	.06
Healthy food preferences	.21***	.14***
Attention to healthy diet	.31***	.28***
Index of Health Behavior ^a	.34***	.39***

^aComponents of the Index of Health Behavior include all of the above measures except number of hours of sleep

** $p \leq .01$; *** $p \leq .001$, one-tailed test of significance

and as might be expected, the correlations of Value on Health with the personality measures tend to be somewhat higher (.3 to .5) than those with the perceived environment measures (.1 to .2).

The correlations relevant to establishing the discriminant validity of the Value on Health measure indicate that Value on Health is linked positively to internal health locus of control and negatively to external health locus of control, as expected. These correlations also indicate that relatively little variance (2%–14%) is shared between the measures of these two constructs, supporting the inference that the Value on Health scale and the health locus of control scales assess separate psychological constructs.

II. The Relationship of Value on Health to Health-Related Behavior

Theoretically, Value on Health should relate positively to participation in health-enhancing behaviors and negatively to involvement in health-compromising behaviors. Because findings were generally similar for males and females at each school level, the results in Table 23.3 are again presented for the genders combined.

Value on Health correlates significantly and positively with physical activity, regular toothbrushing, regular seatbelt use (junior high school only), preference for healthier foods over less healthy foods, and attention paid to healthy dietary habits. It is negatively correlated with sedentariness, as assessed by hours of television viewing. There is no significant relation of Value on Health to hours of sleep. The Value on Health measure also correlates significantly with the overall Index of Health Behavior; $r = .34$ in the junior high school sample and .39 in the senior high sample, both significant at $p < .001$.

Since other research has suggested that the relationship of value on health to health behavior may be mediated by the expectancy construct of health locus of control (Abella & Heslin, 1984), we generated correlations between Value on Health and the overall Index of Health Behavior with scores on the two health locus of control scales partialled out. The relationship between Value on Health and the

Index of Health Behavior remains significant in both the junior high and the senior high samples. The partial correlation is nearly identical to the zero-order correlation in the senior high sample (.36 versus .39, respectively) and is somewhat smaller in the junior high (.24 versus .34, respectively). The linkage of Value on Health to health behavior, therefore, cannot be interpreted as mediated by variation in health locus of control.

III. The Relationship of Value on Health to Conventionality-Unconventionality

In order to examine the relation of Value on Health to the dimension of conventionality-unconventionality in Problem Behavior Theory, two sets of analyses were performed. First, three groups differing in their levels of Value on Health (low, medium, or high)⁶ were compared on their mean scores on measures reflecting *psychosocial* conventionality-unconventionality. Second, these same groups were also compared on their mean scores on measures reflecting *behavioral* conventionality-unconventionality, i.e., involvement in problem behaviors and conventional behaviors. Individuals who value health more highly should evidence greater conventionality in other personality dispositions and in their perceived social environments, and they should be less involved in problem, or unconventional, behaviors and more involved in conventional behaviors than individuals who place a lower value on health. Table 23.4 presents the results of both of these analyses.

a. Relation of Value on Health to measures of psychosocial conventionality-unconventionality. In the Personality System, Value on Health is consistently and significantly associated with Problem Behavior Theory attributes that reflect greater conventionality. Adolescents who place a higher value on health also value academic achievement more highly, place less value on independence relative to academic achievement, have higher expectations for academic achievement, are more intolerant of deviance, and are characterized by greater religiosity, compared with those who value health less. The only exception to this conceptually consistent pattern is that higher value on health is linked to higher value on and expectations for independence in the junior high sample. Junior high students with a higher value on health do, however, place greater value on academic achievement *relative to* the value they place on independence, and this is consistent with a generally greater orientation to conventionality.

In the Perceived Environment System, adolescents who value health more highly perceive significantly greater compatibility between their friends and their parents, greater influence from parents relative to friends, greater parental disapproval of adolescent drinking (junior high only), and fewer friends models for problem behavior (junior high only).⁷ Once again, in all cases of significant mean differences,

⁶Members of the Low Value on Health group had scores in the lower 25% of the distribution in their sample, members of the Medium group had scores in the middle 40% of the distribution, and members of the High group had scores in the upper 35% of the distribution.

⁷Although there is no difference across senior high Value on Health groups in overall Friends Models for Problem Behavior, significant differences obtain on the component measures of Friends Models for Smoking and Friends Models for Marijuana Use. Students with a high value on health have fewer models for cigarette smoking, and students with a low value on health have more models for marijuana use, when compared with the other groups.

Table 23.4 Mean Scores on Measures of Conventionality-Unconventionality across Three Value on Health Groups: Junior High and Senior High School Students, Genders Combined

	Value on Health—Junior High School Sample			
	Low (<i>n</i> = 225)	Medium (<i>n</i> = 363)	High (<i>n</i> = 315)	<i>F</i> -ratio
Personality Measures				
Value on academic achievement	14.5 ^a	16.2 ^b	17.4 ^c	***
Value on independence	16.2 ^a	16.5 ^a	17.4 ^b	***
Independence-achievement value discrepancy	16.7 ^b	15.3 ^a	15.0 ^a	***
Expectations for academic achievement	14.5 ^a	15.5 ^b	16.2 ^c	***
Expectations for independence	16.8 ^a	17.1 ^a	17.6 ^b	***
Attitudinal intolerance of deviance	31.4 ^a	33.6 ^b	34.7 ^c	***
Religiosity	11.3 ^a	13.0 ^b	13.7 ^c	***
Perceived Environment Measures				
Parent-friends compatibility	8.8 ^a	9.8 ^b	10.5 ^c	***
Parent-friends influence	3.5 ^b	3.4 ^b	3.2 ^a	**
Parental disapproval/approval of adolescent drinking	2.0 ^b	1.8 ^a	1.7 ^a	**
Friends models for problem behavior	5.5 ^c	4.9 ^b	4.4 ^a	***
Problem Behaviors				
Delinquent-type behavior in past 6 months	18.6 ^b	16.9 ^a	15.9 ^a	***
Involvement with smoking	4.4 ^b	3.3 ^a	3.0 ^a	***
Times drunk in past 6 months	1.8 ^b	1.6 ^{ab}	1.5 ^a	*
Problem drinking	3.7 ^b	3.2 ^a	3.0 ^a	**
Involvement with marijuana	1.7 ^c	1.0 ^b	0.6 ^a	***
Frequency of marijuana use in past 6 months	1.8 ^b	1.3 ^a	1.1 ^a	***
Multiple problem behavior index	1.6 ^b	1.1 ^a	1.0 ^a	***
Conventional Behaviors				
School performance	5.4 ^a	5.8 ^b	6.0 ^b	***
Church attendance frequency in past year	3.8	4.2	4.2	n.s.
	Value on Health—Senior High School Sample			
	Low (<i>n</i> = 166)	Medium (<i>n</i> = 268)	High (<i>n</i> = 249)	<i>F</i> -ratio
Personality Measures				
Value on academic achievement	14.5 ^a	15.6 ^b	16.6 ^c	***
Value on independence	17.0	17.2	17.3	n.s.
Independence-achievement value discrepancy	17.5 ^c	16.6 ^b	15.7 ^a	***

(continued)

Table 23.4 (continued)

Expectations for academic achievement	13.8 ^a	15.1 ^b	15.5 ^b	***
Expectations for independence	17.3 ^a	17.7 ^{ab}	17.8 ^b	n.s.
Attitudinal intolerance of deviance	31.7 ^a	32.9 ^b	33.4 ^b	***
Religiosity	10.9 ^a	12.1 ^b	13.3 ^c	***
Perceived Environment Measures				
Parent-friends compatibility	9.0 ^a	10.0 ^b	10.6 ^c	***
Parent-friends influence	3.7 ^b	3.5 ^a	3.3 ^a	***
Parental disapproval/approval of adolescent drinking	2.1	2.1	2.0	n.s.
Friends models for problem behavior	9.5	9.2	8.8	n.s.
Problem Behaviors				
Delinquent-type behavior in past 6 months	19.6	18.5	17.8	n.s.
Involvement with smoking	5.3 ^c	4.3 ^b	3.6 ^a	***
Times drunk in past 6 months	2.4	2.5	2.3	n.s.
Problem drinking	4.6	4.8	4.5	n.s.
Involvement with marijuana	2.9 ^b	2.3 ^{ab}	1.9 ^a	**
Frequency of marijuana use in past 6 months	2.5 ^b	1.9 ^a	1.7 ^a	***
Multiple problem behavior index	2.6 ^b	2.4 ^{ab}	2.1 ^a	*
Conventional Behaviors				
School performance	5.4 ^a	5.8 ^{ab}	5.9 ^b	**
Church attendance frequency in past year	3.6	3.9	4.0	n.s.

Note: Superscripts refer to the results of multiple comparisons among the groups. Means not sharing a common superscript are significantly different by Scheffe's multiple-range test with the "experiment-wise" alpha set at .10

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$. Refers to the significance level of the F -ratio

mean scores are ordered in the expected direction across the three groups differing in Value on Health.

Variation in Value on Health is, however, only partly accounted for by its linkage to psychosocial conventionality-unconventionality. When Personality System and Perceived Environment System measures of conventionality-unconventionality (Value on Academic Achievement, Attitudinal Intolerance of Deviance, Religiosity, Parent-Friends Compatibility, Parent-Friends Influence, and Total Friends Models for Problem Behavior) were used to predict Value on Health, only 20% and 14% of the variance in Value on Health were accounted for in the junior high and senior high school samples, respectively. The Value on Health measure, therefore, is not a redundant addition to the explanatory framework of Problem Behavior Theory.

Furthermore, the relationship between Value on Health and adolescent involvement in health behaviors is also only partly explained by the conventionality

component of Value on Health. When the conventionality component is removed from the Value on Health measure,⁸ its correlation with the Index of Health Behavior remains significant in both samples ($r = .20$ in the junior high, and $r = .30$ in the senior high; $p \leq .001$). These findings indicate that Value on Health does contribute additional and significant explanatory power to the prediction of health behavior beyond that contributed by the relation of Value on Health to conventionality/unconventionality.

b. Relation of Value on Health to measures of behavioral conventionality-unconventionality. With respect to problem, or unconventional, behavior, those adolescents with a higher value on health are significantly less involved in general deviance or delinquency (junior high school only), cigarette smoking, alcohol use (junior high school only), and marijuana use, and are involved in fewer areas of problem behavior (lower part of Table 23.4). With respect to conventional behaviors, those who place a higher value on health report higher grade-point averages. These findings are consistent with expectations and further support the construct validity of the measure of value on health.

Discussion

The Value on Health scale introduced in this paper was shown to be psychometrically sound and to demonstrate construct validity in samples of junior high school and senior high school adolescents. Value on Health was positively and significantly associated with other health-related psychosocial constructs, including self-reported health status, self-description of health and fitness, positive functions for physical exercise, and social models for health-promoting behavior. Value on Health was also significantly linked in expected ways to adolescents' involvement in health-related behaviors such as physical activity and healthy dietary practices. Finally, Value on Health was established as part of a larger network of psychosocial and behavioral characteristics that reflect an underlying dimension of conventionality-unconventionality.

Although the association between value on health and health-related behaviors is significant and consistent across both genders and both school levels, the magnitude of the obtained relationships is generally quite modest. Since it is only a single explanatory variable in what is clearly a complexly determined pattern of behavior this is, of course, not unexpected. Other psychological factors undoubtedly influence health behavior—including the expectation of attaining the valued goal of

⁸The conventionality/unconventionality component of Value on Health was represented by the personality and perceived environment measures used in the multiple regression analyses reported in the preceding paragraph. Each psychosocial measure was multiplied by its b-weight; these values and the constant from the regression equation were summed to operationalize the conventionality/unconventionality component of Value on Health. This component was then subtracted from the overall scale score to construct scores not reflecting conventionality.

health, the extent to which various behaviors are perceived as relevant to health, and even other personal values with which value on health may well be in conflict, e.g., value on social popularity. The demonstrated relation of value on health to both health behaviors and problem behaviors is, nonetheless, of theoretical importance.

The linkage of Value on Health to conventionality-unconventionality was established with respect to personality, perceived environment, and behavior variables. The most substantial relationships between Value on Health and other measures were in the Personality System. Value on Health can be seen, therefore, as one component of a theoretically coherent constellation of psychosocial attributes implicating conventionality-unconventionality. Good health, and the behaviors necessary to maintain it, seem to some extent to be embedded in an overall outlook characterized by more conventional values and attitudes and by a greater commitment to conventional social institutions.

The fact that the bulk of the variation in Value on Health remains unaccounted for by the measures of psychosocial conventionality-unconventionality already in Problem Behavior Theory indicates that value on health has other meanings or conceptual significance in addition to its linkage with conventionality. Value on health may well be related to other values that have little to do with conventionality. Our own findings showing that males value physical fitness and endurance more highly than females, and that females value maintaining an optimal body weight more highly than males, suggest that value on health may be related to other, gender-typed values such as effectiveness, competitiveness, and attractiveness. At least among young people, health may not only be a terminal value in itself, but also an instrumental value relevant to fulfilling other valued goals. The linkage of value on health with other values and with other categories of behavior remains to be explored empirically.

The data are somewhat stronger and more consistent at the junior high school level than at the senior high school level. These findings suggest that efforts to influence adolescents' health-related behavior by influencing their value on health and other aspects of conventionality-unconventionality might best be implemented early in adolescence or even before then. Others (e.g., Johnson, Hansen, Collins, & Graham, 1986) have also recommended that intervention efforts directed at younger students would likely be more effective in general.

The demonstration that value on health plays a significant role in relation to variation in health behavior among adolescents has implications for the design of prevention/intervention programs for that age group. Programs designed to focus on and strengthen value on health could well have consequences across a variety of health-related behaviors, and enhancing value on health could serve as an insulating or protective factor against involvement in a variety of problem behaviors.

Several limitations of the present research need mention. First, the research is limited by the nature of the final sample. Because only 55% of the designated sample received parental permission to participate in the study, those adolescents who took part in the research cannot be considered representative of the students in the school district. The nature of the bias due to this loss, and the limits it imposes on the generality of the findings, are unknown. The exclusive reliance upon self-report measures is another limitation of the study. Given the necessity to confine data collection to self-report questionnaires in this study, however, maximum effort was

directed to ensuring veridicality of responding, including placing more sensitive material later in the questionnaire, using instructions that emphasized the importance of honest responses, and ensuring the confidentiality of those responses.

The measures of health-related psychosocial variables used to establish convergent and discriminant validity for the Value on Health measure are all new measures that have not been independently validated. This is also a limitation of the study. Nevertheless, the number and variety of the validating measures used, and the convergence of their findings, would seem to minimize that limitation. Furthermore, Value on Health was shown to relate in the expected direction to other, well-established psychosocial measures in Problem Behavior Theory. For example, Pearson correlations of Value on Health with Value on Achievement are .4 at the junior high school level and .3 at the senior high school level ($p \leq .001$); the correlation of Value on Health with Independence-Achievement Value Discrepancy is $-.2$ ($p \leq .001$) for males and females at both school levels; and Value on Health correlates .2 and .3 ($p \leq .001$) with Attitudinal Intolerance of Deviance for all groups but the senior high school males. All of these latter measures have had long-established validation.

The measure of Value on Health is, itself, limited. Although it does include assessment of psychological health, e.g., the sense of energy, it tends to emphasize the domain of physical health, and it does not encompass all aspects of the latter. A longer and more inclusive scale might well focus on other aspects of health, e.g., a sense of personal competence, social effectiveness, role fulfillment, and fulfillment of inner capabilities (see Perry & Jessor, 1985). Despite such limitations and its brevity, the present Value on Health scale has been shown to have adequate psychometric properties, and it has generated a network of coherent relationships with other health-related psychosocial factors and with health-related behavior.

This research has drawn attention to a neglected aspect of personality—personally-held values—and has shown the relevance of a particular value—value on health—to health-related behavior in adolescence. In doing so, and in providing a construct-valid measure of value on health, the study should advance theoretically-guided research on adolescent health.

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Chapter 24

Applying Problem Behavior Theory to Adolescent Health Behavior

Richard Jessor, John E. Donovan, and Frances M. Costa

Introduction

Both societal and scientific concern with health among young people has grown substantially in recent years. Indeed, the World Health Organization selected “The Health of Youth” as the topic for global attention during its 1989 Technical Discussions in Geneva (Jessor, 1989). Among biomedical and social scientists, there is now considerable consensus that adolescence is something of a crucible for the shaping of health in later life. Not only are many health-related behaviors—eating and exercise patterns, sanitary practices, safety habits, and substance use—initially learned and tried out in adolescence, but many of the values, beliefs, and self-concepts that influence and regulate the occurrence of health-related behaviors are acquired or consolidated in that period as well. Perhaps the most important advance has been the recognition that behavior plays a central role in health and that much of the variation in health derives from the actions and decisions and choices that individuals make. In short, there is now considerable agreement that behaviors are critically important risk factors for disease, disability, and death.

The behavioral perspective on health has been generative in several respects, especially in relation to youth. It has stimulated a large body of research on the psychosocial determinants of health behavior, determinants that reflect individual

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difference variation and determinants that refer to the immediate context or setting in which health behavior occurs. It has also stimulated inquiry about the organization of health-related behaviors, their interrelatedness, and the degree to which they covary in the maintenance of health or the etiology of disease. The behavioral perspective has also put on the scientific agenda the question of the linkage of health behaviors to other domains of adolescent life, for example, to school achievement, or to interpersonal relations, or to problem behavior.

Salutary as these developments have been, they have not as yet enabled scientific understanding to “exceed its grasp” by as much as may have been hoped. The key limitations of the research thus far would seem to stem from the unsatisfactory state of theory in the field of adolescent health. Much of the research appears to be entirely atheoretical. Where theory has been engaged, it has tended to be highly proximal, invoking concepts that are directly and immediately implicative of health, such as health beliefs and intentions, social support for health behavior, or health internal-external control. Although such work clearly advances understanding of factors that influence health behavior, the proximal nature of the concepts—their immediacy, and the commonsense obviousness of their linkage to behavior—does not yield a social psychology that can capture more remote regions of the causal network. Neither do such proximal concepts make apparent the relation of health behavior to other domains of adolescent behavior. Finally, such proximal conceptual efforts are unlikely to engage systematically the role of the larger social environment, an even more distal and yet enduringly important source of influence on behavior.

Problem Behavior Theory and Adolescent Health Behavior

Our own efforts over the past decade have sought to explore the reach and the relevance of a particular social-psychological framework—Problem Behavior Theory—as an account of variation in adolescent health behavior (Jessor, 1978, 1982, 1984; Costa, Jessor, & Donovan, 1989; Perry & Jessor, 1985; Donovan, Jessor, & Costa, 1991). Originally formulated for a study of alcohol abuse and other social problem behaviors in a small, rural, tri-ethnic community (Jessor, Graves, Hanson, & Jessor, 1968), the theory was later revised and elaborated to guide a longitudinal study of problem behavior among cohorts of adolescents who were followed well into young adulthood (Jessor & Jessor, 1977; Jessor, Donovan, & Costa, 1991).

Since the general framework of Problem Behavior Theory has been explicated in other publications (e.g., Jessor & Jessor, 1977, Chapter Two; Jessor, 1987), only a brief description is warranted here. The theory is focused upon three major systems: *behavior*, both conventional behavior (e.g., church attendance, school achievement) and unconventional or problem behavior (e.g., problem drinking, illicit drug use, delinquency, aggression, precocious sexual intercourse, risky driving); *personality* (including values and expectations about achievement and autonomy, beliefs about the self and the social world, and attitudes about morality and

normative transgression); and the *perceived environment* (perceived controls, and supports, models, and approval for problem behavior). Some of the concepts in the theory are theoretically proximal to problem behavior, for example, attitudinal intolerance of deviance, or perceived models for drug use, and others are distal, for example, value on academic achievement, or perceived parental support. All of the concepts in each of the systems have an explicit directional implication for the likelihood of occurrence of problem behavior and reflect the underlying idea of *proneness to problem behavior*. In the logic of Problem Behavior Theory, it is possible to speak of personality proneness, or perceived environment proneness, or, when taken together, of overall psychosocial proneness to problem behavior. At whatever level, proneness is the fundamental explanatory notion in the theory.

The theory has by now been employed in a wide variety of studies—both cross-sectional and longitudinal—dealing with a wide variety of problem behaviors in a number of different societies, and it has consistently shown itself to be at least modestly useful. The key personality and perceived environmental variables have proved predictive of both cross-sectional and developmental variation and, taken together, they usually account for between 30 and 50% of the variance in behaviors such as illicit drug use or delinquency among adolescents. In addition, the research has shown that there is significant co-variation among problem behaviors, and that they tend to be positively interrelated among themselves while related negatively to conventional behaviors.

As mentioned earlier, the theory has been extended in recent years to explore its relevance for adolescent health behavior. Some comment needs to be made about the warrant for extending the theory beyond the problem behavior domain for which it was originally formulated; the rationale has been elaborated in more detail elsewhere (Jessor, 1984; Donovan, Jessor, & Costa, 1991). First, it was argued at the very outset of our work (Jessor et al., 1968) that a theory of deviance or problem behavior was, necessarily and simultaneously, an account of conforming behavior. To the extent that health behavior can be seen as conforming or conventional behavior, the theory ought, logically, to be relevant. Second, it is clear that there are widely shared social norms for engaging in health-enhancing behavior and for avoiding health-compromising behavior. Those norms are promulgated by the institutions of conventional society, and youth are regularly exhorted by parents, schools, and the media to comport themselves in accord with them. To the extent that failing to engage in health-enhancing behavior or actively engaging in health-compromising behavior represents the transgression of or departure from norms, the theory should be apposite since accounting for normative transgression is, precisely, its primary aim.

Third, several of the problem behaviors that the theory is concerned with, for example, cigarette smoking or alcohol abuse, are simultaneously defined as health-compromising behaviors by researchers in the health field. The theory's demonstrated utility in accounting for such health-compromising behaviors suggests the possibility of its relevance to other, nonproblem health behaviors. Finally, the Problem Behavior Theory research showing the interrelatedness of various problem behaviors suggests the possibility of even larger organizations of behavior within an individual's repertoire, organizations at the level of life-style that may entail linkages between problem behaviors and health behaviors.

Given these various considerations as warrant, the exploration of adolescent health behavior within the framework of Problem Behavior Theory has the potential of providing a more distal account, one that embeds health behavior in a broader network of person-environment variables, one that illuminates the relation of health behavior to other domains of adolescent behavior, and one that can articulate its linkage with the larger social environment. These are the key issues in the present report.

Description of the Study

The research to be presented here was only recently completed, and its data are not yet fully analyzed. Nevertheless, the study will enable us to address, at least in a preliminary fashion, the three key issues noted above. Data were collected during the Spring of 1989 in six middle schools (Grades 7–8) and four high schools (Grades 9–12) in a large metropolitan school district in a Rocky Mountain state. The city's population numbers over half a million residents, and it is ethnically heterogeneous with Hispanic citizens constituting its largest minority. Schools were assigned to the study by the school district central administration so as to maximize representation of Black and Hispanic students from inner-city areas. Letters explaining the nature of the study were written to each student in each school and to the student's parents, and active signed consent was requested from both student and parent. Participation rates varied from school to school and by whether it was a middle school or a high school. The overall participation rate for the middle schools was 67%; for the high schools, it was 57%.

Data were collected in large group sessions, usually in the library or the cafeteria, with students being released from their regular classes if they had obtained signed parental permission to participate. A 37-page "Health Behavior Questionnaire" was given to each student to fill out; average time for completion was 48 minutes at the middle school level and 42 minutes at the high school level. Upon completing the questionnaire, each student received a token payment of \$5.00.

The Health Behavior Questionnaire was a revised and elaborated version of questionnaires used in our previous studies. It included well-established scales assessing the major variables in the personality, perceived environment, and behavior systems of Problem Behavior Theory. In addition, it included a variety of measures of health behavior in such areas as eating, exercise, safety, and sleep, as well as measures of health-related psychosocial orientation such as Value on Health, Health Internal Control, and Models for Health Behaviors. At the end of the questionnaire, students were asked their evaluation of it, and the great majority thought it was interesting and a worthwhile experience.

In the present report, the data are based upon all those participants for whom ethnic status could be determined and who were classified as either White, Black, or Hispanic. At the middle school level, there are 258 White males, 126 Black males, and 265 Hispanic males; among the female middle school participants, 262 are White, 173 Black, and 305 Hispanic. At the high school level, there are 349 White

males, 193 Black males, and 425 Hispanic males; among the female high school participants, 457 are White, 308 Black, and 583 Hispanic. Overall, there were 1,389 middle school youth and 2,315 high school youth; 1,326 were White, 800 were Black, and 1,578 were Hispanic.

The three key issues to be addressed in the remainder of this report rely on the data from responses to the Health Behavior Questionnaire by the samples just described. The first issue to be examined is the relationship of the distal measures in the personality system of Problem Behavior Theory to variation in adolescent health behavior. The second issue is the relationship of health behavior to other domains of behavior, especially problem behavior, in this adolescent population. And the third issue is the linkage of variation in adolescent health behavior to the larger social environment.

Linking Personality Variation to Variation in Adolescent Health Behavior

The first step in examining all three issues was to establish an overall health behavior criterion measure. Measures were selected from four separate domains of health-related behavior: exercise, healthful eating practices, adequacy of sleep, and safety. Exercise was assessed by a four-item scale asking about the number of hours a week spent in organized sports participation, in working out as part of a personal exercise program, in pickup games, or in practicing physical activities (Cronbach's $\alpha = .70$). Healthful Eating Practices were measured by a nine-item scale asking how much attention adolescents paid to seeing that their diet is healthy, to limiting the amounts of salt or fat eaten, to eating healthy snacks like fruit, and so forth ($\alpha = .87$). Sleep Adequacy was assessed by a two-item scale focused on usual number of hours of sleep on school nights ($\alpha = .78$). Safety was measured by a single question regarding how much of the time a seatbelt is used when riding in a car. The four measures correlate positively and significantly among themselves, but their correlations are small, generally less than .20. The measure of Healthful Eating Practices has the strongest and most consistent associations with the other measures. A summary index of involvement in health behavior was constructed by summing *T*-scores on the four component behaviors; higher scores on the Health Behavior Index reflect greater involvement in positive health behavior. Some indication of the construct validity of the Health Behavior Index can be found in its relation to five different measures of proximal psychosocial orientations to health: Value on Health, Health Internal Control, Health External Control, Parental Models for Health, and Friends' Models for Health. As expected, all of the relationships were positive. Multiple correlations (*R*s) of these five measures of psychosocial orientations toward health with the Health Behavior Index were all above .50 for middle school and high school males and females.

The relationship of the distal personality system variables in Problem Behavior Theory to adolescent health behavior is shown in Table 24.1. Bivariate correlations

Table 24.1 Pearson Correlations between the Distal Personality System Measures and the Health Behavior Index

Personality measures	Middle School		High School	
	Males	Females	Males	Females
Value on Independence-Value on Achievement Disjunction	-.29*	-.26*	-.31*	-.27*
Expectations for Academic Achievement	.36*	.35*	.30*	.30*
Intolerant Attitude Toward Deviance	.28*	.37*	.25*	.25*

* $p < .05$ (two-tailed test)

between three personality measures and the Health Behavior Index are presented for males and females at the middle school and high school levels. The three personality measures—all of them distal from health behavior—are: (1) Value on Independence-Value on Academic Achievement Disjunction (a discrepancy score indicating the degree to which independence is valued more highly than academic achievement); (2) Expectations for Academic Achievement (a four-item scale indicating the subjective probability of doing well in schoolwork; Cronbach's $\alpha = .85$); and (3) Intolerant Attitude Toward Deviance (a 10-item scale indicating the unacceptability of engaging in nonnormative behavior; Cronbach's $\alpha = .90$).

It is clear in Table 24.1 that all three personality measures relate to the Health Behavior Index in the theoretically expected direction, and significantly, for all four subsamples. The more independence is valued relative to academic achievement, the less the involvement in positive health behavior; and the higher the expectations for academic achievement and the more intolerant the attitude toward transgression, the greater the involvement in positive health behavior.

Although the magnitude of the correlations is modest, the consistency across the three measures, and across the different age and gender groups, is noteworthy. The predictiveness of the personality system as a whole can be determined from the multiple correlations of the three personality measures, taken together, with the Health Behavior Index. For the middle school males and females and the high school males and females, the respective R s are: .42, .46, .41, and .38. Multiple correlations carried out within the three ethnic groups yield results that are similar, with the single exception of the high school Black males.

With respect, then, to the first issue addressed in the present study, it is apparent that there are systematic relations between personality measures that are distal from health behavior and a composite measure of health behavior itself. The relationship shown when the three personality measures are combined is not trivial; the amount of variance accounted for in the Health Behavior Index ranges around 15 to 20 percent for the various gender-by-grade groups, as well as for the three different ethnic groups.¹

¹In this report, we restrict our focus to the personality system and to its distal variables. A substantial increment in the account of variance in the Health Behavior Index could be achieved by engaging the distal variables in the perceived environment system as well. However, our aim in this presentation is not to try to exhaust the variance in adolescent health behavior but rather to illustrate the general point about the explanatory relevance of more remote regions of the causal network. For that purpose, reliance on the distal measures in the personality system alone is sufficient.

These data provide the first replication of our previous findings (Donovan, Jessor, & Costa, 1991). The present data extend those earlier findings to a large urban sample and to minority ethnic groups not represented in the previous study. What the results permit is the linkage of adolescent health behavior to a larger network of individual difference variation—individual difference attributes with no immediately obvious implication for health behavior. In addition, the findings show that measures originally designed to explain variation in problem behavior are also predictive of health behavior. Such findings strengthen the inference that involvement in health behavior—just as is true of involvement in problem behavior—is normatively regulated, and that variables that account for normative adherence or transgression can add a significant increment to understanding of variation in health behavior.

Linking Adolescent Health Behavior and Adolescent Problem Behavior

In prior work on Problem Behavior Theory, research that was focused on the behavior system has helped to illuminate its structure and organization. A significant degree of interrelatedness among different problem behaviors, and their negative relation with conventional behaviors, has been demonstrated in a variety of studies (e.g., Jessor & Jessor, 1977). More recently, it has been shown that co-variation among problem behaviors holds in young adulthood as well as in adolescence, and that a single underlying factor can explain the obtained pattern of correlations among them (Donovan & Jessor, 1985; Donovan, Jessor, & Costa, 1988).

The second key issue to be addressed in the present study is whether involvement in health behavior has any systematic relation to involvement in problem behavior. To the extent that there is, indeed, evidence for co-variation between health behavior and problem behavior, it would contribute to an understanding of the larger organization of behavior in adolescence. To examine this issue, in a rather preliminary fashion, we correlated four measures of problem behavior (delinquent-type behavior, involvement with marijuana, frequency of drunkenness, and sexual intercourse experience) with the four measures of health behavior discussed earlier (exercise, healthful eating practices, adequacy of sleep, and seatbelt use). As expected, the correlation matrix shows negative associations between each of the problem behaviors and each of the health behaviors; the correlations are again small, generally about .20, but almost all are statistically significant. The exercise measure is the one with the smallest correlations, almost none significant, when the analysis is carried out by gender and school level.

A more general and more stable appraisal of the issue is obtained by examining the relation between the summary Health Behavior Index and a comparable composite index of the four problem behaviors constructed in the same way as was done for the four health behaviors. The relevant data are presented in Table 24.2

Table 24.2 Pearson Correlations between the Health Behavior Index and the Multiple Problem Behavior Index

	Total sample	Whites	Blacks	Hispanics
Middle school				
Males	-.28*	-.22*	-.23*	-.31*
Females	-.35*	-.29*	-.34*	-.33*
High school				
Males	-.31*	-.32*	-.13	-.35*
Females	-.29*	-.39*	-.14*	-.27*

* $p < .05$ (two-tailed test)

by gender and school level for the total sample as well as for the three ethnic subgroups.

As can be seen, there are consistent and significant correlations between involvement in health behavior and involvement in problem behavior. These correlations between the Health Behavior Index and the Multiple Problem Behavior Index are negative, as expected, and they hold for all the gender-by-school-level groups and for all of the ethnic subgroups except for the high school Black males. The data, again, serve as an independent replication of earlier findings (Donovan, Jessor, & Costa, 1991) and extend them to an urban and ethnically heterogeneous population.

It is of further interest to examine, for the same groups, the relation of the Health Behavior Index and of the Multiple Problem Behavior Index to a measure of another behavioral domain, namely, involvement in school achievement. This measure of a conventional behavior is indexed by self-reported Grade-Point Average. The correlations of the Health Behavior Index are, as expected, all positive and significant; they range between .16 and .32 with Grade-Point Average. The correlations of the Multiple Problem Behavior Index are, again as expected, all negative and significant; they are higher and range between .17 and .46. These findings not only add to the construct validity of both indexes, but they also reveal the linkage, albeit modest, of health behavior to yet another domain of behavior, school achievement.

The correlations in Table 24.2 are small in magnitude, the common variance being, at best, no more than about 15%, but the consistency of their direction and of their statistical significance across the multiple subgroups is of major theoretical importance. They strongly suggest that health behavior is not isolated from the rest of an adolescent's behavioral repertoire. Indeed, they suggest that a full understanding of health behavior will require consideration of an adolescent's involvement in other conventional behaviors, such as school achievement, as well as in the variety of youthful problem behaviors. Further analyses of the structure of health and problem behavior in this data set, using latent-variable procedures, are currently underway.

Linking Adolescent Health Behavior with the Larger Social Environment

The third and final issue to be addressed in this report focuses on the role that Problem Behavior Theory can play in articulating the relationship between adolescent health behavior and the larger social environment. In its earliest formulation (Jessor, Graves, Hanson, & Jessor, 1968), the theory sought to bridge between society and the person by elaborating isomorphic conceptual structures for both. The opportunity structure, the normative structure, and the social control structure were elaborated for the social environment, and, as parallels, the perceived opportunity structure, the personal belief structure, and the personal control structure were elaborated for the person. In that early research, an important personality variable referred to the “perception of life chances in the opportunity structure.” It was a variable designed to reflect, at the subjective level, Max Weber’s concept about the objective position that a person occupied with respect to access to societal rewards such as status, respect, income, power, and the like (see Dahrendorf, 1979). Objective position in the opportunity structure is often indexed by proxy measures of socioeconomic status. Because of our interest, in the present study, in the relation of health behavior to poverty and disadvantage, we have again given attention to the perception-of-life-chances variable, and we have developed a new measure to assess it. Our initial findings with this measure of Perceived Life Chances enable us to explore, in a preliminary fashion, the linkage of adolescent health behavior to the larger social environment.

The 10-item Perceived Life Chances scale is shown in Table 24.3. It represents a variety of future states that are widely endorsed as desirable, and it assesses the subjective likelihood of their future attainment. Taken together, the items yield a measure of an adolescent’s belief about the future and about the overall likelihood that it will be benign or malignant. In Problem Behavior Theory, the Perceived Life Chances variable is considered to be a generalized expectancy and to occupy a place in the Personal Belief Structure of the Personality System.

The Perceived Life Chances scale has excellent psychometric properties. Cronbach’s alpha reliability ranges between .88 and .92 for the four gender-by-school-level subgroups. The relation of the Perceived Life Chances measure to variation in the Health Behavior Index is shown in Table 24.4. As can be seen, there is a consistent positive relation between Perceived Life Chances and the Health Behavior Index: the greater the perception of access to future opportunity, the greater the involvement in positive health behavior.² Though modest, the correlations are statistically significant for all of the gender-by-school-level subgroups as well as for the three ethnic groups. The magnitude of the correlations is similar to that of the other three personality measures presented earlier in Table 24.1, and in

²Since one of the items in the Perceived Life Chances scale, Item 7, refers directly to “good health,” it could have inflated the correlations in Table 24.4. The correlations were run again with Item 7 deleted, and the magnitude of the difference in *r* is trivial, ranging from .00 to .03.

Table 24.3 The Measure of Perceived Life Chance in the Opportunity Structure

Think about how you see your future					
	I think the chances are:				
What are the chances that:	Very high	High	About 50–50	Low	Very low
1. You will graduate from high school?					
2. You will go on to college?					
3. You will have a job that pays well?					
4. You will be able to own your own home?					
5. You will have a job that you enjoy doing?					
6. You will have a happy family life?					
7. You will stay in good health most of the time?					
8. You will be able to live wherever you want to in the country?					
9. You will be respected in your community?					
10. You will have good friends you can count on?					

Table 24.4 Pearson Correlations between the Measures of Perceived Life Chances and the Health Behavior Index

	Total sample	Whites	Blacks	Hispanic
Middle school				
Males	.35*	.34*	.20*	.43*
Females	.40*	.35*	.41*	.36*
High school				
Males	.27*	.31*	.32*	.23*
Females	.30*	.32*	.26*	.30*

* $p < .05$ (two-tailed test)

the total sample, the Perceived Life Chances measure accounts for between 7 and 16% of the variance in health behavior. Perceived Life Chances constitutes, then, another distal personality measure that is systematically linked to health behavior in youth.

In order to establish whether this new measure contributes any unique personality variance beyond that accounted for by the other three distal personality measures discussed earlier, hierarchical regression analyses were carried out in which the Perceived Life Chances measure was added to the regression after the other three personality measures had been entered. The multiple correlations for the total sample and the three ethnic subgroups are shown in Table 24.5. The measure of Perceived Life Chances does, indeed, add a significant increment to the multiple correlations for all but two of the subgroups, the middle school Black males and the high school

Table 24.5 Multiple Correlations (*R*s) of the Distal Personality System Measures and the Perceived Life Chances Measure with the Health Behavior Index

	Total sample	Whites	Blacks	Hispanics
Middle school				
Males				
Personality measures	.42	.37	.46	.46
With Perceived Life Chances added	.47*	.42*	.46	.54*
Females				
Personality measures	.46	.46	.42	.43
With Perceived Life Chances added	.50*	.49*	.48*	.47*
High school				
Males				
Personality measures	.41	.43	.19 [†]	.48
With Perceived Life Chances added	.43*	.46*	.32*	.48
Females				
Personality measures	.38	.42	.28	.37
With Perceived Life Chances added	.41*	.46*	.33*	.40*

[†]This multiple correlation is the only one of the 16 based on the three distal personality measures that did not reach significance at the $p = .05$ level

*The increment in *R* yielded by the addition of the Perceived Life Chances measure is statistically significant at $p < .05$

Hispanic males. Although the increases in the *R*s are generally small, they represent a *relative* increase in the amount of variance accounted for of as much as 39% (e.g., for the high school Black males).

Having established, thus far, that the distal personality measure of Perceived Life Chances is relevant to variation in adolescent health behavior, we can turn to the issue of linking adolescent health behavior to the larger social environment. Our efforts in this direction are still quite preliminary, but as initial steps they are promising and of interest. They entail examining whether the Health Behavior Index and the measure of Perceived Life Chances *both* vary according to position in the social system. To the extent that that is indeed the case, it may be reasonable to consider Perceived Life Chances as mediating between the larger social environment and health behavior.

The approach to indexing location in the social system was to employ three standard measures of socioeconomic status: Father’s Occupation, Father’s Education, and Mother’s Education. The large amount of missing data on Father’s Occupation led us to develop an Index of Socioeconomic Status that was based, for each participant, on the average of whichever of the three measures was available. All of the analyses to be reported were carried out using the Index but, in addition, also using the three component measures separately. The findings are almost identical, their robustness providing greater confidence in the Index.

Table 24.6 Mean Scores on the Health Behavior Index and the Measure of Perceived Life Chances by Low, Medium, and High Socioeconomic Status

	Index of Socioeconomic Status			<i>F</i>	Eta ²
	Low	Medium	High		
A. Health Behavior Index					
Middle school					
Males	194.7	199.5	205.0	9.3***	.031
Females	193.0	198.5	206.5	18.3***	.052
High school					
Males	196.5	199.1	204.9	10.0***	.021
Females	195.1	199.9	204.4	15.6***	.024
B. Perceived Life Chances					
Middle school					
Males	41.0	42.0	44.5	13.6***	.046
Females	39.8	42.8	44.1	27.7***	.077
High school					
Males	40.4	42.5	43.2	15.3***	.033
Females	40.7	42.0	43.9	27.9***	.042

Level of significance of *F* ratio:

****p* < .001

The data in Table 24.6 present mean scores on the Health Behavior Index by three categories of socioeconomic status, low, medium, or high, for the four gender-by-school-level subgroups. They also present a comparable appraisal of the Perceived Life Chances scale. As can be seen, both the Health Behavior Index and the Perceived Life Chances scale vary significantly with the measure of socioeconomic position. The higher the socioeconomic status, the greater the involvement in health behavior *and* the greater the perception of access to future opportunity. The findings are consistent for all four gender-by-school-level subgroups.

Since we have already shown in Table 24.4 that Perceived Life Chances are linked to health behavior, the present findings suggest that the linkage between adolescent health behavior and the larger social environment may be mediated, at least in part, by the perception of life chances in the opportunity structure. In pursuit of greater conviction about the role of Perceived Life Chances as a mediator between the larger social environment and health behavior, we carried out analyses of covariance by gender and school level. In these analyses, Perceived Life Chances was controlled as a covariate while examining the relationship between the Index of Socioeconomic Status and the Index of Health Behavior. That relationship should be reduced by controlling for Perceived Life Chances if the latter is, in fact, mediating the relationship. The results of the analysis of covariance support the mediating role of Perceived Life Chances for all four gender-by-school-level groups. In all cases, the *F* ratio is sharply reduced, and the percentage of variance in health behavior accounted for by the measure of socioeconomic status is lowered by about half when compared to the Etas already shown in Table 24.6.

Summary and Conclusions

The major aim of this report has been to enlarge understanding of adolescent health behavior by embedding it in a broader social-psychological framework. That framework, Problem Behavior Theory, is concerned with distal as well as proximal determinants of behavior; it is concerned with the structure and organization of behavior; and it is concerned with the impact of the larger social environment on behavior. All three of those concerns were addressed in the present study. The findings show that personality measures that are distal from adolescent health behavior—values about academic achievement and autonomy, expectations for academic achievement, and attitudes about normative transgression—are all relevant to an account of its variation. The findings also show that involvement in health behavior is positively related to other conventional behavior such as school achievement, and negatively related to involvement in problem behavior. Finally, the findings suggest that the perception of access to future opportunity—another personality variable that is distal from health behavior—may mediate between a disadvantaged position in the larger social environment and the lesser involvement in health behavior. Position in the opportunity structure was related to both involvement in health behavior and the perception of future life chances, and, as would be expected if it actually serves as a mediating variable, controlling for Perceived Life Chances weakens the linkage between the larger social environment and health behavior.

Overall, the findings indicate that it is useful to consider adolescent health behavior as normatively regulated, as linked to other domains of behavior, and as reflecting the impact of location in society. To the extent that such knowledge enlarges our understanding of adolescent health behavior, it calls attention to the positive role that theory can play in research on social behavior among youth.

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Chapter 25

Linking Health Behavior and Problem Behavior in Adolescence

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In this paper, we explore the linkage between variation in adolescent conventionality-unconventionality, on the one hand, and variation in adolescent health-related behavior, on the other. Conventionality-unconventionality has been conceptualized here as a dimension underlying and summarizing an orientation toward, commitment to, and involvement in the prevailing values, standards of behavior, and established institutions of the larger American society. This generalized dimension of individual differences underlies several of the personality, social environment, and behavior variables comprising Problem Behavior Theory (R. Jessor, 1987; R. Jessor & S. L. Jessor, 1977).

Problem Behavior Theory is a social-psychological framework that has been developed to account for variation in adolescent involvement in a variety of problem behaviors as well as conventional behaviors. Problem behaviors are behaviors that have been defined socially as a problem, as a source of concern, or as undesirable by the norms of conventional society, and their occurrence usually elicits some kind of social control response. Examples in adolescence include delinquent behavior, problem drinking, illicit drug use, and precocious sexual activity. Conventional behaviors, in contrast, include church attendance, involvement in school activities, and other behaviors that are socially approved, normatively expected, and institutionalized as appropriate for adolescents and youth. The framework of Problem Behavior Theory, with its assessment of variables relevant to psychosocial and behavioral conventionality-unconventionality, has been shown to account for between a third and a half of the variance on measures of these different problem behaviors and conventional or conforming behaviors in national as well as local

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samples of adolescents (Donovan & R. Jessor, 1978; R. Jessor, Chase, & Donovan, 1980; R. Jessor & S. L. Jessor, 1977).

The category of adolescent health-related behaviors, which constitutes the focus of the present study, includes those actions or practices that either compromise or maintain an individual's physical, mental, or social health; subjective sense of well-being; or effectiveness of functioning (see Perry & R. Jessor, 1985). The focus in this paper is on behaviors relevant to physical health. Examples include sedentary behavior patterns, overeating, unprotected sexual intercourse, cigarette smoking, alcohol and drug abuse, regular exercise, healthy eating habits, adequate sleep, regular dental care, and good safety practices (see Califano, 1979).

As should be obvious, there is some overlap between behaviors comprising the category of problem behavior and those considered health-compromising behaviors. Specifically, problem drinking, marijuana use, cigarette smoking, and unprotected sexual activity all can have a negative impact on health and also are subject to social norms and sanctions (ranging from disapproval to legal sanctions).

The major question posed in the present paper is whether the explanatory variables of Problem Behavior Theory that reflect conventionality-unconventionality can account for variation in health-related behaviors that are not also problem behaviors. To the extent that they do, this would suggest the utility of viewing health-maintaining behaviors as a subcategory of conventional behavior. The expectation, then, would be that greater psychosocial and behavioral conventionality (or less unconventionality), as measured in the theory, would be associated with greater involvement in health-maintaining behavior (less involvement in health-compromising behavior).

In addition, there are other reasons to expect that conventionality and health-maintaining behavior are linked. Like conventional behaviors, health-maintaining behaviors are socially approved by conventional adult society. Adolescents are encouraged by parents, the media, schools, and other institutions to get adequate exercise, to get plenty of sleep at night, to eat healthy foods, and to use safety belts. Social norms are thus relevant to health-related behaviors just as they are to other conventional behaviors. In addition, much of the socialization concerning health behavior is carried out by institutions in our society—the family, the schools, and the churches—that have a stake in fostering conventional behavior. To the extent that adolescents are psychologically committed to these conventional institutions and positively involved with them, they should be more likely to adopt the patterns of behavior promoted by them, including health-maintaining behaviors, and less likely to adopt behaviors not endorsed by them, including health-compromising behaviors.

These considerations make a plausible case for extending Problem Behavior Theory to the domain of adolescent health behavior. Because variables in the framework that can be interpreted as reflecting conventionality-unconventionality relate successfully to variation in involvement in problem behavior, and because the conventionality-unconventionality dimension appears to be relevant to health behavior, reliance on the theory and its measures could help to illuminate the latter domain (see R. Jessor, 1984).

The social-psychological framework of Problem Behavior Theory encompasses three systems of explanatory variables: the personality system, the perceived environment system, and the behavior system. Each system is composed of variables that serve either as instigations for involvement in problem behavior or as controls against involvement in problem behavior. It is the balance between instigations and controls that determines the degree of proneness for problem behavior within each of the three systems. The overall level of proneness for problem behavior, across all three systems, reflects the degree of psychosocial conventionality-unconventionality characterizing each adolescent.

In the framework of the theory, problem-behavior proneness—or unconventionality—consists of the following profile of individual difference attributes. In the personality system, unconventionality is reflected by lower value on academic achievement, greater value on independence, greater value on independence relative to achievement, lower attitudinal intolerance of deviance, and lower religiosity. In the perceived environment system, unconventionality refers to less compatibility between parents' and friends' expectations, greater friends' than parents' influence on decision making, lower parental disapproval of problem behavior, and greater friends models for involvement in problem behavior. In the behavior system, unconventionality refers to greater involvement in the various problem behaviors (e.g., drug use and delinquent behavior) and lower involvement in conventional behaviors (e.g., school-related activities, academic performance, and church attendance).

Almost no previous research has examined systematically the linkage in adolescence between psychosocial conventionality-unconventionality and health behavior. Maron et al. (1986) did employ several attitudinal, social, and behavior measures modeled on Problem Behavior Theory variables to account for variation in safety belt use among adolescents. Although successful, that linkage relied strongly on variables highly proximal to safety belt use (e.g., attitudes toward safety belt use and friends' safety belt use) rather than ones that might capture psychosocial conventionality-unconventionality more generally.

The most relevant research on adults has linked more frequent church attendance to lowered risk of contracting tuberculosis, to lowered risk of death from arteriosclerotic heart disease, emphysema, cirrhosis, and suicide (Comstock & Partridge, 1972), and to significantly lower blood pressure (Graham et al., 1978). Church attendance, although a conventional behavior, is a limited and rather remote proxy measure of the more elaborated dimension of concern here—namely, conventionality-unconventionality in Problem Behavior Theory. Further, these physiological disease states reflect health behaviors only in a very indirect way.

Chassin, Presson, and Sherman (1987) pointed out that “the covariation of positive health behaviors (i.e., diet, exercise, seat belt use) is unknown. [And] there is no empirical literature that has addressed the issue of whether a larger health life-style does or does not exist for adolescents” (p. 365). By addressing the relation of behavioral conventionality-unconventionality (i.e., problem drinking, illicit drug use, smoking, etc.) to the various measures of health-maintaining behavior, the present research should be able to contribute to this area of research.

Explanatory variables that are theoretically proximal to health-related behavior—that is, variables that have direct and obvious relationships and that actually refer to health and health-related behavior (e.g., value on health and health locus of control)—are likely to account for more of the variation in adolescent health-related behavior than does conventionality-unconventionality. In order to demonstrate more fully the utility of conventionality-unconventionality for the explanation of adolescent health-related behavior, additional analyses are carried out to determine whether conventionality-unconventionality accounts for significant variation in adolescent health-related behavior over and above that explained by these theoretically more proximal—and more usual—explanatory variables. In addition to measures of value on health and health locus of control, other personality system measures relevant to health are examined. These include a measure of one's concept of self as a healthy and fit person and a measure of the extent to which exercise, an important health-maintaining activity, occupies a central role in the adolescent's behavioral repertoire, serving as a way to achieve a wide variety of personal goals, including relaxation, mood alteration, celebration, excitement, and so forth. Social environment variables relevant to health that are examined involve the adolescents' exposure to social agents (mother, father, friends) who model an active concern with a variety of different aspects of their own health including their weight, exercise, sleep, safety, and diet.

Method

Study Design and Procedures

A stratified sampling frame was used to select a sample of 7th through 12th graders on the basis of school and grade attended, from the 11 secondary schools in a single school district in northeastern Colorado. The district serves several urban and rural communities with a total population of about 72,000 residents and 7,000 secondary school students.

Active parental consent was requested for students' participation in the research. Of the 3,010 parents contacted by mail, 1,667 (55%) returned signed consent forms. This level of response, although lower than desirable, is similar to that obtained in several other studies in which active consent was sought from parents (see R. Jessor & S. L. Jessor, 1977; Lueptow, Mueller, Hammes, & Master, 1977; Severson & Ary, 1983).

Data were collected between mid-November and mid-December 1985. Anonymous questionnaires were filled out in large-group settings (e.g., in the cafeteria). The questionnaires were distributed and collected by members of the research team. Each student was given a token payment of \$5.

A total of 1,588 students completed questionnaires, constituting 95% of those who had received parental permission to participate, and 53% of those originally sampled. No information is available to permit comparison of participants and

nonparticipants in the present research. It is assumed, however, consistent with studies that have made such a comparison, that participating students are more conventional in general than nonparticipants (see, e.g., Severson & Ary, 1983).

Of the 1,588 participants, 54% were female, 83% were Anglo (White), 8% were Hispanic, 5% were Native-American, 2% were Asian-American, and 0.4% were Black. With respect to school level, 57% were in Grades 7 through 9, and 43% were in Grades 10 through 12. The majority of the students came from middle-class backgrounds, and most (70%) lived in intact families. In comparison with the larger, secondary school population in the district, this sample overrepresents females (54% vs. 49%), minority students (17% vs. 12%), and junior high school students (57% vs. 50%).

Questionnaire

The 1985 Health Questionnaire was 29 pages long and was printed so that it could be computer scanned and scored. Average time to complete the questionnaire was about 45 min for the junior high school sample and about 42 min for the senior high school sample.

Despite the length of the questionnaire, there was little evidence of respondent fatigue. Questions were formatted using lots of space, and most pages contained 10 questions or fewer. Even though students could skip any question they did not care to answer, there was relatively little missing data. Across the array of 16 personality, social environment, and behavior measures of conventionality-unconventionality described later, scores were available for no fewer than 93% of the junior high school males, 96% of the junior high school females, 94% of the senior high school males, and 97% of the senior high school females on any given measure.

Many of the measures comprising the questionnaire have been used frequently in earlier research. The measures of problem behavior and of psychosocial conventionality-unconventionality were developed originally to test the explanatory usefulness of Problem Behavior Theory (R. Jessor & S. L. Jessor, 1977). These measures were abridged and modified for use in the present research. Measures of the health behaviors and of the theoretically proximal health orientation variables were developed specifically for the present research. All the measures are described briefly as follows.

Measurement of Health-Related Behaviors

In addition to those health-related behaviors that are also problem behaviors (described later), a variety of other health-related behaviors was also assessed. Regular Physical Activity is a 3-item scale assessing the amount of time that adolescents spend exercising on their own or participating in organized sport or exercise

programs outside of school physical education classes (Cronbach, 1951: $\alpha = .72$). Usual Hours of Sleep is a single question asking how many hours of sleep adolescents usually get each night during the school week. Safety Belt Use is a single item assessing how regularly students use safety belts when in a car (from *hardly ever* to *almost every time*). Attention to Healthy Diet is an 8-item summative scale measuring the amount of attention adolescents pay to their usual diet—for example, seeing that their diet is balanced, limiting the amount of fat in the food they eat, and so forth ($\alpha = .82$). Healthful Food Preferences is a scale for which adolescents choose between two alternative foods in each of 16 pairs ($\alpha = .61$); higher scores indicate the extent to which more healthful foods (those with a lower sodium content, or less saturated fat, or more complex carbohydrates) are chosen over less healthful foods.

In addition to these five separate measures, a summary index of involvement in health-related behavior was constructed by summing *T*-scores ($M = 50$, $SD = 10$) on the component behaviors. Despite the low level of consistency of involvement found across the different health-related behaviors in the present study (Cronbach's $\alpha = .38$), the composite score was retained as an index summarizing individual differences in overall levels of involvement in the domain. Higher scores on the index reflect greater involvement in health-maintaining behavior.

Measurement of Psychosocial Conventionality-Unconventionality

The questionnaire also included measures of the major variables in Problem Behavior Theory that constitute proneness to problem behavior and that also reflect the dimension of conventionality-unconventionality.¹ Further discussion of these variables can be found in R. Jessor and S. L. Jessor (1977).

The following four measures represent the motivational-instigation structure of the personality system: Value on Achievement, a 5-item summative scale measuring the personal importance placed on the attainment of success in school work ($\alpha = .82$); Value on Independence, a 5-item scale assessing the personal importance placed on self-determination and autonomy from parents ($\alpha = .70$); Independence-Achievement Value Discrepancy, an index reflecting the extent to which independence is valued more highly than academic achievement (score range = 0 to 30, after constant added); and Expectations for Academic Achievement, a 5-item scale

¹Other analyses established that these psychosocial measures of problem-behavior proneness explain variation in adolescent problem behavior in these data. The measures display consistent correlations with a variety of different problem behaviors (e.g., marijuana use, problem drinking, delinquent-type behavior) as well as with a summary measure of involvement across the different areas. Multiple correlations of .71 and .76 were obtained in the present data set for the junior high school sample and senior high school sample, respectively, when these measures are used to account for variation on the summary problem behavior index.

assessing the subjectively held probabilities of achieving success in academic work ($\alpha = .87$).

The personal control structure of the personality system was represented by two measures: Attitudinal Intolerance of Deviance, a 10-item scale assessing adolescent beliefs regarding the “wrongness” of a variety of normative transgressions including property destruction, lying to parents, shoplifting, and aggression ($\alpha = .87$); and Religiosity, a 5-item scale measuring the personal importance placed upon religious teachings, practices, and counsel for the direction of daily life ($\alpha = .89$).

There were two measures of aspects of the perceived environment system that are theoretically distal from problem behavior: Parent-Friends Compatibility, a 3-item scale assessing the degree to which an adolescent’s parents and friends are perceived to have similar interests and common expectations ($\alpha = .74$); and Parent Versus Friends’ Influence, a 2-item scale measuring whether the views and opinions of parents or of friends are perceived as being more influential when a difficult decision is faced, for example, whether to continue in school or not ($\alpha = .55$).

Two measures of perceived environment variables that are theoretically more proximal to problem behavior were included: Friends Models for Problem Behavior, a scale assessing the perceived prevalence of drinking, cigarette smoking, and marijuana use (and sexual intercourse among senior high students) among friends (junior high $\alpha = .81$, senior high $\alpha = .75$); and Parental Disapproval-Approval of Drinking, a single question that asked how adolescents thought their parents felt about people their age drinking (high score = more approval).

Measurement of Behavioral Conventionality-Unconventionality

The behavioral dimension of conventionality-unconventionality was assessed by measures of the problem behavior and conventional behavior structures of the behavior system in Problem Behavior Theory.

Four measures were used to represent the problem-behavior structure: Delinquent-Type Behavior, a 10-item measure assessing frequency of engagement in the past 6 months in norm-violative activities, such as shoplifting, property destruction, getting into fights, lying to parents or teachers, and so forth ($\alpha = .83$); Problem Drinking, a 3-item scale reflecting frequency of high-volume drinking (five or more drinks per occasion), drunkenness, and negative consequences due to drinking, all in the past 6 months ($\alpha = .83$); Involvement With Marijuana, a 4-item scale of degree of involvement with the drug in terms of ever use, experience of the effects of the drug, frequent current use, and ease of access to a supply ($\alpha = .81$); and Cigarette Smoking, a 2-item scale summarizing past experience as well as levels of recent use ($\alpha = .76$). A summary measure of current involvement in these and other forms of problem behavior (including drinking status, other illicit drug use, and sexual intercourse), the Multiple Problem Behavior Index ($\alpha = .76$), was used in several analyses.

A measure of conventional behavior was also included: Church Attendance Frequency, a single question asking how many times in the past year religious services were attended, from none to more than once a week.

Measurement of Psychosocial Orientation to Health

The questionnaire also included a number of psychosocial measures that are theoretically proximal to health-related behavior and that were developed for the present study. In the personality system, these include the following: Value on Health, a 5-item scale assessing the personal importance placed on being healthy and feeling fit ($\alpha = .77$), whose development and validation are described by Costa, Jessor, and Donovan (1989); Health Self-Description, a 5-item scale developed in tandem with the preceding scale, measuring the degree to which adolescents see themselves as being healthy and in good physical condition ($\alpha = .80$); External Health Locus of Control, a 4-item scale developed using items similar to those used by Wallston, Wallston, Kaplan, and Maides (1976), assessing beliefs that factors outside one's control (luck, genetic background, parents, doctors) are responsible for the state of one's health ($\alpha = .70$); Internal Health Locus of Control, a 2-item scale developed similarly to the preceding one, but measuring beliefs that good health is contingent on personal behavior ($\alpha = .40$);² and, Exercise Functions, a 9-item index of the extent to which physical exercise is used to achieve a diverse array of valued ends such as relaxation, mood modification, social integration, and others (score range = 0 to 9).

Three perceived environment system measures proximal to health-related behavior were also developed: Maternal Modeling of Health Behavior, an 8-item scale assessing adolescent perceptions of mother's attention to her own diet, exercise, sleep, and safety ($\alpha = .77$); Paternal Modeling of Health Behavior, an 8-item scale analogous to the previous measure, but focusing on perceptions of father's attention to his own health ($\alpha = .79$); and Friends Modeling of Health Behavior, an 8-item scale concerned with perceptions of the amount of attention best friends pay to their own diet, exercise, sleep, and safety ($\alpha = .78$).

Analytic Procedures

In order to determine the generality of results across gender and age levels within this sample of adolescents, all analyses were carried out in each of four subsamples: junior high school males ($n = 437$), junior high school females ($n = 464$), senior high school males ($n = 296$), and senior high school females ($n = 388$). Three participants did not report their gender and were not included in the analyses.

²Although this brief scale has low reliability, it was retained for its theoretical interest.

Pearson correlations were examined to determine the bivariate relations between the measures of conventionality-unconventionality and the measures of adolescent health-related behavior. Multiple regression analyses were examined to determine the multivariate relations of sets of conventionality-unconventionality measures with the adolescent health-related behavior measures. Hierarchical regression analyses (Cohen & Cohen, 1983) were examined to determine if the measures of conventionality-unconventionality account for additional independent variation on the adolescent health-related behaviors beyond that accounted for by the health orientation measures. Due to the relatively low level of missing data, the Pearson correlations were calculated using pairwise deletion, and the regression analyses were based on these correlation matrices.

All analyses that focused on the composite measure of adolescent health-related behavior were replicated predicting variation in the five component health-related behaviors as well. This was done in order to determine the generality of results across the separate indicators of health-related behavior.

Results

The results are organized in two sections. The first section examines the relation of the psychosocial and behavioral measures of conventionality to the measures of health-related behavior. The second section examines the extent to which the measures of conventionality-unconventionality account for variation not explained by the more proximal measures of orientation to health.

Relation of Conventionality-Unconventionality to Health-Related Behavior

Table 25.1 presents Pearson correlations between the measures of psychosocial and behavioral conventionality-unconventionality and the composite measure of involvement in health-related behavior. Nearly every measure of conventionality-unconventionality correlates significantly and in the expected direction with the summary measure of health-related behavior. The correlations are modest in size but are consistent across the four subsamples tabled. Only value on independence fails to correlate with health-related behavior. On the basis of these bivariate findings alone, conventionality-unconventionality would seem clearly relevant to variation in involvement in health-related behavior.

Of particular interest are the consistent negative correlations between the measures of problem behavior and the summary index of involvement in health-maintaining behavior. Greater involvement in delinquent-type behavior, problem drinking, marijuana use, and cigarette smoking are all associated with lower levels

Table 25.1 Pearson Correlations between Measures of Conventionality-Unconventionality and the Index of Involvement in Health Behavior, by School Level and Gender

Measures of Conventionality - Unconventionality	Index of Involvement in Health Behavior			
	Junior High School		Senior High School	
	Males ^a	Females ^b	Males ^c	Females ^d
Personality system measures				
Value on academic achievement	.24***	.36***	.21***	.21***
Value on independence	.01	.05	.04	.00
Independence-achievement value discrepancy	-.21***	-.29***	-.16**	-.19***
Expectation for academic achievement	.29***	.38***	.27***	.20***
Intolerance of deviance	.28***	.38***	.21***	.26***
Religiosity	.24***	.33***	.20***	.21***
Perceived environment system measures				
Parent-friends compatibility	.24***	.34***	.21***	.15**
Parent versus friends influence	-.14**	-.24***	-.17**	-.10*
Friends models for problem behavior	-.17***	-.37***	-.13*	-.27***
Parent approval of teenage drinking	-.13**	-.09*	-.09	-.11*
Behavior system measures				
Multiple problem behavior index	-.23***	-.41***	-.17**	-.26***
Delinquent-type behavior/past 6 months	-.16***	-.35***	-.19***	-.19***
Problem drinking/past 6 months	-.13**	-.35***	-.15*	-.21***
Involvement with marijuana	-.19***	-.34***	-.15**	-.26***
Involvement with smoking	-.26***	-.43***	-.26***	-.34***
Church attendance/past year	.15*	.19***	.11	.15**
Demographic measures				
Age (months)	-.18***	-.12*	-.05	-.01
Father's education	.18***	.22***	.17**	.17***
Mother's education	.10	.13**	.09	.12*

^a*n* = 437. ^b*n* = 464. ^c*n* = 296. ^d*n* = 388

p* ≤ .05, two-tailed. *p* ≤ .01, two-tailed. ****p* ≤ .001, two-tailed

of involvement in health-maintaining behaviors. More frequent attendance at religious services, on the other hand, is associated with greater involvement in health-maintaining behaviors.

Also presented in Table 25.1 are the correlations of the sociodemographic measures of age (in months), father's education, and mother's education. Only father's education correlates consistently with health-related behavior. When these sociodemographic variables are partialled out of the other correlations presented in the table, there is little change in either the significance or the magnitude of the relationships.

Pearson correlations were also calculated between these measures of conventionality-unconventionality and the five separate health-related behavior measures of physical activity, sleep, safety belt use, attention to healthful diet, and healthful food preferences. These correlations (not tabled) support the correlations for the composite measure in Table 25.1.

Consonant with the general multivariate, system-level emphasis of Problem Behavior Theory, multiple correlations were calculated between each of five sets of variables representing personality, environmental, psychosocial (personality and environmental), behavioral, and overall conventionality-unconventionality, and the six measures of health-related behavior (the composite summary measure and the five component health-related behavior measures).³ These multiple correlations are presented in Table 25.2.

Although modest, there is a highly consistent and statistically significant level of relationship between the sets of conventionality-unconventionality measures and the different measures of health-related behavior. Whether assessed by the personality measures, the social environment measures, their combination, the behavior measures, or all the measures together, conventionality-unconventionality explains significant levels of variation in all of the health-related behaviors and for both genders and at both school levels. The only consistent exception to this is the lack of significant relation between conventionality-unconventionality and healthful food preferences among the senior high school females.

Multiple correlations between psychosocial conventionality-unconventionality (Set 3 in Table 25.2) and the summary measure of health-related behavior involvement range from .37 to .53 across the four subsamples. The multiple correlations for behavioral conventionality-unconventionality (Set 4) are somewhat lower, ranging from .28 to .46 across the subsamples. Together, the psychosocial and behavioral measures of conventionality-unconventionality (Set 5) correlate .41 to .55 with the summary measure of health-related behavior. In general, these multiple correlations with the summary measure are larger than the multiple correlations with the component health-related behaviors.

There are only a few consistent gender or school-level differences in the magnitude of the relationships between conventionality-unconventionality and the different health-related behaviors. Gender differences may be seen with respect to the predictability of the summary index, sleep, and safety belt use in the junior high school sample (with *R*s for females higher) and with respect to healthful food preferences in the senior high school sample (male *R*s higher). School-level differences in predictability occur with respect to healthful food preferences for both genders (senior high school *R*s larger for males, smaller for females), and with respect to sleep and to the summary index of health-related behavior for females (junior high school *R*s higher).

³Personality conventionality-unconventionality was represented by four measures: the independence-achievement value discrepancy, expectations for academic achievement, attitudinal intolerance of deviance, and religiosity. Environmental conventionality-unconventionality was represented by parent-friends compatibility, parent versus friends' influence, perceived parental approval of teen drinking, and perceived friends models for problem behavior. Psychosocial conventionality-unconventionality was represented by all eight of these personality system and perceived environment system variables. Behavioral conventionality was represented by delinquent-type behavior, problem drinking, marijuana involvement, cigarette smoking, and church attendance. Lastly, overall conventionality-unconventionality was represented by all 13 of the aforementioned measures.

Table 25.2 Multiple Correlations between Conventionality-Unconventionality and Health Behaviors, by School Level and Gender

		Junior High School		Senior High School	
		Males ^a	Females ^b	Males ^c	Females ^d
1	Personality conventionality measures predicting:				
	Health Behavior Index	.39***	.50***	.35***	.33***
	Regular physical activity	.21***	.25***	.23**	.25***
	Usual hours of sleep/weekdays	.13	.28***	.20*	.14
	Regular safety belt use	.25***	.35***	.24**	.22***
	Attention to healthy diets	.33***	.32***	.19*	.29***
	Healthful food preferences	.27***	.26***	.31***	.18*
2	Perceived environment conventionality measures predicting:				
	Health Behavior Index	.30***	.44***	.26***	.30***
	Regular physical activity	.21***	.28***	.18*	.26***
	Usual hours of sleep/weekdays	.10	.31***	.15	.11
	Regular safety belt use	.23***	.34***	.29***	.33***
	Attention to healthy diets	.20***	.30***	.20*	.17*
	Healthful food preferences	.20***	.22***	.13	.03
3	Psychosocial conventionality measures predicting:				
	Health Behavior Index	.41***	.53***	.37***	.38***
	Regular physical activity	.27***	.33***	.26**	.32***
	Usual hours of sleep/weekdays	.15	.34***	.23*	.18
	Regular safety belt use	.29***	.39***	.34***	.37***
	Attention to healthy diets	.34***	.35***	.24*	.30***
	Healthful food preferences	.28***	.30***	.34***	.18
4	Behavioral conventionality measures predicting:				
	Health Behavior Index	.29***	.46***	.28***	.36***
	Regular physical activity	.14	.21***	.31***	.35***
	Usual hours of sleep/weekdays	.17*	.30***	.26***	.19*
	Regular safety belt use	.25***	.37***	.25**	.32***
	Attention to healthy diets	.20***	.20**	.20*	.21**
	Healthful food preferences	.22***	.24***	.33***	.08
5	Overall conventionality measures predicting:				
	Health Behavior Index	.43***	.55***	.41***	.42***
	Regular physical activity	.29***	.35***	.39***	.40***
	Usual hours of sleep/weekdays	.22	.37***	.29*	.25*
	Regular safety belt use	.30***	.41***	.35***	.39***
	Attention to healthy diets	.36***	.35***	.32**	.30***
	Healthful food preferences	.29***	.33***	.44***	.18

^a*n* = 437. ^b*n* = 464. ^c*n* = 296. ^d*n* = 388

p* ≤ .05. *p* ≤ .01. ****p* ≤ .001 (by *F* test)

Table 25.3 Correlations between Health Orientation Measures and the Index of Involvement in Health Behavior, by School Level and Gender

Measures of Health Orientation	Index of Involvement in Health Behavior			
	Junior High School		Senior High School	
	Males ^a	Females ^b	Males ^c	Females ^d
Personality system measures				
Value on health	.40***	.35***	.41***	.36***
Health description	.35***	.35***	.36***	.34***
Internal health locus of control	.35***	.35***	.25***	.17***
External health locus of control	.00	-.12*	-.16**	-.06
Exercise functions	.31***	.30***	.34***	.28***
Perceived environment system measures				
Maternal modeling of health behavior	.37***	.46***	.26***	.36***
Paternal modeling of health behavior	.40***	.32***	.26***	.31***
Friends' modeling of health behavior	.33***	.18***	.27***	.33***

^a $n = 437$. ^b $n = 464$. ^c $n = 296$. ^d $n = 388$

* $p \leq .05$, two-tailed. ** $p \leq .01$, two-tailed. *** $p \leq .001$, two-tailed

Independent Contribution of Conventuality-Unconventuality to Explanation of Health-Related Behavior

Hierarchical multiple-regression analyses were performed to determine the extent to which psychosocial and behavioral conventionality-unconventionality accounts for variance in health-related behavior that is independent of that explained by other explanatory variables. Of particular interest here is whether conventionality-unconventionality, a set of variables that are theoretically distal from health behavior, can increase the predictability of these behaviors even after variables that are theoretically proximal (and that refer explicitly to health behaviors) have been entered into the regression equation.

Table 25.3 presents Pearson bivariate correlations between the eight health orientation measures described earlier and the summary index of involvement in health-related behavior. Nearly all of these theoretically proximal measures correlate significantly and in the expected direction with the summary index. Higher values on health, self-descriptions affirming health and fitness, greater internal locus of control, lower external locus of control, and beliefs that exercise serves a variety of positive personal functions are all associated with greater involvement in health-related behavior. Greater modeling of health-maintaining behaviors by parents and by friends also are associated with higher levels of involvement in health-related behavior. The magnitude of these correlations is, in general, higher than was seen for the separate measures of conventionality-unconventionality.

These health orientation measures were also correlated with the five separate component measures of health-related behavior, and the majority of these correlations (not tabled) are statistically significant.

The hierarchical multiple regressions are presented in Table 25.4. For each of the six measures of health-related behavior (the summary index and its five component measures), the table reports the multiple correlation (R), with the coefficient of determination (RSQ) in parentheses, for the regression based on the health orientation predictor measures, the R and RSQ based on the addition of the conventionality-unconventionality measures to the regression equation, and the difference (increment) in the R and RSQ , which expresses the independent contribution of the conventionality-unconventionality measures to the predictability of the health-related behaviors. Cohen and Cohen's (1983) general F test for increments (Equation 4.4.2) was used to test the significance of this increment in predictability.

In general, and as expected, the multiple correlations based on the more proximal health orientation measures are somewhat larger than the multiple correlations in Table 25.2 that employed only the measures of overall conventionality-unconventionality. The multiple correlations based on the health orientation measures range from .55 to .60 when the summary index of health-related behavior is the criterion. The key point, however, is that the measures of psychosocial and behavioral conventionality-unconventionality do increase the predictability of the health-related behaviors beyond their predictability from the health orientation measures alone. The addition of the conventionality-unconventionality predictors generally increases the proportion of the variance accounted for on each health-related behavior by .05 to .10. These increments are statistically significant for predictions of variations on the summary index of involvement in health-related behavior for three of the four subsamples (not for senior high school males). The increments are also significant in all four subsamples for the component measures of regular physical activity and safety belt use and for two of the four subsamples for the component measures of usual hours of sleep and healthful food preferences. Across all six behavior measures, psychosocial and behavioral conventionality-unconventionality accounts for a significant increment in the predictability of the health-related behaviors in two thirds of the analyses. It should be noted that, although the conventionality measures usually added only 5% to 10% to the total variance accounted for, this increment constituted a 34% relative increase, on average, in the variance accounted for over that accounted for by the proximal measures alone.

Discussion

In this paper, we have explored the linkage between psychosocial and behavioral conventionality-unconventionality, an individual differences dimension in Problem Behavior Theory, and variation in health behavior in adolescence. The findings provide consistent support for such a linkage and, therefore, for the extension of the

Table 25.4 Independent Contribution of Conventionality-Unconventionality to Predictability of Health Behavior Measures, by School Level and Gender

Health Behavior Measures	Junior High School		Senior High School	
	Males ^a	Females ^b	Males ^c	Females ^d
Health Behavior Index				
<i>R (RSQ)</i> on health orientation	.58 (.34)***	.60 (.36)***	.55 (.30)***	.55 (.31)***
<i>R (RSQ)</i> after conventionality added	.62 (.39)***	.68 (.46)***	.59 (.35)***	.60 (.36)***
Increment	.04 (.05)**	.08 (.10)**	.04 (.05)	.04 (.05)**
Regular physical activity				
<i>R (RSQ)</i> on health orientation	.44 (.19)***	.49 (.24)***	.61 (.38)***	.56 (.31)***
<i>R (RSQ)</i> after conventionality added	.49 (.24)***	.53 (.28)***	.65 (.42)***	.61 (.37)***
Increment	.05 (.05)*	.04 (.04)*	.04 (.04)*	.05 (.06)**
Usual hours of sleep/weekdays				
<i>R (RSQ)</i> on health orientation	.14 (.02)	.28 (.08)***	.16 (.03)	.30 (.09)***
<i>R (RSQ)</i> after conventionality added	.26 (.07)	.44 (.19)***	.32 (.11)	.38 (.14)***
Increment	.12 (.05)	.16 (.11)**	.16 (.08)*	.08 (.05)
Regular safety belt use				
<i>R (RSQ)</i> on health orientation	.38 (.14)***	.43 (.19)***	.42 (.18)***	.35 (.12)***
<i>R (RSQ)</i> after conventionality added	.44 (.19)***	.53 (.28)***	.49 (.24)***	.47 (.22)***
Increment	.06 (.05)*	.10 (.09)**	.06 (.06)*	.12 (.10)**
Attention to healthy diet				
<i>R (RSQ)</i> on health orientation	.52 (.27)***	.49 (.24)***	.43 (.19)***	.45 (.20)***
<i>R (RSQ)</i> after conventionality added	.57 (.33)***	.52 (.27)***	.48 (.23)***	.49 (.24)***
Increment	.05 (.06)**	.03 (.03)	.05 (.04)	.04 (.04)
Healthful food preferences				
<i>R (RSQ)</i> on health orientation	.37 (.14)***	.32 (.10)***	.31 (.10)***	.33 (.11)***
<i>R (RSQ)</i> after conventionality added	.42 (.18)***	.40 (.16)***	.49 (.24)***	.37 (.14)***
Increment	.05 (.04)	.08 (.06)**	.18 (.14)**	.04 (.03)

Note: Numbers in parentheses are proportions of the variance (RSQ); significance of increments was determined by Cohen and Cohen's (1983) general *F* test for an increment: Equation 4.4.2.

^a*n* = 437. ^b*n* = 464. ^c*n* = 296. ^d*n* = 388

p* ≤ .05. *p* ≤ .01. ****p* ≤ .001 (by *F* test)

theory. In general, greater conventionality has been shown to relate to greater involvement in health-maintaining behaviors; stated otherwise, greater unconventionality is related to less involvement in health-maintaining behaviors. The results are consistent across all three of the explanatory systems of Problem Behavior Theory (personality, perceived environment, and behavior), across a variety of different health-related behaviors, across two different age samples (junior high school students and senior high school students), and across both genders.

Although the measures of psychosocial conventionality-unconventionality relate consistently to variation in involvement in the different health-related behaviors, these associations are generally quite modest in size, accounting for about 10% of the variance on the behaviors. This level of correlation, however, is not unexpected given the fact that the personality and perceived environment measures of conventionality are theoretically distal from, and do not directly implicate, the various health-related behaviors.

Given their distal nature, it is possible that the observed relation of the measures of conventionality-unconventionality to health behavior is spurious, or only an indirect relation mediated by variables that are theoretically more proximal to health behavior. This possibility turns out on examination not to be the case. In the hierarchical regression analyses, we found that, for most of the health-related behaviors, the measures of psychosocial conventionality-unconventionality do add a statistically significant increment to the prediction of the health-related behaviors, even when theoretically proximal health orientation measures are forced to enter the regression in a prior step.

It was pointed out recently that:

The unsatisfactory state of theory in the field of adolescent health may well be the most serious obstacle to progress in understanding the nature of adolescent risk behavior and in devising effective approaches to reducing risk and enhancing adolescent health. (R. Jessor, 1984, p. 79)

The present study represents an instance of the application of social-psychological theory to adolescent health behavior. Bringing a particular theoretical perspective to bear has enabled us to illuminate a new source of variation in health behavior—conventionality-unconventionality—and to reveal the linkages of problem and conventional behaviors with health behaviors in an adolescent's repertoire. This approach has made clear that there are, indeed, consistent and systematic relationships between personality and behavior, in this case, between the relatively enduring individual differences in values, beliefs, and attitudes constituting the conventionality-unconventionality dimension of personality, and those behaviors that can influence health.

The findings of the present research generally are consistent with the results of other investigators. For example, Robinson et al. (1987) found that substance use among 10th graders correlated negatively with safety belt use, and positively with both risk-taking behavior and the use of diet pills, laxatives, or diuretics for weight control. A 1984–1985 national survey of Canadian 9-, 12-, and 15-year-olds found that alcohol users, marijuana users, and cigarette smokers were less likely to use

safety belts and more likely to take chances by hitchhiking (King, Robertson, & Warren, 1985).

The evidence provided by this study that problem behaviors and conventional behaviors are related to health behaviors may have important ramifications both for theory and for prevention/intervention. Such evidence suggests the need for conceptualizing health behaviors as part of an interrelated and larger system—an adolescent lifestyle—rather than as isolated and unrelated actions. The concept of lifestyle, in calling attention to the organized patterning of behavior, also suggests that attempts to change any part of that pattern may need to deal with the pattern as a whole. It may well be that behavior-specific intervention or prevention efforts will be less successful than efforts focused on the organized patterning of behavior, that is, on adolescent lifestyles as a whole.

There is a further implication for prevention and intervention. The consistent negative correlations between involvement in cigarette smoking, marijuana use, and problem drinking, on the one hand, and involvement in health-maintaining behavior, on the other, suggest the need for research to determine if a positive orientation to health may serve as a protective factor against the initiation of substance abuse in adolescence.

Finally, and as a cautionary note, the findings showing that unconventionality is linked to less involvement in health-maintaining behavior suggest that those youth who are most unconventional, that is, the so-called high-risk youth, may be in double jeopardy. Not only does their unconventionality place them at greater risk for engaging in health-compromising problem behavior, but it also may lead them to eschew health-maintaining behavior to the extent that the latter is seen as conventional. Insofar as conventionality is linked to the concept of health, those youth who could benefit most from efforts at health promotion may be the very ones most resistant.

The present findings are limited in several ways. First, the use of an active consent procedure resulted in parental permission for only 55% of the selected students to participate in the study. Because of this initial loss, generalization of the present results to the rest of the students in the school district may be unwarranted. Previous research in the area of adolescent problem behavior generally has found that participants tend to be somewhat more conventional than nonparticipants, thereby truncating the range of unconventionality in the sample. The probable impact of this truncation would be to reduce the level of correlations observed, thus rendering them more conservative estimates of the relationships in the larger population of adolescents. A second limitation is the relatively homogeneous nature of the sample of adolescents. The largely Anglo, middle-class composition of the sample may limit the extent to which these results can be generalized to inner-city and/or minority adolescents. Further research in these populations is certainly called for.

A third limitation derives from the employment of several measures of health-related behavior that have still to be fully refined psychometrically and independently validated. A fourth limitation is the exclusive reliance on self-report methods in collecting the data. Had several different sources of data been available for use (e.g., parent interviews, school records, collateral informants, etc.), a greater degree

of confidence in the validity of the findings and in their generality might have been attained. Despite these limitations, however, the present findings are consistent and coherent and replicate at both school levels and for both genders. In addition, analyses of other portions of this data set replicate results obtained in both our own earlier research (see Donovan, R. Jessor, & Costa, 1988; R. Jessor & S. L. Jessor, 1977) and in research reported by others.

This extension of Problem Behavior Theory into the field of adolescent health behavior has demonstrated the significance to health behavior of a major dimension of psychosocial variation, conventionality-unconventionality, and it has shown that health behavior is linked systematically, if only modestly, to a larger system of adolescent behavior. In both respects, understanding of adolescent health behavior would seem to have been advanced.

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Chapter 26

Problem Behavior Theory and Contraceptive Use in Adolescence

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Nonuse of contraception and ineffective contraceptive practices can have serious immediate and long-term consequences for the health and more general well-being of sexually active adolescents. Social concern about teenage pregnancy, about the personal and economic consequences of early childbearing (Hayes, 1987), and about the prevalence of sexually transmitted diseases (STDs) among adolescents (Cates, 1991) underscores the need for a better understanding of the factors that are related to contraceptive behavior in adolescence.

In this paper we examine the influence of psychosocial conventionality and psychosocial orientation to health on regularity of contraceptive use. Conventionality is a key construct of Problem Behavior Theory (Jessor, Donovan, & Costa, 1991; Jessor & Jessor, 1977), which is concerned with the tendency to transgress social norms. It is conceptualized as a commitment to and involvement in the standards, values, and expectations of established institutions of adult society (Jessor & Jessor, 1977). Health orientation is conceptualized as a commitment to values and attitudes that emphasize a healthy lifestyle, association with others who encourage and support healthy behavior, and personal involvement in health-enhancing behaviors (Donovan, Jessor, & Costa, 1991; Jessor, 1984).

Contraceptive use in adolescence may be seen both as a normatively regulated behavior and as a health-related behavior. Irregular use, ineffective use, or nonuse of contraception by sexually active adolescents may be interpreted as a departure

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from or transgression of the norms of the larger society, for example, norms regarding the appropriate timing of and circumstances for pregnancy, childbearing, and parenting, and norms regarding school dropout, which may accompany early pregnancy and childbearing. The effective use of contraception, on the other hand, may be interpreted as a commitment to conventional norms regarding the timing of childbearing and to the conventionally valued goal of completing high school. Variation in use of contraception ought, therefore, to be predictable from constructs that reflect psychosocial and behavioral conventionality.

The use of contraception may also be seen as protecting against the health risks associated with pregnancy, abortion, childbearing, and, often, STDs. Nonuse of contraception, on the other hand, puts one at risk for these potentially health-compromising outcomes of unprotected sexual intercourse (Jessor, 1984). Contraceptive behavior, therefore, may be seen as part of and predictable from a more general orientation to health, including health values and beliefs, health models, and involvement in other health behaviors (Donovan, Jessor, & Costa, 1993).

Relatively few recent studies of adolescent contraceptive behavior have examined the relation of psychosocial characteristics to contraceptive use, and many of these have highlighted characteristics that are proximal to sexual behavior and contraceptive use (e.g., attitudes toward and beliefs about contraception) (Hingson, Strunin, Berlin, et al., 1990; Jemmott & Jemmott, 1990; Keith, McCreary, Collins, et al., 1991; Morrison, 1989; Pendergrast, DuRant, & Gaillard, 1992). Findings from a few studies have suggested that more distal personality variables such as higher self-esteem (Adler & Hendrick, 1991) and more egalitarian sex role attitudes (Morrison, 1989) are associated with more reliable and effective contraceptive practices among youth.

Investigations of the linkages of other behaviors with contraceptive use have resulted in sometimes contradictory findings. Although some studies report that adolescents' involvement in problem behaviors, such as the use of alcohol and other drugs, is associated with less regular use of contraception (Hingson, Strunin, Berlin, et al., 1990; Brown, DiClemente, & Park, 1992; Richter, Valois, McKeown, et al., 1993), others have failed to find such a relationship (Choquet & Manfredi, 1992). Findings on the relationship of health-protective behaviors to contraceptive use are also mixed. Although some research suggests that greater involvement in health behaviors, such as exercise (Richter, Valois, McKeown, et al., 1993) and seatbelt use (Baldwin & Baldwin, 1988), is linked to more regular use of contraception, other work does not support these findings (Galavotti & Lovick, 1989).

The conflicting results about adolescents' contraceptive behavior may be at least partly accounted for by limitations of sampling and measurement that characterize this area of study. Work on adolescent contraceptive behavior has been limited by the use of samples of only males (Jemmott & Jemmott, 1990; Pendergrast, DuRant, & Gaillard, 1992) or only females (Keith, McCreary, Collins, et al., 1991; Morrison, 1989), or by a focus on one racial/ethnic group, usually African-Americans (Jemmott & Jemmott, 1990; Keith, McCreary, Collins, et al., 1991; Pendergrast, DuRant, & Gaillard, 1992; Adler & Hendrick, 1991). Studies that have involved more sociode-

mographically diverse samples have assessed condom use only (Hingson, Strunin, Berlin, et al., 1990; Brown, DiClemente, & Park, 1992; Richter, Valois, McKeown, et al., 1993), rather than contraception more generally. Research that has examined the association between psychosocial characteristics and contraceptive behavior has tended to focus on only one or two isolated variables, and studies that have assessed the linkage between health orientation and contraceptive use have investigated health variables that are very proximal to contraceptive use, such as beliefs in the health protective aspects of contraception (Hingson, Strunin, Berlin, et al., 1990; Brown, DiClemente, & Park, 1992), to the exclusion of more general health attitudes and beliefs. As has been emphasized in reviews of research on adolescent contraceptive behavior (Balassone, 1991; Morrison, 1985), there is a need for more comprehensive, multivariate, theory-based studies of the linkage between adolescents' psychosocial and behavioral characteristics and their contraceptive behavior.

The purpose of this paper is to determine the psychosocial and behavioral factors that are associated with variation in contraceptive use among adolescents. Because regular use of contraception may be seen both as a conventional behavior and as a health protective behavior, analyses will assess the association between psychosocial conventionality and health orientation, on the one hand, and variation in contraceptive use, on the other. The extent to which these two explanatory perspectives supplement one another will be examined as well.

Method

Study Design and Procedures

Data for this study were taken from the final wave (1992) of a four-wave longitudinal study of adolescent health and development. That wave was the first one in which comprehensive assessment of sexual behavior and contraceptive use was permitted by the administration of the participating school district. At Wave 1, in 1989, participants were in grades 7, 8, and 9 in six middle schools and four high schools in a large urban school district in the Rocky

Mountain region. Participating schools were selected for the study by school district officials to maximize representation of Hispanic and African-American adolescents from inner-city areas. Active parental and student consent was sought for all 7th, 8th, and 9th graders enrolled in the selected schools; letters describing the study and consent forms were written in both English and Spanish.

Study participants were released from class to take part in large group questionnaire administration sessions proctored by members of the research staff. In the three follow-up waves, questionnaires were also mailed to students no longer enrolled in the school district or otherwise unavailable for in-school testing. Bilingual versions of the questionnaire were provided for students who preferred to work in Spanish. Each participant received a payment of \$5.

Participants

At the first wave of data collection (1989), 2,410 students participated in the study. Questionnaires were completed by 67% of the middle school students (grades 7 and 8) and by 49% of the high school students (grade 9) who were invited to take part in the study. In Wave 4 (1992), 1,782 students (74% of the Wave-1 sample) completed questionnaires.

Forty-four percent of the Wave-4 sample is male. Equal proportions of the sample are in the three starting cohorts (7th, 8th, and 9th graders at Wave 1). Members of these cohorts were in grades 10, 11, and 12, or had left school by Wave 4, when the average age of participants in the three respective starting cohorts was 15.7, 16.6, and 17.9 years old. Thirty-four percent of the sample is white, 22% is African-American, 38% is Hispanic, 4% is Asian, and 2% is Native-American. With respect to socioeconomic background, 20% of participants' fathers had not graduated from high school, 17% of participants' fathers were high school graduates, and 62% had some education beyond high school. About one-third of participants' fathers were employed in unskilled jobs, one-third in skilled or clerical jobs, and one-third in managerial or professional jobs. Forty-seven percent of the participants were from intact families; 16% had a stepparent living with them (usually stepfather); 31% lived with a single parent (usually mother); and 5% lived with other relatives or guardians.

Analyses presented in this paper were based on the 971 Wave-4 white, African-American, and Hispanic participants who were nonvirgins, unmarried, sexually active during the past year, and had scores on the criterion measure of regularity of contraceptive use: 151 white males, 156 white females; 97 African-American males, 158 African-American females; 192 Hispanic males, and 217 Hispanic females. Owing to the small numbers of Asian ($N = 66$) and Native-American ($N = 28$) participants, adolescents from these racial/ethnic groups were not included in the analyses.

Possible Implications of Sample Loss

Initial nonparticipation. As noted elsewhere (Costa, Jessor, Donovan, et al., 1995), nonparticipants at Wave 1 of the study were characterized by lower levels of academic achievement, greater numbers of disciplinary actions, and more absences from school. Nevertheless, both extremes of the full range of scores on these measures in the total population were found in the sample of study participants, suggesting that initial sample losses do not threaten the validity of the research findings.

Subsequent attrition. The effects of attrition between Waves 1 and 4 on the integrity of the sample were also examined. Compared with the 628 students who were lost to attrition, the 1,782 Wave-4 participants were slightly but significantly younger (13.6 vs. 13.9 years old at Wave 1), more likely to live with both natural parents,

higher in socioeconomic status, and more likely to be white, and less likely to be Hispanic. Comparisons of mean scores on 12 measures of psychosocial and behavioral conventionality showed that the Wave-4 participants were more conventional than the subjects lost to attrition, as indicated by significant mean differences in the expected direction on 10 of the 12 measures. The actual size of the mean differences was insubstantial in three out of these 10 instances.

Furthermore, when the intercorrelations of the variables within the two samples were examined, there was no evidence of bias in the relationships among the measures of conventionality. Structural equation analyses were used to test the equality of the covariance structure matrices in the two groups. This test, based on nine representative variables, resulted in a goodness of fit index of .998, indicating a high degree of similarity between the two matrices. Although the associated Chi-square statistic for lack of fit was significant, this Chi-square was small (62.66 with 36 degrees of freedom), considering the sample size and the number of variables involved, and indicates no serious degree of difference in the covariance structures for the Wave-4 participants vs. the nonWave-4 participants. In short, the pattern and magnitude of relationships among these variables are essentially equivalent in the two groups.

Measurement of Contraceptive Use

Contraceptive use was measured by a three-item scale assessing regularity of any contraceptive use in the past year, regularity of condom use in the past year, and use of contraception at last intercourse. Participants were asked: "When you had sex in the past year, did you make sure that some kind of birth control method or contraceptive was used, either by you or by the other person?"; "When you had sex in the past year, how often was a condom (rubber) used?"; and "The last time you had sex, what type of birth control method or contraceptive was used?" Response options for the first two items were: "almost always," "most of the time," "about half of the time," "some of the time," "hardly ever," and "never." The open-ended responses to the third item were coded as nonuse (e.g., "none," "nothing") or use (e.g., "condom," "Norplant," "pill"). Scale items include content similar to that used in prior studies (Hingson, Strunin, Berlin, et al., 1990; Jemmott & Jemmott, 1990; Pendergrast, DuRant, & Gaillard, 1992; Brown, DiClemente, & Park, 1992; Richter, Valois, McKeown, et al., 1993; Baldwin & Baldwin, 1988; Galavotti & Lovick, 1989).

Scores on the contraceptive use scale could range from 4–18. Mean scores on the measure were 14.7 for males and 13.6 for females, and the respective standard deviations were 4.42 and 4.61. The distribution of scale scores was negatively skewed with the mode at 18 for both genders.

Psychometric properties of the three-item scale of contraceptive use were good. Alpha reliability was .83, and the mean inter-item correlation was .62. Bivariate correlations between the criterion measure and a 6-item scale of positive attitudes toward contraception were .29 for males and .27 for females ($p \leq .001$); correlations

with perceived peer use of contraception were .42 and .40 for males and females, respectively ($p \leq .001$); and correlations with self-reported pregnancy experience were $-.10$ for males ($p \leq .05$) and $-.26$ for females ($p \leq .001$). These correlational data provide support for the validity of the three-item criterion measure of contraceptive use.

It is worth noting that there was little variation in the contraceptive methods used by the adolescents in this sample. The great majority of the respondents reported that their usual method of birth control is condoms (44%) or a combination of condoms and another method (26%), such as oral contraceptives, spermicides, or diaphragm. Of the remaining 30%, 10% reported that they usually do not use contraception, 8% reported using oral contraceptives only, and small percentages reported using other methods, for example, withdrawal (1%), Norplant (1%), sponge (0.2%), spermicides (0.4%), or rhythm (0.1%).

Measurement of Psychosocial and Behavioral Conventionality

The questionnaire included a wide range of measures of psychosocial and behavioral conventionality/unconventionality. A comprehensive description of these variables, their theoretical significance, their measurement, and the rationale for using each of the measures as an indicator of conventionality is presented elsewhere (Jessor, Donovan, & Costa, 1991; Jessor & Jessor, 1977; Costa, Jessor, Donovan, et al., 1995).

The 13 conventionality/unconventionality variables used in the present study include measures of personality factors, perceived environment factors, and behaviors. Greater personality conventionality is indicated by higher value placed on achievement relative to independence, by higher expectations for academic achievement, and by higher intolerance of deviance. Perceived environment conventionality is indicated by more compatibility between parents and friends about such things as what is important in life and what one should get out of school, by greater influence of parents relative to friends, by higher parental disapproval of adolescent problem behavior, and by relatively fewer friends who model problem behavior. Behavioral conventionality is indicated by lower levels of involvement in problem behaviors, such as marijuana use, and higher involvement in conventional behavior, such as school achievement.

Independence-Achievement Value Discrepancy is a derived index that reflects the extent to which value on academic achievement (a four-item scale, $\alpha = .78$) is greater than value on independence (a four-item scale, $\alpha = .72$). *Expectation for Achievement* is a four-item scale assessing expectation for success in the area of academic achievement ($\alpha = .88$). *Attitudinal Intolerance of Deviance* is a 10-item scale that measures the rated "wrongness" of various normative transgressions, including theft, physical aggression, and lying ($\alpha = .90$).

Parent-Friends Compatibility is a three-item scale of perceived agreement between parents and friends regarding what is important in life, the kind of person

the respondent should become, and what the respondent should be getting out of being in school ($\alpha = .77$). *Parent-Friends Influence* is a three-item scale that assesses the relative influence of parents and friends on the respondent's outlook on life and on his or her choices and behavior ($\alpha = .68$). *Parental Approval-Disapproval of Problem Behavior*, a two-item scale, assesses perceived parental attitudes toward adolescent use of alcohol and marijuana ($\alpha = .63$). *Friends as Models for Problem Behavior* is a four-item scale measuring the respondent's perception of the prevalence of models for nonnormative or illegal behavior. It includes friends who smoke cigarettes, who use alcohol, who have had sexual intercourse, or who use marijuana (e.g., "How many of your friends drink alcohol fairly regularly?"; response options range from "none" to "all of them") ($\alpha = .69$).

Deviant Behavior, a 10-item scale, assesses frequency of engaging in various delinquent-type behaviors during the past 6 months, including physical aggression, property destruction, theft, and lying ($\alpha = .82$). *Problem Drinking* is a three-component scale assessing frequency of drunkenness during the past 6 months, frequency of high-volume drinking (five or more drinks per occasion) during the past 6 months, and negative consequences of drinking (including frequency of trouble with parents, with friends, with dates, and with the police) ($\alpha = .84$). *Marijuana Behavior Involvement* is a four-item scale measuring extent of involvement in marijuana use, including ever use, ever getting high or stoned, current use, and perceived availability of the drug ($\alpha = .74$). *School Performance* is measured by self-report of respondent's usual grades in school (from "mostly A's" to "mostly D's and F's"). *Family Activities* is a single item assessing the number of hours each week the respondent spends doing things with his or her family. *Church Attendance* is a single item that assesses how often the respondent has attended religious services during the past 6 months.

For analytic purposes, composite summative indexes were derived to measure personality conventionality, perceived environment conventionality, and behavior conventionality. The composite measures were computed by adding the standardized scores of the three measures of personality conventionality, the four measures of perceived environment conventionality, and the six measures of behavior conventionality, respectively.

Measurement of Health Orientation

The annual questionnaire also included a comprehensive assessment of health attitudes, values, and beliefs, models for health behavior, and health behaviors. The 11 health measures used in the present study include measures of personality characteristics, perceived environment factors, and behavior.

All reflect personal orientation toward health. Personality health orientation is indicated by higher value on health, by a greater internal locus of control with regard to health, and by a stronger belief that behaviors such as poor nutritional practices can have a negative impact on health. Perceived environment health orientation is

indicated by more parental and peer models for health behaviors, such as seatbelt use. Behavioral health orientation is indicated by higher levels of involvement in health behaviors, such as regular exercise.

Value on Health is a 10-item scale assessing the personal importance of being healthy and feeling physically fit ($\alpha = .88$). *Internal Health Locus of Control* is a four-item measure of beliefs that good health is contingent on personal behavior ($\alpha = .63$). *Perceived Health Effects* is a six-item scale of the rated seriousness of the effect on the health of young people of behavioral practices, such as not getting enough exercise, eating a lot of junk food, and being overweight ($\alpha = .77$).

Maternal Model for Health Behavior is a four-item scale assessing the respondent's perceptions of mother's attention to her own diet, exercise, sleep, and safety ($\alpha = .68$). *Paternal Model for Health Behavior* is a four-item scale assessing the respondent's perceptions of father's attention to his own diet, exercise, sleep, and safety ($\alpha = .71$). *Friend Model for Health Behavior* is a four-item scale assessing the respondent's perceptions of best friend's attention to his or her own diet, exercise, sleep, and safety ($\alpha = .63$).

Exercise, a four-item scale, assesses the number of hours per week spent taking part in organized sports, working out as part of a personal exercise program, playing pickup games (e.g., touch football), and practicing different physical activities (e.g., dance routines, shooting baskets) ($\alpha = .70$). *Attention to a Healthy Diet* is a nine-item scale measuring the amount of attention paid to eating habits that limit intake of sodium and fats, drinking enough milk, eating fresh fruits and vegetables, eating healthy snacks, etc. ($\alpha = .88$). *Sleep* is a two-item scale based on usual number of hours of sleep each night (from less than 6 hours to more than 10 hours per night) and usual bedtime minus waketime, an alternate method of estimating hours of sleep derived from reports of usual sleeping habits ($\alpha = .81$). *Seatbelt Use* is a four-item scale assessing how much of the time a seatbelt is used when riding in or driving a car ($\alpha = .93$). *Dental Care*, a three-item scale, assesses frequency of toothbrushing, flossing, and use of anticavity rinses ($\alpha = .57$).

Intercorrelations of the psychosocial health measures show that they are all positively related (average $r = .24$; $p \leq .01$), and they are consistently associated with variation in health behavior as well (Donovan, Jessor, & Costa, 1991). These findings support the notion of a coherent psychosocial orientation to health among adolescents.

For analytic purposes, as was the case with the conventionality measures, composite summative indexes were derived to measure personality health orientation, perceived environment health orientation, and involvement in health behavior. The composite measures were computed by adding the standardized scores of the three measures of personality health orientation, the three measures of perceived environment health orientation, and the five measures of health behavior, respectively.

Analyses controlled the following sociodemographic characteristics: gender, race/ethnicity, grade in school, family composition (intact family vs. non-intact family, i.e., families that include both biologic parents vs. families missing at least one biologic parent), pregnancy experience, and family socioeconomic status, a Hollingshead-type indicator based on father's educational attainment, mother's

educational attainment, and father's occupational status. Grade in school, rather than chronologic age, was used as a control because of our interest in the contemporary heterosocial situation that grade membership represents.

Results

Presentation of findings is organized into three parts. First, we examine the bivariate relations of the separate measures of psychosocial conventionality and of health orientation to regularity of contraceptive use. Second, we assess the multivariate linkages of psychosocial conventionality and of health orientation to variation in contraceptive use. Finally, we assess whether these two explanatory domains supplement one another to provide a more comprehensive account of variation in adolescent contraceptive use.

1. Conventionality, Health Orientation, and Regularity of Contraceptive Use: Bivariate Analyses

An important focus of this paper is the identification of psychosocial and behavioral characteristics associated with regularity of contraceptive use among sexually active adolescents. Partial correlations of regularity of contraceptive use with measures of psychosocial and behavioral conventionality and health orientation were computed, adjusting for the effects of race/ethnicity, socioeconomic status, grade in school, family composition, and pregnancy experience. Results are presented by gender in Table 26.1. Correlations of regularity of contraceptive use with the demographic control variables are also presented in Table 26.1.

The data in Table 26.1 indicate that greater regularity of contraceptive use was associated with greater conventionality and greater orientation toward health. This was the case for both male and female adolescents.

With respect to conventionality, greater regularity of contraceptive use was significantly correlated with higher value on academic achievement than on independence; higher expectations for achievement; greater compatibility between parents and friends (males only); fewer friends as models for problem behavior; less involvement in delinquent behavior, problem drinking, and marijuana use; better school performance; and more frequent attendance at religious services (males only).

With respect to health orientation, greater regularity of contraceptive use was associated with greater internal health locus of control (males only), higher paternal modeling of health behavior, higher maternal modeling of health behavior, greater friend modeling of health behavior, more frequent involvement in exercise, greater attention to healthy diet, more regular use of seatbelts, and better dental hygiene.

With respect to the demographic control measures, greater regularity of contraceptive use was significantly correlated with being white, being nonHispanic, having higher socioeconomic status, living in an intact family (females only), being in a lower grade in school (males only), and never having been pregnant or, for boys, responsible for a pregnancy. These significant relations support the importance of controlling demographic background in the other correlations.

Table 26.1 Correlations of Contraceptive Behavior Scale with Control Measures, Measures of Conventionality, and Health Orientation Measures, by Gender^a

	Males (<i>n</i> = 440)	Females (<i>n</i> = 531)
Demographic control measures		
White/nonwhite ^b	.13**	.21***
Hispanic/nonHispanic ^b	-.23***	-.24***
Socioeconomic status ^c	.22***	.18***
Family composition ^b	.05	.13**
Grade in school ^c	-.13**	-.01
Pregnancy experience ^b	-.10*	-.26***
Conventionality measures ^d		
Personality		
Independence-achievement value discrepancy	-.14**	-.18***
Expectation for achievement	.16***	.14***
Intolerance of deviance	.07	.02
Perceived environment		
Parent-friends compatibility	.10*	.07
Parent-friends influence	-.05	-.01
Parent disapproval-approval of problem behavior	-.05	.01
Friends as models for problem behavior	-.20***	-.12**
Behavior		
Deviant behavior	-.11*	-.16***
Problem drinking	-.17***	-.10*
Marijuana involvement	-.19***	-.14***
School performance	.16***	.14***
Family activities	.03	.05
Church attendance	.14**	.08
Health orientation measures ^d		
Personality		
Value on health	.05	.04
Internal health locus of control	.09*	.07
Perceived health effects	.05	.04
Perceived environment		
Paternal model for health behavior	.20***	.13**
Maternal model for health behavior	.15**	.21***
Friend model for health behavior	.16***	.19***
Behavior		
Exercise	.18***	.13**
Attention to healthy diet	.13**	.16***
Seatbelt use	.23***	.23***
Sleep	.05	.02
Dental care	.15**	.16***

(continued)

Table 26.1 (continued)

^aIn order to minimize sample loss in these analyses, missing values on conventionality and health orientation measures were replaced by mean scores derived for gender-by-ethnic subsamples

^bCorrelations with these dichotomous demographic control measures are point-biserial correlations

^cCorrelations with these demographic control measures are Pearson correlations

^dCorrelations with conventionality measures and health orientation measures are partial correlations controlling race/ethnicity, socioeconomic status, family composition, grade in school, and pregnancy experience

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Because the bivariate correlations of regularity of contraceptive use with a measure of frequency of sexual intercourse and with a measure of number of years since first intercourse were significant for males and females ($p \leq .10$ for the frequency of sexual intercourse measure for females; data not tabled), parallel partial correlation analyses were run that also adjusted for the effects of these two measures. The pattern and magnitude of the partial correlations were essentially the same as when the adjustment for the effects of these sex related variables were not made. In light of these data, and because sample sizes would decrease considerably owing to missing data if these two control measures were included as controls (109 males and 168 females would be lost from the analyses), neither was included in the analyses presented in this paper.

The data indicate that greater psychosocial conventionality and greater orientation to health are both linked to regularity of contraceptive use for male and female adolescents. Although the correlations were modest in magnitude, the overall pattern is coherent and consistent. These relationships, moreover, obtain when the effects of the demographic background characteristics have been removed.

The analyses were repeated for white, African-American, and Hispanic youth separately, adjusting for the effects of gender, socioeconomic status, grade in school, family composition, and pregnancy experience. In general, the findings reported in Table 26.1 were replicated within the three racial/ethnic groups; more regular contraceptive use was associated with greater conventionality and with greater health orientation in all three groups (not tabled; data available from authors upon request).

II. Conventionality, Health Orientation, and Regularity of Contraceptive Use: Multivariate Analyses

The multivariate relationship between the conventionality measures and regularity of contraceptive use and the multivariate relationship between the health orientation measures and regularity of contraceptive use were assessed by hierarchical multiple regression analyses. In these analyses, two consecutive blocks of predictors were entered into the regression model: first, the sociodemographic variables were entered as controls; and second, the three summary index measures of conventionality or the three summary index measures of health orientation were entered.

Table 26.2 Hierarchical Multiple Regressions of Conventuality Indexes and Health Orientation Indexes^a with Regularity of Contraceptive Use, by Gender

	Males (<i>N</i> = 440)			Females (<i>N</i> = 531)		
	beta ^b	<i>R</i> ²	<i>R</i> ² Change	beta ^b	<i>R</i> ²	<i>R</i> ² Change
Part I: Conventuality Indexes						
Variables entered						
Step 1: controls		.10***	–		.15***	–
White/nonwhite	.02			.06		
Hispanic/nonHispanic	–.15*			–.20***		
Socioeconomic status	.13**			.02		
Family composition	.03			.11**		
Grade in school	–.15***			–.02		
Pregnancy experience	–.03			–.24***		
Step 2: conventuality indexes		.15***	.05***		.18***	.04***
Personality conventuality	.03			.07		
Perceived environment conventuality	.05			–.03		
Behavior conventuality	.19**			.17***		
Part II: Health Orientation Indexes						
Variables entered						
Step 1: controls		.10***	–		.15***	–
White/nonwhite	–.04			.00		
Hispanic/nonHispanic	–.21***			–.25***		
Socioeconomic status	.11*			–.02		
Family composition	.05			.09*		
Grade in school	–.11**			.03		
Pregnancy experience	–.06			–.23***		
Step 2: health orientation indexes		.17***	.07***		.21***	.07***
Personality health orientation	–.05			–.03		
Perceived environment health orientation	.13***			.15**		
Health behavior	.20***			.17***		

^aIn order to minimize sample loss in these analyses, missing values on conventuality and health orientation measures were replaced by mean scores derived for gender-by-ethnic subsamples

^bBeta at final step

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

The index measures permit an examination of the role of the three explanatory systems (personality, perceived environment, and behavior) in accounting for regularity of contraceptive use. Two separate regressions were run this way, one adding the conventuality measures at Step 2, and one adding the health orientation measures at Step 2. Results are presented separately for males and females in Table 26.2.

Conventionality and Regularity of Contraceptive Use

As shown in Table 26.2, the full set of controls and conventionality measures accounted for a small but significant proportion of the variance in regularity of contraceptive use for both genders—15% for males, 18% for females. For both male and female adolescents, sociodemographic characteristics are significantly associated with regularity of contraceptive use, accounting for 10% and 15% of the variance in contraceptive behavior for males and females, respectively. More important, the set of conventionality measures made a significant increment to the R^2 when entered after the set of sociodemographic control measures, indicating that greater psychosocial and behavioral conventionality is associated with greater regularity of contraceptive use, independent of the effects of demographic characteristics. The amount of additional variance contributed by the conventionality measures was 5% for males and 4% for females. For males and females, the beta coefficient for behavioral conventionality was significant. The index of behavioral conventionality includes measures of deviant behavior, problem drinking, marijuana use, school performance, family activities, and church attendance (Table 26.1).

When additional analyses were run, entering only one of the three summary index measures of conventionality at Step 2 of the hierarchical regression, each of the three explanatory systems made a significant increment to the R^2 when entered after the control measures (not tabled; table available from authors upon request). This was the case for both genders; for females, the increment to the R^2 was not significant ($p \leq .08$) when the index of perceived environment conventionality was entered after the control measures. These findings suggest that personality conventionality, perceived environment conventionality, and behavior conventionality are all associated with regularity of contraceptive use, and that the lack of significant betas for all three indexes, when simultaneously entered in Step 2 of the hierarchical regression, reflects their intercorrelations.

Multivariate analyses run for the three separate racial/ethnic groups replicated these findings for white, African-American, and Hispanic adolescents. For all three racial/ethnic groups, the demographic controls plus the conventionality measures accounted for a significant amount of variance in regularity of contraceptive use, and the set of conventionality measures significantly improved the R^2 value when entered after the controls in all three racial/ethnic groups. The relationship between conventionality and contraceptive use is stronger among African-American adolescents than among white and Hispanic adolescents; the improvement in R^2 was roughly four times as great for African-American adolescents as for white and Hispanic youth. For African-American adolescents, the conventionality measures accounted for an additional 13% of the variance in contraceptive behavior (R^2 change to .21 from .08), compared with 3% for white adolescents (R^2 change to .12 from .10) and 3% for Hispanic youth (R^2 change to .12 from .09) (not tabled; table available from authors upon request). The beta coefficient for behavior conventionality was significant for African-American and Hispanic adolescents but not for

white adolescents; neither personality nor perceived environment yielded a significant beta.

In summary, measures that represent an underlying construct of conventionality have a significant additive effect on regularity of contraceptive use for both genders and the three racial/ethnic groups.

Health Orientation and Regularity of Contraceptive Use

The data in Part II of Table 26.2 demonstrate a similar multivariate linkage between health orientation and regularity of contraceptive use for adolescents of both genders. As was the case for the relation between conventionality and regularity of contraceptive use, the outcomes for females and males were generally comparable. For both genders, the combined set of controls and health orientation measures accounted for a significant proportion of the variance in regularity of contraceptive use, and the set of health orientation measures significantly improved the R^2 when entered after the set of sociodemographic controls. The health orientation measures accounted for an additional 7% of the variance for males and for females. For both genders, the beta coefficients for both perceived environment health orientation and health behavior were significant.

When additional analyses were run, entering only one of the three summary index measures of health orientation at Step 2 of the hierarchical regression, the index measures of perceived environment health orientation and health behavior each added a significant increment to the R^2 for males and females (not tabled; table available from authors upon request). Although the measure of personality health orientation also increased the amount of variance accounted for, findings for both genders were not statistically significant ($p \leq .10$). It appears, then, that personality health orientation, as measured in this study, is less strongly associated with regularity of contraceptive use than are perceived environment health orientation and health behavior.

When the multivariate analyses were repeated for whites, African-Americans, and Hispanics separately, the controls plus the health orientation measures accounted for a significant amount of variance in regularity of contraceptive use for all three racial/ethnic groups. In addition, the set of health measures significantly improved the R^2 value when entered after the controls for all three groups. As was the case with the conventionality measures, this association was stronger for African-American adolescents than for white and Hispanic adolescents. For the African-American adolescents, the size of the improvement to the R^2 value was at least one-half again as great as for the white and Hispanic youth. For African-American adolescents, the health orientation measures accounted for an additional 12% of the variance in contraceptive behavior (R^2 change to .20 from .08), compared with 8% for white adolescents (R^2 change to .17 from .10) and 6% for Hispanic youth (R^2 change to .15 from .09) (not tabled; table available from authors upon request). The beta coefficient for health behavior was significant in the three groups, and the beta

Table 26.3 Hierarchical Multiple Regressions of Combined Relationship of Conventionality and Health Orientation^a with Regularity of Contraceptive Use, by Gender

Part I: Conventionality Indexes	Males (N = 440)			Females (N = 531)		
	beta ^b	R ²	R ² Change	beta ^b	R ²	R ² Change
Variables entered						
Step 1: controls		.10***	–		.15***	–
White/nonwhite	–.01			.02		
Hispanic/nonHispanic	–.18**			–.24***		
Socioeconomic status	.11*			–.03		
Family composition	.03			.08*		
Grade in school	–.13**			.01		
Pregnancy experience	–.04			–.23***		
Step 2: conventionality indexes		.15***	.05***		.18***	.04***
Personality conventionality	–.01			.04		
Perceived environment conventionality	.01			–.05		
Behavior conventionality	.15**			.10*		
Step 3: health orientation indexes		.19***	.03***		.22***	.04***
Personality health orientation	–.05			–.03		
Perceived environment health orientation	.11*			.13**		
Health behavior	.16**			.14**		

^aIn order to minimize sample loss in these analyses, missing values on conventionality and health orientation measures were replaced by mean scores derived for gender-by-ethnic subsamples

^bBeta at final step

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

coefficient for perceived environment health orientation was significant for white and African-American youth but not for Hispanic adolescents.

As was the case in the analyses using the conventionality variables, measures that represent health orientation were shown to have a significant additive effect on regularity of contraceptive use for male and female adolescents and for white, African-American, and Hispanic youth.

III. The Combined Influence of Conventionality and Health Orientation on Regularity of Contraceptive Use

Additional hierarchical multiple regressions were run to assess the extent to which constructs that represent conventionality and constructs that represent health orientation supplement or substitute for one another in accounting for variation in adolescent contraceptive behavior. The conventionality index measures were entered at Step 2 (after the controls), and the health orientation index measures were entered at Step 3. Analyses were done separately for males and females. Results are presented in Table 26.3.

For both genders, the measures of health do supplement the measures of conventionality in accounting for regularity of contraceptive use in adolescence. Three main points can be made about the findings presented in Table 26.3. First, the complete set of controls, conventionality indexes, and health orientation indexes accounted for a significant amount of variance in contraceptive use—19% for males and 22% for females. Second, adding the measures of health orientation at Step 3 significantly improved the amount of variance that had been accounted for after the controls and the conventionality measures had already entered the regression equation. The amount of improvement in variance accounted for was 3% for males and 4% for females. Together, the conventionality and health orientation measures doubled the amount of variance accounted for by the sociodemographic factors, accounting for an additional 8% of the variance in regularity of contraceptive use. Third, at the final step of the regression analysis, significant predictors of contraceptive behavior include both demographic and psychosocial measures. For males, significant betas indicate that more regular contraceptive use is associated with nonHispanic ethnic background, higher socioeconomic status, earlier grade in school, greater involvement in conventional behavior and lower involvement in problem behaviors, more social models for health behavior, and greater personal involvement in health behavior. For females, significant betas indicate that greater regularity of contraceptive use is associated with nonHispanic ethnic background, intact family, no pregnancy experience, greater involvement in conventional behavior and lower involvement in problem behaviors, higher social models for health behavior, and greater personal involvement in health behavior.

When these analyses were repeated for the three racial/ethnic subsamples, the cumulatively combined sets of demographic controls, conventionality measures, and health orientation measures again accounted for a significant amount of variance in contraceptive use—18% for whites, 26% for African-Americans, 16% for Hispanics (compared with 10%, 8%, and 9%, respectively, for the controls alone). For all three racial/ethnic groups, the set of health orientation measures significantly increased the amount of variance accounted for after the set of conventionality measures had been entered. The additional variance accounted for was 5% for both whites and African-Americans, and 4% for Hispanics.

Discussion

Greater psychosocial and behavioral conventionality and greater orientation toward health are both associated with more regular contraceptive use among sexually active male and female adolescents. The patterning and magnitude of the linkages of conventionality and health orientation to contraceptive behavior are comparable for males and females, and these relationships hold when the sociodemographic characteristics of race/ethnicity, socioeconomic status, grade in school, family composition, and pregnancy experience are controlled.

This sample of sexually active adolescents was previously shown to be more unconventional than their virgin peers (Costa, Jessor, Donovan, et al., 1995). The present findings suggest, then, that variation in psychosocial conventionality is influential even among adolescents who are more involved in problem behavior. Within this sample of nonvirgins, the demonstrated association between conventionality and more regular contraceptive use is reflected by personality attributes, such as higher value on academic achievement than on independence, and higher expectation for achievement; by characteristics of the perceived social environment, such as having fewer friends as models for problem behavior; and by lower personal involvement in problem behaviors, such as problem drinking and marijuana use; and higher levels of involvement in conventional behaviors, such as school achievement. The linkage between health orientation and contraceptive behavior is also consistent across psychosocial and behavioral domains; more regular contraceptive use is related to a more internal health locus of control, to more modeling of health behaviors by parents and friends, and to greater personal involvement in health behaviors, such as exercise, healthy dietary practices, and seatbelt use. In its negative relationship to problem behavior and its positive linkage with health behavior, contraceptive behavior may be seen as part of a larger, organized system of behavior in this stage of development, i.e., a more conventional adolescent lifestyle.

The present findings extend beyond the linkages that others have shown between more proximal psychosocial characteristics (attitudes, beliefs, and models that directly implicate contraception) and contraceptive behavior (Jemmott & Jemmott, 1990; Brown, DiClemente, & Park, 1992; Galavotti & Lovick, 1989; Balassone, 1991). Analyses of our data not reported here showed that even after such proximal variables have been taken into account, conventionality and health orientation still accounted for significant proportions of the variance in regularity of contraceptive use for both genders. Although the establishment of proximal or immediate relationships is useful, it has been considered insufficient (Chilman, 1994). There is a clear need to expand the explanatory network beyond these more obvious linkages. The present findings establish a more comprehensive and more distal set of influences on regularity of contraceptive use.

Although significant, the amount of variance in regularity of contraceptive use that was attributable to either conventionality or to health orientation was generally quite modest. This level of correlation is not unexpected given the fact, just noted, that the conventionality and health orientation measures were entered after the control measures, are distal, and do not directly implicate contraceptive behavior. In addition, because contraceptive use occurs in the context of a dyadic relationship, variation in use may also be influenced by the sexual partner and depend on his or her characteristics as well.

Psychosocial conventionality and health orientation were shown to make independent contributions to the explanation of variation in regularity of contraceptive use. Conventionality should explain variation in contraceptive use insofar as regular use of contraception may be seen as reflecting a commitment to conventional social norms and expectations regarding the timing of pregnancy and parenting and the completion of one's high school education. Health orientation should be associated

with variation in contraceptive use because regular contraceptive use helps protect against the potentially health-compromising consequences of unprotected intercourse, including health risks associated with pregnancy, childbearing, and STDs.

Not only are conventionality and health orientation linked to regularity of contraceptive use, but there are also conceptual and empirical linkages between these two explanatory constructs. As proposed elsewhere (Jessor, 1984), health enhancing behaviors, like conventional behaviors, are approved of and fostered by conventional adult society and encouraged by major social institutions, such as the family and the schools. This proposed conceptual linkage is supported by findings that greater conventionality is associated with greater involvement in various health maintaining behaviors, even when health orientation has been controlled (Donovan, Jessor, & Costa, 1991). In short, the association between conventionality and health orientation, on the one hand, and contraceptive use, on the other, may derive from regularity of use representing both a conventional behavior and a health behavior, as well as from the linkage between psychosocial conventionality and health behavior.

The relation of conventionality and of health orientation to contraceptive use was found to be stronger for African-American adolescents than for Hispanic and white adolescents. This outcome may have to do with social context influences and associated differences in subgroup norms about sex, pregnancy, and childbearing, and differences in sexual socialization. Furstenberg et al., (1987), for example, presented findings supporting the argument that racial differences in the prevalence and timing of premarital sexual intercourse were linked to group differences in attitudes and perceptions. They emphasized the need for more adequate consideration of the social context as a potentially important determinant of sexual behavior in adolescence. Social environmental factors associated with intercourse may also be associated with contraceptive behavior. That suggests the need for further research on such factors (e.g., differential social norms about the timing of parenthood) to help explain group differences in psychosocial characteristics associated with contraceptive behavior.

Interventions aimed at promoting more regular contraceptive use in adolescent populations might benefit from engaging the more distal characteristics identified in this study, for example, values, beliefs, and attitudes that encourage a commitment to health. Since health behaviors were also linked to contraceptive use, intervention efforts might address the larger domain of health related behaviors and emphasize health promoting lifestyles (Jessor, 1984).

The present findings are limited in several ways. First, the initial sample represented only 60% of the students who were invited to participate in the study, and only 74% of the Wave-1 sample took part in Wave 4 of the data collection. The Wave-1 sample does not appear to have been greatly distorted by the level of participation in Wave 1, nor does the Wave-4 sample appear to have been seriously distorted by attrition between Waves 1 and 4, but sample loss remains a limitation. A second limitation has to do with the criterion measure of regularity of contraceptive use, which did not allow assessment of other factors affecting regularity of

contraceptive use, including access to or availability of contraceptives and contraceptive services. Controlling for access to contraception could further clarify the relation of regularity of use to psychosocial conventionality and health orientation. The criterion measure also did not take into account whether contraceptive use was a behavior intended primarily to prevent pregnancy or to guard against the transmission of disease. The purpose of the behavior may affect the relation of regularity of contraceptive use to conventionality and health orientation. A third limitation of the study is the exclusive reliance on self-report data, making it impossible to reject the possible influence of some common method factor on the findings.

Despite these limitations, the findings are consistent and coherent, they replicate for both genders and across racial/ethnic groups, and they contribute to a more comprehensive understanding of variation in contraceptive behavior, an arena of exceptional significance for the course of adolescent development.

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Chapter 27

The Role of Protection in Adolescent Health Behavior

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Adolescence is a critical period for the adoption of behaviors relevant to health (Jessor, 1984; Maggs, Schulenberg, & Hurrelmann, 1997). Health-related habits, values, and lifestyles established during this important formative period “are likely to continue throughout life” (Maggs et al., 1997, p. 523) and, consequently, have enduring consequences for individual health and well-being. The early formation of healthy behavioral practices, such as eating foods lower in fat and cholesterol and engaging in regular physical exercise, not only has immediate benefits for health but contributes to the delay or prevention of major causes of premature disability and mortality in adulthood—heart disease, stroke, diabetes, and cancer (Adeyanju, 1990; Haskell, 1984; Matarazzo, 1984; Meredith & Dwyer, 1991; Sallis, 1993). A major task for the promotion of adolescent health is to advance understanding of the network of influences—the “web of causation” (MacMahon, Pugh, & Ipsen, 1960, p. 18)—that can account for variation in adolescent health-related behaviors.

In this paper, we examine psychosocial influences on adolescents’ health behaviors—a set of individual differences in personality characteristics, in perceived social environmental factors, and in other behaviors that may influence young people’s engagement in actions that promote, maintain, or protect their health. We focus on the role that psychosocial protective factors play in adolescents’ involvement in behaviors that can enhance their health, specifically, regular physical exercise, healthy eating habits, dental care, safety behavior, and adequate sleep.

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The conceptual role of protective factors is to increase the likelihood of desirable or positive behaviors or outcomes in diverse life areas, including health and well-being, and also to buffer or moderate the negative influence of exposure to risk (Luthar, 1993; Rutter, 1987). Two categories of protective factors are examined in this paper. The first category consists of those protective factors that are health-specific, that is, they are variables proximal to, and directly implicating, health. Such health-specific protective factors include personal orientation toward and commitment to health (e.g., value on health and internal health locus of control) and perceived social support for engaging in health behaviors (e.g., parental and peer models for health-enhancing behavior). The second category of protective factors consists of psychosocial variables that are distal from health, that is, variables that do not have any direct reference to health or any obvious or immediate implication for health-enhancing behavior. Nevertheless, they also can serve a protective function. The category of distal protective factors includes personality, perceived social environment, and behavior variables that reflect an orientation toward and involvement with the conventional institutions of family, school, and church (e.g., religiosity, positive relations with adults, and participation in prosocial activities such as family activities, school clubs, and volunteer work).

Linking the proximal protective factors to variation in health-enhancing behavior is unproblematic because their very content implicates their relationship. Linking the distal protective factors, however, requires theory because their content has no obvious relationship to health behavior. The guiding framework in this regard is Problem Behavior Theory (Jessor, Donovan, & Costa, 1991; Jessor & Jessor, 1977), a theoretical formulation specifically concerned with psychosocial instigators (risk factors) and controls (protective factors) that regulate the transgression of conventional norms. Over a decade ago, it was already argued that “the theory may well have relevance...for variation in health-enhancing behavior...to the extent that the latter can usefully be conceptualized as conventional” (Jessor, 1984, p. 80). Because health-enhancing behaviors, such as healthy eating habits, regular exercise, adequate sleep, dental care, and safety practices, are advocated, encouraged, and supported by the various institutions of conventional society—the family, schools, and church—engagement in them can reflect adherence to the norms of conventional society. It is this formulation that engages the distal conventionality-related variables of Problem Behavior Theory, variables explicitly used to account for transgression of—or adherence to—conventional norms. In this regard, our own earlier research has indeed demonstrated that measures of psychosocial conventionality are positively correlated with health behaviors in adolescence (Donovan, Jessor, & Costa, 1991). The critical interest in the present study is to determine the influence of such distal protective factors, once proximal health protection has been taken into account. To our knowledge, the direct and moderating effects of proximal and distal protection on health-enhancing behavior have heretofore not been investigated. Establishing a wider network of psychosocial protective factors, beyond those obviously proximal to health, should have significant implications for approaches to adolescent health promotion.

In any investigation of protective processes, it is, of course, necessary to examine risk processes at the same time (Rutter, 1987). The present study incorporates a set

of proximal risk factors that can compromise engaging in health-enhancing behavior. Risk factors are, conceptually, conditions or variables associated with a lower likelihood of positive or socially desirable outcomes and a higher likelihood of negative consequences. With respect to health behavior, risk factors operate, specifically, to reduce involvement in health-enhancing behavior or to encourage other behaviors that are incompatible with health-enhancing behaviors. The psychosocial risk factors examined in this study include individual differences in susceptibility to peer pressure, in perceived life stress, in peer models for sedentariness and for poor eating habits, and in parental models for cigarette use. The assessment of health-related risk factors permits not only an examination of their direct influence on health behavior but also an investigation of the buffering role of protective factors as moderators of the impact of risk. That is, their protective effect may be greater at high levels of risk than when risk is low.

Despite extensive research, understanding of the patterns of factors that influence adolescents' participation in health-enhancing behaviors is still quite limited (Weiss, Larsen, & Baker, 1996). There has been relatively little work on psychosocial variables associated with health practices in adolescence (Sussman, Dent, Stacy, Burton, & Flay, 1995). In a previous cross-sectional study, positive orientation to health and greater conventionality were both linked to greater involvement in a variety of health-enhancing behaviors (Donovan et al., 1991). Most other research has assessed only a few isolated variables, and most of those are highly proximal predictors of health behavior (Gillis, 1994; Gottlieb & Chen, 1985; Lonnquist, Weiss, & Larsen, 1992; Oleckno & Blacconiere, 1991; Rivas Torres & Fernandez Fernandez, 1995; Weiss et al., 1996). There is, for example, a positive relation between value on health, on the one hand, and safety practices such as seatbelt use (Rivas Torres & Fernandez Fernandez, 1995) as well as overall participation in health behaviors (Lonnquist et al., 1992; Weiss et al., 1996), on the other. Peer and parental models for health behavior have also emerged as significant correlates of young people's participation in health behaviors (Gillis, 1994; Gottlieb & Chen, 1985; Lonnquist et al., 1992; Weiss et al., 1996). Other, more distal correlates of health behavior include self-efficacy (Gillis, 1994) and religiosity (Oleckno & Blacconiere, 1991). These findings were derived from samples of college students and younger adolescents; samples were typically quite small (Gillis, 1994; Lonnquist et al., 1992; Rivas Torres & Fernandez Fernandez, 1995; Weiss et al., 1996) and consisted mostly of White youth (Donovan et al., 1991; Gillis, 1994) or of adolescents of unspecified racial-ethnic background (Lonnquist et al., 1992; Oleckno & Blacconiere, 1991; Weiss et al., 1996). In addition, there was wide variability in the criterion measures of health behavior that were used.

Social cognitive models of health-protective behavior have relied almost exclusively on proximal health-related cognitions to predict health behaviors. The most frequently used of these approaches (see Weinstein, 1993) include the health belief model (Becker, 1974), the theory of reasoned action (Fishbein & Ajzen, 1975), subjective expected utility theory (Edwards, 1954; Ronis, 1992), and protection motivation theory (Prentice-Dunn & Rogers, 1986). Beyond their reliance on proximal predictors, these models typically are concerned with particular health-related

choices or decisions rather than with explaining the characteristic level of involvement in health behaviors. Among the contributions of the present research is the exploration of more distal protective factors that may have a regulatory impact on adolescent engagement in health-enhancing behaviors and of their role in accounting for the level of that engagement.

This focus on individual differences in psychosocial protective factors extends our earlier work on successful development among at-risk youth (Costa, Jessor, & Turbin, 1999; Jessor, Turbin, & Costa, 1998; Jessor, Van Den Bos, Vanderryn, Costa, & Turbin, 1995). Those studies examined patterns of psychosocial risk and protection related to variation in outcomes in the domains of school engagement and problem-behavior involvement. The concern of the present study is with a different domain, that of health-enhancing behavior in adolescence. We examine the direct effects of protective factors on levels of health-enhancing behavior, and we also assess the moderating influence of protection on exposure to risk. In addition, we assess whether psychosocial protective factors that are distal from health behavior have an independent relation to engagement in health-enhancing behavior or whether their relation is entirely mediated by the variables more proximal to health behavior. Both cross-sectional and longitudinal analyses of individual differences in risk and protective factors were carried out in a sample of racially and socioeconomically diverse male and female adolescents. Four key questions are addressed:

1. Do proximal, health-specific protective factors have a direct, positive relation with adolescent health-enhancing behavior?
2. Do distal protective factors, reflecting psychosocial conventionality, account for unique variation in health-enhancing behavior that is not explained by proximal, health-related risk and protective factors?
3. Do proximal and distal protective factors moderate the relation of health-specific risk factors to adolescent health-enhancing behavior?
4. Do proximal and distal protective factors predict the development of health-enhancing behavior in adolescence?

Method

Study Design, Procedures, and Participants

The data reported in this paper are from a longitudinal, questionnaire study of health-related behavior among adolescents in a large urban area in the Rocky Mountain region. The sample was drawn from six middle schools and four high schools selected to maximize minority racial-ethnic representation. Letters describing the study were written to the students and to their parents, and students returned signed consent forms to the schools. All letters and consent forms were written in both English and Spanish. Confidentiality was safeguarded by a certificate of confidentiality from the U.S. Department of Health and Human Services. Study

participants were released from class to take part in large-group administration sessions. Bilingual versions of the questionnaire were available for those students who preferred to work in Spanish. Four annual waves of data were collected from Spring 1989 through Spring 1992. After the first wave, participants who could not be reached for participation at school were contacted by mail and asked to complete the questionnaire and send it back to the researchers. Each student received a token payment of \$5 for participating in each wave.

Largely because of the necessity of obtaining active personal and parental consent, and because of the difficulty of eliciting a response from many of the parents, the initial participation rate was less than desirable. At Wave 1 (1989), 2,263 Hispanic, non-Hispanic White, and Black students in Grades 7 through 9 filled out questionnaires (67% of the seventh and eighth graders and 49% of the ninth graders). Comparisons of the Wave-1 participants with the nonparticipants, using school record data, showed that the participant sample represented the full range of scores on grade point average (GPA), standardized achievement test scores, and disciplinary actions, and nearly the full range on school absences, even though participants had, on average, higher academic achievement (average GPA 2.5 vs. 1.7, $t[3802] = 25.6, p \leq .001$; average composite test score 45 vs. 36, $t[2568] = 9.1, p \leq .001$) and fewer absences (average 18 vs. 33, $t[2339] = 19.3, p \leq .001$) and suspensions (average 0.4 vs. 0.7, $t[3544] = 7.0, p \leq .001$) than nonparticipants. Forty-two percent of the Wave-1 sample are Hispanic, 33% are non-Hispanic White, and 24% are Black; 55% are female.

The most comprehensive set of measures relevant to the purposes of this paper is available only in Wave 3 (1991) and Wave 4 (1992). The Wave-3 questionnaire was completed by 1,863 (82%) of the Wave-1 participants, and the Wave-4 questionnaire was completed by 1,688 (75%) of the Wave-1 participants. The primary, cross-sectional analyses for this paper are based on the data from Wave 4; data from other waves are used for replication. The analysis sample includes those Hispanic, White, and Black participants with complete Wave-4 data. In this sample, $n = 1,493$; 589 (40%) are Hispanic, 572 (38%) are non-Hispanic White, and 332 (22%) are Black; 57% are female; and about equal percentages were in Grades 10, 11, and 12 at Wave 4. Forty-four percent of the participants are from intact families; 17% have a step-parent living with them (usually a stepfather); 33% live with one parent, usually the mother, or alternate living with each parent; and 6% live with other relatives or guardians.

To gauge the possible biasing effect of subsequent attrition from the original Wave-1 participant sample, we compared the participants who have complete Wave-4 data with those who do not on the 16 Wave-1 measures of variables used in the present analyses. The 770 participants lost to attrition ($n = 575$) or missing data ($n = 195$) after Wave 1 reported, as expected, somewhat less health-enhancing behavior ($p \leq .05$), higher means ($p \leq .05$) on four out of five risk factors, and lower means ($p \leq .05$) on 4 out of 10 protective factors. The magnitudes of the differences, in standard deviation units, ranged from 0.01 to 0.20. Despite these mean differences, however, the intercorrelations between the measures are very similar in both groups. A test of the similarity of the covariance matrices of the two groups against

a model that equated the covariances for each measure (see Jöreskog & Sörbom, 1989) yielded a goodness-of-fit index of .96. Although the chi-square is significant, $\chi^2(120, N = 400) = 159.9, p \leq .01$, it is small for the sample size and number of variables involved (much less than twice the 120 degrees of freedom), indicating a very good fit. Therefore, relations among the 16 measures would have been about the same if no cases had been lost to attrition or missing data. The results reported below, therefore, are not likely to have been biased by sample loss after Wave 1.

Establishing the Health-Enhancing Behavior Index

Health behaviors span a wide range of activities. Promoting good health involves actions in a variety of areas: eating a healthy diet, getting adequate sleep, engaging in regular exercise to maintain physical fitness, practicing good hygiene, and avoiding injury. To ensure a broad sample of health-enhancing behaviors, we employed measures of five categories of behavior: healthy diet, regular exercise, adequate sleep, good dental hygiene, and regular seatbelt use.

Healthy diet is a nine-item scale ($\alpha = .88$); questions begin with the phrase “Do you pay attention to . . .” and concern eating enough healthy foods and avoiding unhealthy foods. Some items are specific, such as “keeping down the amount of fat you eat” and “eating healthy snacks like fruit instead of candy,” whereas other items are more general, such as “eating only as much as your body really needs” and “eating in a healthy way even when you’re with friends.” Response options are *none*, *some*, and *a lot*. *Regular exercise* was assessed by four items ($\alpha = .70$) asking how many hours each week are spent playing sports or engaging in other physical activities. The six response options range from *none* to *8 or more hours a week*. Within this range, more activity is assumed to be more health-enhancing. *Adequate sleep* was measured by averaging two indicators assessing number of hours of sleep ($\alpha = .80$). One asks, “How much sleep do you usually get each night?” The other is computed from two items, usual bedtime and usual time for getting up in the morning. Scores ranged from 5 to 10.5 hr. *Good dental hygiene* is a three-item scale ($\alpha = .57$) assessing frequencies of brushing teeth, flossing, and using anticavity rinse. The four response options vary from *almost never* to *after every meal*. *Seatbelt use* is a four-item scale ($\alpha = .93$) assessing frequency of using a seatbelt when driving alone and with a friend, and when riding with a friend and with a parent. The four response options range from *hardly ever* to *almost always*.

A single summary measure of health-enhancing behavior, a composite of the five measures described above, was constructed. The factor structure of the five measures was examined by principal-axis factoring using squared multiple correlations as communality estimates. One factor had an eigenvalue of 1.59, explaining 32% of the total variance, and the other four eigenvalues were grouped closely together between .67 and .99. This pattern is interpreted as showing one common factor. A similar finding of a single common factor emerged earlier from the Wave-1 data that included middle-school and high-school students ($N = 3,499$; Donovan, Jessor, &

Costa, 1993). The largest factor loading was for healthy diet (.71). Dental hygiene and regular exercise had moderate loadings (.36 and .35, respectively). Seatbelt use and adequate sleep had fairly small loadings (.26 and .23). Because much of the variance in these health behavior measures is not shared by the common factor, a composite measure should be considered an index of five different domains of health-enhancing behavior rather than a scale.

The criterion measure for the present analyses is this composite health-enhancing behavior index (HEBI), computed as the mean of the z scores of the five measures described above. There were some small but significant sociodemographic differences in average scores on the HEBI as follows. Socioeconomic status (SES), measured by father's occupation and father's and mother's education, correlated .14 ($p \leq .001$) with the HEBI; higher status is associated with more health-enhancing behavior. Male participants had a slightly higher mean score on the HEBI than female participants ($r = -.05, p \leq .05$). Grade cohort correlated $-.08$ ($p \leq .001$) with the HEBI, showing less health-enhancing behavior for the older participants. Participants who lived with both biological parents throughout the four waves of the study reported slightly more health-enhancing behavior than those from nonintact families (0 or 1 dummy variable; $r = .06, p \leq .05$). White participants reported more health-enhancing behavior than non-White participants (0 or 1 dummy variable; $r = .09, p \leq .001$). There was no significant difference on the second ethnicity measure, which contrasted Hispanic with Black participants.

The Measurement of Psychosocial Risk Factors and Protective Factors

For the present study, our interest is in those characteristics of adolescents and their perceived social environment that may operate as risk factors or protective factors for engagement in health-enhancing behavior. Attitudes, values, and perceptions that directly refer to health—proximal variables—are, of course, expected to relate to health behavior itself. We are more interested, however, in exploring whether attributes that do not refer to health—distal variables—also relate to engagement in health-enhancing behavior. Therefore, measures of psychosocial protective factors distal from health behavior were examined as well.

Health-related risk factors. Five health-related risk factors were measured. Three of the risk factors measure the prevalence of models for involvement in health-compromising behaviors, behaviors antithetical to health enhancement. *Friends as models for sedentary behavior* is a single item: "Do your friends usually sit around a lot instead of getting some exercise or working out?" *Friends as models for eating junk food* is also a single item: "How many of your friends eat a lot of 'junk food' instead of a healthy diet?" Both items had 4-point response scales ranging from *None of them do* to *All of them do*. Another single-item measure, *parents smoke cigarettes*, asked whether father, mother, or both parents smoke (coded 0, 1, or 2

parents who smoke). Exposure to friends or parents who model health-compromising behaviors constitutes risk because models indicate that those behaviors are acceptable and, consequently, may promote orientations and social networks incompatible with health-enhancing behaviors. Furthermore, prevalence of these models indicates that health-compromising behavior is characteristic of or normative in the social group in which the adolescent is included. A fourth risk factor, *felt stress*, was assessed by three items ($\alpha = .72$) that asked, "In the past six months, how much stress or pressure have you felt at school," "at home," and "in your personal or social life?"¹ High levels of stress are presumed to discourage or interfere with the maintenance of health and may instigate coping behaviors (e.g., substance use) that are incompatible with health maintenance. Fifth, *susceptibility to peer pressure* was included as a risk factor because the influence of peers, and of pressure to go along with the crowd, is often in a health-compromising direction. High susceptibility, or a low level of refusal skills, may leave the adolescent vulnerable to engagement in behaviors incompatible with maintaining health. This risk factor was measured by a single item: "How well do you resist peer pressure from the rest of the group?" The item was reverse-scored to make higher scores represent greater risk.

Health-related (proximal) protective factors. Five proximal health-related measures were used as protective factors. *Value on health* is measured by 10 items ($\alpha = .87$) that ask how important various health outcomes are to the respondent, such as "to feel in good shape" and "to get better quickly when you are sick." A positive value on health constitutes protection because it indicates the personal importance attached to health and represents a commitment to behaviors that promote healthful outcomes. *Perceived health effects* is measured by six items ($\alpha = .76$) that ask how serious an effect behaviors like "getting less than 8 hours of sleep each night," "not exercising regularly," and "eating a lot of junk food" can have on the health of young people. Perception of strong negative outcomes should serve to deter engaging in such behaviors. *Internal locus of control for health* consists of four items ($\alpha = .63$) that ask for degree of agreement or disagreement with statements indicating that one's own behavior can promote staying healthy (e.g., "I might get sick more often if I didn't take care of myself"). An internal locus of control is protective because it indicates that engaging in health-enhancing behaviors is within one's control and that such behaviors can be instrumental for achieving valued health outcomes. The remaining proximal protective factors measure models for involvement in health-enhancing behaviors. *Parents as models for health behavior* (eight items; $\alpha = .80$) and *best friend model for health behavior* (four items; $\alpha = .63$) include items that ask how much attention is paid by mother, father, and best friend to "eating a healthy diet," "getting enough exercise," "getting enough sleep," and "using seat belts when in a car." Models for health-enhancing behaviors constitute protection because models provide opportunities to learn how to engage in the behaviors, provide social support for engaging in the behaviors, and indicate that the behaviors are characteristic of the social group to which the adolescent belongs.

¹Wave-4 reliabilities are reported for all measures. In Wave 3, the reliability for each measure does not depart from the Wave-4 value by more than .03.

Conventionality-related (distal) protective factors. As stated earlier, other aspects of adolescents and their environment, distal from health behavior, may also serve to regulate health behavior. Seven measures of psychosocial conventionality were examined as an additional set of protective factors for health-enhancing behavior. None of the items in these measures has any reference, directly or indirectly, to health. *Orientation to school* is a 13-item scale ($\alpha = .87$) measuring attitudes toward school (e.g., “How do you feel about going to school?”) and personal value on academic achievement (e.g., “How important is it to you to get at least a B average this year?”). Having a positive orientation to school reflects positive engagement with a conventional social institution and commitment to its goals. Such an orientation toward conventionality is not compatible with engaging in behaviors that are considered inappropriate by adults and that may also jeopardize conventionally valued outcomes. *Religiosity* is a four-item scale (available only in Waves 3 and 4; $\alpha = .89$) measuring the importance of religious beliefs and teachings for the direction of daily life. Religiosity reflects a commitment to conventional values and disapproval of norm-violative activities and serves as a personal control against involvement in nonnormative behaviors. *Orientation to parents* is a two-component index based on standardized scores on two scales, one measuring perceived agreement on values between one’s parents and friends (three items, e.g., “Would your friends agree with your parents about what is really important in life?”; $\alpha = .78$) and the other measuring the relative influence of parents and friends on the respondent’s outlook, life choices, and behavior (three items, e.g., “If you had to make a serious decision about school, who would you depend on most for advice—your friends or your parents?”; $\alpha = .69$). Higher parents-friends agreement and higher influence from parents indicate greater orientation to parents and constitute conventionality because parents represent and exercise controls against norm-violative behavior and generally serve as models for conventional values, attitudes, and activities. *Positive relations with adults* was measured by four questions ($\alpha = .70$) assessing a respondent’s relationships with parents and other adults, including the extent to which parents show interest in the respondent and whether the respondent is able to discuss personal problems with an adult. More positive relations with adults indicates greater conventionality because adults generally provide support for conventional behavior and sanctions against normative transgression. *Friends as models for conventional behavior*, a six-item scale ($\alpha = .78$), assesses the proportion of friends who get good grades in school and who engage in conventional activities such as school clubs, community and church groups, and family activities. This measure reflects greater involvement with conventional peers engaged in conventional activities. *Prosocial activities* is a three-item index that combines own involvement and time spent in family activities, in volunteer activities, and in school clubs other than sports ($\alpha = .39$). *Church attendance* is a single item (available only in Waves 3 and 4) assessing frequency of going to religious services during the past 6 months. Higher levels of prosocial activities and of church attendance reflect higher involvement with conventional institutions, promote orientations and social networks incompatible with unconventional behavior, and also preempt time to become involved in the latter.

Because all of the measures are based on self-report, establishing discriminant validity between predictors and the criterion is important for valid interpretation of findings. Therefore, prior to carrying out the main analyses, we examined the discriminant validity between the criterion measure, the HEBI, and the predictor most similar to it in the number and content of its components, the measure of best friend model for health behavior. The correlation between these 2 measures is .36; they share only 13% of their variance. The correlations of these 2 measures with 10 other measures of the participant's health-related and conventionality-related values, beliefs, and behaviors were then compared. The magnitude of these correlations ranged from $-.02$ between best friend model for health and stress to $.34$ between the HEBI and orientation to school. In each case, the measure of own behavior, the HEBI, correlated more strongly with the 3rd measure than did the measure of best friend model; 8 of the 10 differences between the pairs of correlations, differences ranging from $.06$ to $.16$, are significant ($p \leq .05$). These findings support the discriminant validity of the measure of participant's own health behavior as against perceived best friend's health behavior and suggest that the multivariate relations to be examined are not merely the result of the confounding of two self-reports.

Another avenue for demonstrating discriminant validity between a measure of the participant's own health-enhancing behavior and a measure of perceived friend's health behavior is to use them both to predict a third variable, while showing that each measure accounts for unique variance in the third variable. In multiple regressions predicting friends' problem behaviors and friends' conventional behaviors, and participants' problem behaviors and their prosocial activities (i.e., conventional behaviors), the HEBI measure and the best friend model for health behavior measure each contributed significant unique variance to each criterion measure. This is an additional demonstration that the two measures are not measures of the same thing.

The analytic procedure used in the present study is hierarchical multiple regression. At each step of the regression, we show the contribution of the measure(s) entered at that step, controlling for all measures entered before that step. This procedure enables us to demonstrate how much variance in health behavior is accounted for, in turn, by the health-related risk factors, the health-related protective factors, and the conventionality-related protective factors. At each step, the change in R^2 indicates whether the set of explanatory variables entered accounts for unique variation in health behavior (i.e., whether error variance is significantly reduced when those measures are included). The logic of this analytic approach is that it permits an assessment of whether distal conventionality measures, which have no obvious content-based relationship to the criterion, can nevertheless account for variation in health behavior beyond that already accounted for by the proximal, health-related measures.

This procedure also enables us to determine whether protection moderates the impact of risk. Including a risk by protection interaction term at a later step in the regression and examining whether that product adds predictability to the additive model is the accepted way to demonstrate a moderator effect (Aiken & West, 1991; Baron & Kenny, 1986; Cohen & Cohen, 1983; Saunders, 1956). Hierarchical mul-

multiple regression also permits sociodemographic effects to be partialled out in the first step, before the theoretical measures are entered. Because all predictors are mean-deviated (except parents smoke cigarettes, which has a meaningful zero point at its mode), the model describes relations at typical values of the predictors.

Results

Analyses presented in this section pertain to four main issues. We examine whether the various predictor sets—proximal risk factors, proximal protective factors, and distal protective factors—can account for variation in the HEBI. We also examine whether proximal and distal protection moderates the relation of risk to the HEBI. Next, we explore the robustness of those findings through replication in Wave 3 and near-replication in Waves 1 and 2 and also in an entirely independent sample. Finally, in longitudinal analyses of antecedent risk and protective factors, we examine the predictability of the Wave-4 HEBI criterion over time and development.

Relations of Health-Related Risk and Protective Factors to Variation in Health-Enhancing Behavior

The Wave-4 composite index of health-enhancing behaviors (the HEBI) is the criterion measure in a hierarchical multiple regression analysis. The theoretically derived predictors are the sets of proximal risk factors and proximal and distal protective factors described earlier. Table 27.1 shows that significant proportions of variance in health-enhancing behavior are indeed accounted for by health-related risk and health-related protective factors (see ΔR^2 column at Steps 2 and 3). In addition, and of key conceptual importance, the distal conventionality protection measures also account for significant variance (Step 5), even after the sociodemographic controls and the proximal risk and protective factors have been entered. That the three types of measures each provide significant improvement in the model attests to the fact that they are, at least to some extent, empirically as well as conceptually distinct. The final-step regression weight (B) for each measure in Table 27.1 shows its relation to the HEBI criterion, controlling for all other measures in the model.

The bivariate correlations in Table 27.1 show that five of the six sociodemographic measures—gender, White/non-White, grade in school, intact family, and SES—have small but significant correlations ($p \leq .05$) with the HEBI (described previously in the Method section). These effects were partialled out by entering the set of sociodemographic controls at Step 1 of the hierarchical regression where, together, they accounted for a small (3%, as shown in the ΔR^2 column) but significant ($p \leq .001$) proportion of variance.

Table 27.1 Hierarchical Regression of the Health-Enhancing Behavior Index (HEBI) on the Proximal Risk Factors and the Proximal and Distal Protective Factors, Wave 4 (1992, Grades 10–12)

Step	Measures entered	<i>r</i>	<i>sr</i> ²	β , final step	ΔR^2
1	Sociodemographic controls				.031***
	Gender	-.05*		-.055*	
	White/non-White	.09***		.052	
	Hispanics—Black	.00		.008	
	Grade in school	-.08***		-.062***	
	Intact family	.06*		-.030	
	Socioeconomic status	.14***		-.010	
2	Health-related risk factors				.120***
	Felt stress	-.20***	.037***	-.024***	
	Susceptibility to peer pressure	-.15***	.023***	-.025	
	Friends as models for sedentary behavior	-.24***	.049***	-.030	
	Friends as models for eating junk food	-.27***	.066***	-.058***	
	Parent smoke cigarettes	-.08***	.001	.033*	
3	Health-related protective factors				.197***
	Value on health	.34***	.078***	.024***	
	Perceived health effects	.28***	.059***	.016***	
	Internal locus of control for health	.28***	.039***	.009	
	Parents as models for health behavior	.44***	.115***	.032***	
	Best friend model for health behavior	.36***	.066***	.002	
4	Health-Related Risk \times Health-Related Protection				.009***
	Parents Smoke Cigarettes \times Best Friend Model for Health Behavior	.32***		.029***	
5	Conventionality-related protective factors				.059***
	Orientation to school	.34***	.011***	.005*	
	Religiosity	.08***	.002*	-.007	
	Orientation to parents	.25***	.005*	-.015	
	Positive relations with adults	.27***	.002*	.002	
	Friends as models for conventional behavior	.40***	.044***	.031***	
	Prosocial activities	.29***	.028***	.030***	
	Church attendance	.15***	.009***	.017**	
6	Health-Related Risk \times Conventionality Protection				.004**
	Parents Smoke Cigarettes \times Orientation to Parents	.21***		.032**	
Total $R^2 = .42$ ***					

Note: $N = 1493$. sr^2 was calculated with all measures from preceding steps partialled out of the predictor. Standardized coefficients are not given because they are inappropriate with interaction terms (see Aiken and West 1991, pp. 40–47)

In Steps 4 and 6, interaction terms were included by stepwise selection ($p < .002$ at Step 4, $p < .0014$ at Step 6)

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

All five proximal health-related risk factors are negatively correlated with the health behavior criterion, as expected, and all of these correlations, although modest, are significant ($p \leq .001$). When they were entered at Step 2, after the sociodemographic measures, they accounted for an increment of 12% of variance ($p \leq .001$). Squared semipartial correlations are also shown in Table 27.1. With sociodemographic measures partialled out, the squared semipartial correlation between each health-related risk factor and the HEBI criterion is equal to the change in R^2 that would result if that particular risk factor were entered by itself at Step 2 of the regression—it is the increment in variance that could be accounted for by that one factor. Four of the five risk factors account for a significant increment in variance ($p \leq .001$), as can be seen in the column for s^2 . Those same four risk factors have significant ($p < .001$) B coefficients at this step (not tabled); each one accounts for some variance not redundant with the other risk factors. In addition, two of those risk factors account for some unique variance in the HEBI: Felt stress and friends as models for eating junk food have significant negative B coefficients ($p \leq .001$) in the final model shown in Table 27.1. Parents smoke cigarettes is also significant ($p \leq .05$) as a suppressor variable, serving to improve the predictiveness of one or more other measures by partialing out variance not related to the HEBI.

As Table 27.1 also shows, all five of the proximal health-related protective factors have significant positive correlations ($p \leq .001$) with health-enhancing behavior as expected. These protective factors were entered at Step 3, after the sociodemographic controls and the health-related risk measures, to test whether they account for significant variance in the HEBI that is not accounted for by the risk measures. As shown by the change in R^2 , they account for a large additional increment of 19.7% of variance ($p \leq .001$). That each health-related protective factor alone could account for variance in health behavior that is not related to the risk factors is shown by the significant ($p < .001$) squared semipartial correlations between the proximal health-related protective factors and the HEBI. In addition, all five of the health-related protective factors have significant ($p < .05$) regression weights at this step (not tabled), accounting for variance not shared by other health-related risk or protective factors. Three of them—value on health, perceived health effects, and parents as models for health behavior—also have significant B weights ($p \leq .001$) in the final model shown in Table 27.1.

Health-Related Protective Factors as Moderators of Risk

On the basis of theory and previous research (Jessor, Turbin, & Costa, 1998; Jessor et al., 1995), we expected that protective factors can serve to moderate the effect of risk factors. That is, the relation of risk to health behavior should be attenuated when protection is high in contrast to when protection is low. A significant risk by protection interaction would provide evidence for such a moderator effect. Because there was no a priori basis for expecting any of these interactions to be nonsignificant (theoretically, all of them may interact), all 25 possible health-related risk by

protection product terms were examined at Step 4 to see if any of these interactions make a significant contribution to explained variance (a significant increment in R^2) and, therefore, should be included in the model at this step. Probability of a Type I error was controlled by a Bonferroni adjustment, testing the B weight for each interaction term by a one-tailed t test with $\alpha = .05/25 = .002$, which keeps the overall alpha for this step at less than .05 (Judd & McClelland, 1989, p. 225). Any significant interaction term is included in the model at the step at which it is tested.

One significant interaction, that between parents smoke cigarettes and best friend model for health behavior, was entered at this step; this interaction accounted for a significant increment of almost 1% of variance ($p \leq .001$). The interaction shows that the relation of parents smoking to health behavior changes across different levels of best friend model for health behavior. More specifically, parents smoking is a significant risk factor (the more the parental models for smoking, the less the health-enhancing behavior) only at very low levels of best friend model for health behavior. Higher levels of that protective factor buffer that risk factor, so that at average and higher levels of best friend model, parents smoke has a positive coefficient, significant only as a suppressor variable.²

Relations of Conventuality-Related Protective Factors to Variation in Health-Enhancing Behavior

The seven distal conventionality protective factors were entered at Step 5 to test whether they account for additional variance in the HEBI, variance that is not accounted for by any of the health-related risk or protective factors already entered. With 36% of the variance already accounted for, they nevertheless accounted for a significant increment of nearly 6% of variance ($p \leq .001$) as shown in Table 27.1. All seven of these distal measures have significant positive correlations with the HEBI ($p \leq .001$). Even though the bivariate correlations are of similar magnitude to those for the preceding health-related proximal measures, the squared semipartial correlations are generally smaller, reflecting some redundancy between the proximal health-related measures and the distal conventionality measures. Nonetheless, as shown in Table 27.1, each of the seven could account for significant additional

²The positive regression weight in Table 27.1 for parents smoke cigarettes (applicable at the average level of all other predictors) does not represent a positive association between parents smoking and health behavior. Rather, parents smoking is a suppressor variable. Only when the best friend model score is less than -2.2 ($M = 0$, $SD = 2$) does parents smoking have a significant negative coefficient, consistent with the sign of its bivariate correlation. At higher levels of best friend model, the suppressor effect can be seen by comparing the (positive) conditional slopes for parents smoking with its bivariate correlations. The bivariate correlation between parents smoking and the HEBI among participants with the highest scores on best friend model is .03 (*ns*); among those with scores near the mean, the correlation is $-.05$ (*ns*); among those with the lowest scores on best friend model, the correlation is $-.18$ ($p \leq .001$). Furthermore, the squared semipartial correlation for parents smoke is essentially zero; its variance is unrelated to the criterion measure.

variance if entered alone at this step, and four of them have significant ($p \leq .05$) B weights and account for unique variance, both at this step (not tabled) and in the final model: orientation to school, friends as models for conventional behavior, pro-social activities, and church attendance. These are key findings for enlarging the network of psychosocial correlates of adolescent health behavior.

After the conventionality protective factors were included in the model, the 35 possible interaction terms with the health-related risk measures were tested at Step 6, with a Bonferroni adjustment to the alpha level ($\alpha = .05/35 = .0014$) to keep the overall alpha for this step at less than .05. One significant interaction entered the model at this step: The effect of parents smoking is moderated by orientation to parents, in the same way that it was moderated by best friend model for health behavior at Step 4.³ Thus, parents smoking is a significant risk factor for health behavior only when protection from either of these two moderators—one proximal, one distal—is quite low.

The Generality of the Model

The generalizability of the regression model across genders, ethnic groups, grade cohorts, family structures, and SES levels was examined by testing for significant interactions between the sociodemographic measures, on the one hand, and the risk and protective factors (including the two significant risk by protection interactions), on the other. Significant interactions would indicate differences in the strength of predictors across those subgroups. None of the 114 sociodemographic interactions, tested with alpha set at .001,⁴ is significant; the model does not differ significantly across the sociodemographic groups in this sample. The adequacy of the model across the full range of the HEBI was also tested by examining a plot of residuals against predicted values of the criterion, which showed no relation between the size of the errors and the value of the HEBI; the model fits equally well at all levels of the HEBI.

The Overall Explanatory Account

The total R^2 of .42 indicates that 42% of the variance in the HEBI criterion is accounted for by the six sociodemographic control measures, the five proximal health-related risk factors, the five proximal health-related protective factors, the seven distal conventionality protective factors, and the two risk by protection

³Parents smoke cigarettes has a significant negative coefficient for very low values of orientation to parents (values less than -2 ; $M = 0$, $SD = 1.5$). At higher values, parents smoke has a positive coefficient, serving as a suppressor variable.

⁴This provides an overall alpha for this step of .11, but with statistical power of only about .50. Further reduction in alpha, with consequent further reduction of power, was deemed undesirable.

interactions. This constitutes a substantial account of variation in health-enhancing behavior in adolescence. Each health-related risk and protective factor has a significant bivariate correlation with the criterion, and nine of them have significant regression weights in the final multivariate model (not including parents smoke cigarettes, which is a suppressor). The risk by protection interactions show that two additional protective factors, best friend model for health behavior and orientation to parents, are significant for participants whose parents smoke cigarettes.

The increment of variance accounted for by each set of predictors depends, of course, on which predictors have already been entered into the hierarchical regression. By varying the order of entry, we were able to establish the unique variance in the HEBI accounted for by each set of predictors, when entered after all the other sets of risk and protective factors. Results show that the health-related risk factors account uniquely for 2% of variance; the health-related protective factors account uniquely for 10% of variance. As noted earlier and shown in Table 27.1, the conventionality-related protective factors account uniquely for 6% of variance. These results show that, despite substantial redundancy among the three sets of predictors in the criterion variance they account for, each set accounts uniquely for some variance in health-enhancing behavior. The results also show that, for these measures and this criterion of health-enhancing behavior, the protective factors—both those that are proximal and those that are distal—are more strongly related to the HEBI than are the risk factors.

Testing for Interactions Using Composite Risk and Protection Scale Scores

Although 2 out of 60 risk by protection interactions were found to be statistically significant in the previous analyses, their substantive significance may be considered problematic because so many significance tests were examined. In order to address this problem, we carried out a different kind of analysis in which each set of risk and protective factors was represented by a single scale score, computed as the mean of standard scores of the separate measures. Thus, a composite health-related risk scale and a composite health-related protection scale were entered at Steps 2 and 3 of the regression, followed at Step 4 by a test of the significance of the single interaction between the two scales. Then a composite conventionality-related protection scale was entered at Step 5, and its single interaction with the health-related risk scale was tested at Step 6 (not tabled; table available from the authors).⁵ The

⁵The correlation between the health-related risk and health-related protection scales is $-.34$; between the health-related risk and conventionality-related protection scales, it is $-.30$; between the two protection scales, it is $.44$. The most strongly correlated pair of scales shares just 19% of their variance. The correlations of the health risk scale, the health protection scale, and the conventionality protection scale, respectively, with the HEBI are $-.33$, $.53$, and $.42$. Each scale accounts for significant ($p \leq .001$) variance in the HEBI; total R^2 is $.37$.

former interaction term, at Step 4, is not significant ($p > .05$), whereas the latter interaction term, at Step 6, is significant ($p \leq .01$) and adds 0.3% of variance. Thus, a composite measure of health-related risk factors is shown to be moderated by a composite measure of conventionality-related protective factors. At low to moderate levels of protection, the risk scale is inversely related to the HEBI, and the higher the protection, the weaker the relation. When protection is very high, risk is not related to the HEBI. Conversely, when risk is very low, the effect of protection is weaker but still significant. This supplementary analysis, without the problem of having to carry out multiple significance tests, provides additional support for the key proposition that protective factors—in this case conventionality-related ones—moderate health-related risk factors. The convergence of these two different analytic approaches to assessing moderator effects enhances conviction that protection can moderate risk.

Replication of the Wave-4 Regression Analysis in Earlier Waves of the Study and Also in an Independent Sample

The four-wave design of our study allows us to examine whether the relations of risk and protective factors with health behavior shown in Table 27.1 hold in the preceding three waves of data. The same measures used in the Wave-4 analysis were available from most of the same participants in Wave 3. Most of the same measures, or reasonable approximations of them where certain items were not assessed, were also available in Waves 1 and 2. The analysis carried out for Table 27.1 was repeated, therefore, for Waves 1, 2, and 3, with as comparable as possible criterion measures and risk and protective factors computed from each wave of data.

In the three separate replications (not tabled; table available from the authors), total variance accounted for is between 41% and 44%, almost identical to that obtained in Wave 4 (42%). Further, at each step of the hierarchical regression, the proportion of variance accounted for by each set of predictors is also very nearly the same. At Step 2, the risk factors account for between 9% and 15% of variance. At Step 3, the health-related protective factors account for between 19% and 24% of variance. And at Step 5, the conventionality-related protective factors account for between 3% and 6% of variance.

Each risk or protective factor that is significantly related to the HEBI in the Wave-4 analysis is also significant in all three replications, with only three exceptions: In Wave 1, a single item measure of stress is marginally significant ($p = .07$); church attendance, which was not available in Waves 1 and 2, has a probability value of .09 in the final model for Wave 3; and parents smoke cigarettes is not significant in any replication. Among the health-related risk or protective factors not significant in Wave 4, each is significant in two or three of the replications. The three conventionality-related protective factors that are not significant in Wave 4 are not significant in any replication, except susceptibility to peer pressure in Wave 1.

One of the three replications provides support for the hypothesized moderator effects. In Wave 1, positive relations with adults moderates the effect of friends as models for eating junk food. That risk factor is strongest at the lowest level of the protective factor and is nonsignificant for very high values of the protective factor. Or, conversely, positive relations with adults is a significant protective factor only for fairly high values of friends as models for eating junk food. Overall, then, the findings in Table 27.1 are shown to hold fairly consistently across developmental change as participants grew older (from ages 12–15 in Wave 1 to ages 15–18 in Wave 4) and across whatever historical changes took place over those same years.

An opportunity for replication of the analysis on an entirely independent sample was also available. Data had been collected in 1989 from a cross-sectional sample of 1,380 students in Grades 10–12 from the same high schools, using the Wave-1 questionnaire. Those students were tested only that once and not followed up, because they were already in high school. The analysis carried out for Table 27.1 was repeated using this sample (not tabled; table available from the authors). Health-related risk factors, in this sample, account for a significant ($p \leq .001$) 6% of variance; health-related protective factors, entered next, account for 17% of variance ($p \leq .001$); and conventionality-related protective factors account for an additional 2% of variance ($p \leq .001$). In the final model, felt stress and friends as models for eating junk food are significant risk factors, all five health-related protective factors are significant, and friends as models for conventional behavior and prosocial activities are significant conventionality-related protective factors. Also, risk is significantly moderated by protection in this sample: Friends as models for eating junk food is moderated by friends as models for conventional behavior ($p \leq .001$; risk has a stronger effect when protection is low, no effect when protection is high). Compared with the findings in Table 27.1 on the Wave-4 sample of 10th to 12th graders, somewhat less variance is accounted for in this sample by each set of predictors, and the overall R^2 of .33 is lower. In this regard, it should be noted that the data from this independent sample include a smaller number of predictor measures (15 vs. 17) and were obtained from the initial exposure to the questionnaire in a sample that had not been depleted by attrition. Overall, this replication on an independent sample provides additional support for the findings presented in Table 27.1.

Relations of Antecedent Risk and Protection With Developmental Change in Health-Enhancing Behavior

With the role of psychosocial risk and protection established in cross-sectional analyses of health-enhancing behavior, we turn to demonstrating their importance in accounting for the development of health behavior over time. For these analyses, we used the Wave-3 measures of risk and protection to predict the Wave-4 HEBI, controlling for the Wave-3 HEBI at Step 1 of a hierarchical multiple regression. Thus, we examined the predictability of change in HEBI, that is, the residual variance

Table 27.2 Hierarchical Regression of the Wave-4 Health-Enhancing Behavior Index (HEBI) on Wave-3 Proximal Risk Factors and Proximal and Distal Protective Factors, Controlling for Wave-3 HEBI

Step	Measures entered	<i>r</i>	<i>sr</i> ²	β, final step	Δ <i>R</i> ²
1	Wave-3 HEBI	.70***		.584***	.492***
2	Sociodemographic controls				.006**
	Gender	-.05*		-.003	
	White/non-White	.09***		.042	
	Hispanics—Black	-.01		.014	
	Grade in school	-.11***		-.032*	
	Intact family	.06*		.003	
	Socioeconomic status	.16***		.010	
3	Wave-3 health-related risk factors				.008***
	Felt stress	-.21***	.006***	-.015**	
	Susceptibility to peer pressure	-.15***	.002*	-.008	
	Friends as models for sedentary behavior	-.18***	.000	.021	
	Friends as models for eating junk food	-.23***	.000	.001	
	Parent smoke cigarettes	-.07**	.001	-.027	
4	Wave-3 health-related protective factors				.006**
	Value on health	.30***	.003**	.008*	
	Perceived health effects	.24***	.001	-.003	
	Internal locus of control for health	.28***	.002*	.006	
	Parents as models for health behavior	.40***	.002*	.003	
	Best friend model for health behavior	.29***	.001	.003	
5	Wave-3 conventionality-related protective factors				.009***
	Orientation to school	.31***	.001*	.003	
	Religiosity	.04	.000	-.010	
	Orientation to parents	.23***	.001	.003	
	Positive relations with adults	.28***	.002*	.006	
	Friends as models for conventional behavior	.31***	.004***	.010*	
	Prosocial activities	.27***	.005***	.013*	
	Church attendance	.12***	.001	.008	
Total <i>R</i> ² = .52					

Note: *N* = 1399. *sr*² was calculated with all measures from preceding steps partialled out of the predictor

p* ≤ .05; *p* ≤ .01; ****p* ≤ .001

after Step 1 over a 1-year interval. In that interval, each component health behavior measure except seatbelt use showed a small but significant ($p < .001$) average decrease of 0.1 to 0.2 *SD* of the Wave-3 measures. Seatbelt use showed a small average increase of 0.06 *SD* of the Wave-3 measure ($p < .01$). Regression results are presented in Table 27.2.

The correlation between the Wave-3 and the Wave-4 HEBI is .70 ($r^2 = .492$), indicating substantial over-time stability. Bivariate correlations of the antecedent Wave-3 risk and protective factors with the Wave-4 HEBI are very similar to their concurrent, Wave-4 correlations presented earlier in Table 27.1. Again, sociodemographic effects, which are slight, were partialled out at Step 2 before the Wave-3 theoretical predictors were entered. The health-related risk factors, entered at Step 3, account for a significant ($p \leq .001$) 0.8% of variance, which is equivalent to about 2% of the residual variance. The squared semipartial correlations in Table 27.2 show that felt stress and susceptibility to peer pressure are significantly related to developmental change in health behavior after the sociodemographic measures were partialled out. Felt stress also has a significant *B* weight at this step, controlling for other risk factors. In the final model, greater felt stress is related to less health-enhancing behavior, over and above the effects of all other measures ($B = -.015$).

The health-related protective factors, entered at Step 4, accounted for another 0.6% of variance ($p \leq .01$), which is about 1% of the residual variance. Three of these protective factors—value on health, internal health locus of control, and parents as models for health behavior—have significant squared semipartial correlations with change in health behavior. Value on health also has a significant *B* weight at this step, controlling for all other health-related risk and protective factors. In the final model, after controlling for all other measures, greater value on health is related to more health-enhancing behavior ($B = .008$). All 25 possible interactions between the health-related risk and protective factors were examined for moderator effects; none reached significance at the .002 alpha level.

At Step 5, the conventionality-related protective factors accounted for another increment of close to 1 % of variance ($p \leq .001$), which is 2% of the variance in change in HEBI. Four of these distal protective factors—orientation to school, positive relations with adults, friends as models for conventional behavior, and prosocial activities—could account for significant variance in change in HEBI that is not accounted for by the proximal risk and protective factors. Of those four, friends as models for conventional behavior and prosocial activities also have significant *B* coefficients at this step and in the final model. No interaction between the conventionality-related protective factors and the risk factors is significant at the .0014 alpha level; nor is any sociodemographic interaction significant at $p \leq .001$. All together, the Wave-3 risk and protective factors account for 4.5% of the variance in change in health behavior over a 1-year interval. The total R^2 is .52.

This longitudinal analysis was replicated for the longest time interval available in these data, the interval between Wave 1 and Wave 4 (not tabled; table available from the authors). The correlation between the Wave-1 and the Wave-4 HEBI is .52 ($r^2 = .27$). The increment in variance in change in HEBI accounted for by the Wave-1 risk and protective factors is 3.2% ($p \leq .001$), which is 4.4% of the residual variance.

No health-related risk factor reaches significance in the final model, but friends as models for eating junk food is close ($p = .08$); two health-related protective factors are significant—value on health and internal locus of control for health; and two conventionality-related protective factors are significant—positive relations with adults and prosocial activities. There is no significant interaction between risk and protection at the .002 alpha level, nor is any sociodemographic interaction significant at $p \leq .001$. Total R^2 is .31.

These prospective analyses show that antecedent psychosocial risk and protection do predict, at least to some extent, the subsequent development of health-enhancing behavior. Although the proportion of variance accounted for in change in the HEBI is small, it is nevertheless significant and has theoretically important implications.

Discussion

The role of psychosocial protective factors in adolescent health-enhancing behavior, and in its development, are key findings of the present study. Protective factors account for substantial variance in health-enhancing behavior in adolescence, and, in this study and with these measures, they account for more unique variance (16%) than do the risk factor measures (2%).

There is also modest evidence that protection, in addition to its direct relation to health-enhancing behavior, may moderate the relation of risk to health-enhancing behavior. The present findings have implications for the design of intervention efforts to influence adolescents' health behaviors. They suggest that the current emphasis on reducing risks might be broadened to include efforts to strengthen protective factors.

The partitioning of individual differences in protective factors into proximal, health-related factors and distal, conventionality-related factors has been especially illuminating. Although it is to be expected that protective factors more proximal to health would account for more of the variance in health behavior, it turns out that the theoretically linked, but more distal factors—variables having no obvious or immediate implications for health—are also important correlates of health behavior. Religiosity, a commitment to school, having friends who take part in conventional activities like youth groups and community volunteer work, an orientation toward parents, positive relationships with adults, church attendance, and involvement in prosocial activities all turn out to be protective factors associated with adolescent health behavior. According to these findings, a fuller understanding of adolescent health behavior requires an explanatory network that includes distal as well as proximal variables. Such an approach to explanation is a departure from most current efforts, which largely limit their focus to factors proximal to health.

The fact that these same, distal, conventionality-related variables have been shown in earlier work to be related to other domains of behavior as well, such as academic attainment and problem-behavior involvement (Jessor et al., 1991; Jessor,

Turbin, & Costa, 1998), suggests that health behavior is part of a larger organization of the person, rather than an isolated aspect or a unique domain. Further, it calls attention to a dimension of individual-differences variation, conventionality-unconventionality, that has relevance for several important domains of adolescent behavior.

The psychosocial risk and protective factors used in this study provide a substantial cumulative account of variation in health-enhancing behavior—39% of the variance after the influence of sociodemographic characteristics has been taken into account. With respect to both risk and protection, individual differences in personality and in characteristics of the perceived social environment are shown to be relevant to health behavior in adolescence. In the final, cross-sectional regression model, the health-specific risk factors that relate negatively to engagement in health-enhancing behavior include felt stress and friends who model eating junk food. The health-specific protective factors that relate positively to health-enhancing behavior include value on health, beliefs about the harmful effects of behaviors such as skipping breakfast and not exercising regularly, and parental models for health-enhancing behavior. The distal protective factors that relate positively to health-enhancing behavior include orientation to school, friends who model conventional behaviors, participation in prosocial activities, and frequent church attendance. These findings link adolescent health behaviors to aspects of personality, the perceived environment, and other behavior, and the relations appear not to vary as a function of sociodemographic characteristics.

It appears, too, that neither developmental changes across the years from middle school to high school nor historical changes over the four waves of the study affected the general patterns of relations of the risk and protection measures to health-enhancing behavior. In the cross-sectional replications in each of the four waves of the study, total variance accounted for in health-enhancing behavior ranged from 41% to 44%, and the proportion of variance accounted for by each set of predictor measures was nearly the same in all waves.

The patterns of relations between risk and protection, on the one hand, and health behavior, on the other, are sustained as well when antecedent risk and protective factors are used to predict subsequent change in health behavior. Health-related risk factors; health-related protective factors; and distal, conventionality-related protective factors were significant predictors of change in health behavior over both a 1-year interval and a 3-year interval (risk marginally significant in the latter). Both health-related and conventionality-related protective factors deserve further study as part of a broader approach to influencing adolescent health behavior than has typically been attempted.

The longitudinal analyses convey important information regarding the development of health-enhancing behavior, but they also speak to two issues of possible confounding in the cross-sectional analyses between risk and protective factors and health behavior. It is possible, and indeed even likely, that there is reciprocal influence in the model we have been exploring. That is, it is possible to argue that health behavior itself might influence the variables used as predictors in this study. Clearly, it is not possible to rule out bidirectionality, but it has been possible to establish

some directionality of influence from predictors to criterion in this study by the developmental analyses presented in Table 27.2. In those analyses, antecedent behavior was controlled, and change in behavior became the criterion. Thus, any variance shared by the Wave-3 predictor and behavior measures was partialled out (Urberg, Degirmencioglu, & Pilgrim, 1997), and what remains—what the regression weights measure—is the influence of the Wave-3 predictors on Wave-4 health behavior. (Of course, as in any study, the possibility that observed relations may be partly due to the influence of unmeasured variables cannot be ruled out.)

The other issue has to do with the fact that all of the measures rely on self-report. It is possible that the key measures of perceived models could be biased by the projection of participants' own characteristics or behavior (see Kandel, 1996; Urberg et al., 1997). Although this, too, cannot be ruled out, the discriminant validity evidence presented for the measures of best friend model for health behavior and participant's own health behavior indicates that the obtained multivariate relations are not merely the result of the confounding of self-reports.

Because protection had been shown to moderate the effect of risk in earlier work (Jessor et al., 1995), and because moderation follows from the logic of the conceptualization of protection, we explored the moderating influence of protection on risk in this study as well. Two small but significant moderating effects of protection on risk were indeed found in the cross-sectional analysis, and both distal and proximal protective factors were shown to moderate health-related risk factors. In each instance of a significant moderator effect, a higher score on a health-related risk factor is significantly associated with less health-enhancing behavior only at below-average levels of the protective factor. Interpretation of these interactions should be tentative, however, given the large number of interaction terms tested. Nevertheless, given the pervasive difficulty of detecting moderating effects in field studies (see McClelland & Judd, 1993), the replication of moderating effects across multiple analyses in the present research, using the composite scale scores as well as the separate factors, and in an independent sample as well, increases conviction about protection as a moderator. The establishment of both direct and moderating effects of protective factors supports recent conceptual efforts to differentiate among the various ways in which protective factors may affect outcomes in different domains (see Luthar, 1993).

The analyses presented in this paper relied on a composite index of health-enhancing behavior (the HEBI) as the criterion measure, because principal-components analysis indicated that a single factor underlies the five measures used in the index. Nevertheless, generalizations drawn from the HEBI may not apply equally to all of its components, and indeed, there is substantial variance not shared by the common factor. In order to explore this issue, we replicated the analysis carried out for Table 27.1 for each of the five health behaviors separately (not tabled; tables available from authors). Those analyses do reveal differences in the relations of the predictor measures to the different behaviors in the composite index. The predictor measures account for larger proportions of the variance in healthy diet, exercise, and seatbelt use (28% to 36%) than they do for sleep and dental hygiene (12% and 15%). There is also variation in the proportions of variance accounted for

by the different sets of predictors. For example, the combined proximal health-related risk factors and proximal health-related protective factors account for 32% of variance in healthy diet, compared with only 6% to 12% of variance in each of the other four health behaviors; and sociodemographic measures account for relatively larger proportions of variance in exercise and seatbelt use (10% and 19%, respectively) than in the other behaviors (1% to 5%). It is likely that these differential findings were affected, to some extent at least, by differences in the adequacy and reliability with which the component behaviors were measured. Future assessment of particular health behaviors should employ more elaborate and more equivalent measurement efforts for each component of the behavioral criterion than we were able to do. In the meantime, the use of a composite index has the advantage of having mapped diverse aspects of the health behavior domain and of having assessed that domain more comprehensively.

The study has several limitations that constrain the inferences that may be drawn. First, although the protection measures include many multiple-item, well-established scales that have been used in a wide range of studies, the measures of health-specific risk include several single-item measures, most of which had not been employed in prior research. Inadequacy of the risk measures may account, at least in part, for their relatively limited predictiveness compared with the predictiveness of the protection measures. Another limitation is that the risk and protective factor measures and the criterion measure all relied on self-report, and the obtained relations could be spuriously inflated by common method variance. Finally, the less-than-desirable initial participation rate of the sample drawn and the attrition of the starting sample over the subsequent 3 years deserve mention as potential limitations on the generality of inference that is possible.

Despite these limitations, the present study expands on prior knowledge about adolescent health-enhancing behavior in four major ways. First, unlike much previous work that has focused on negative, health-compromising behaviors, the present study illuminates factors associated with positive, health-enhancing behaviors. Second, the present research goes beyond an emphasis on health risk factors to include an examination of health protective factors as well. Third, the study shows that protective factors distal from health behavior are also related to its occurrence and development. And fourth, the research suggests that there is some moderating effect of protection on the impact of health-related risk. Taken together, such knowledge can be useful in illuminating the development of health-enhancing behavior and informing interventions designed to promote health behaviors in adolescence.

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Chapter 28

Health-Enhancing Behavior in Chinese and American Adolescents

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The focus of this study is on the role of the everyday social context in accounting for variation in adolescents' engagement in health-enhancing behavior and its development over time. The research uses a theoretical framework about three kinds of protective factors (models protection, controls protection, and support protection) and three kinds of risk factors (models risk, opportunity risk, and vulnerability risk) to articulate the explanatory content of the social contexts that adolescents traverse in their daily lives. Linkages are examined between protective and risk factors in four key contexts—the family, the peer group, the school, and the neighborhood—and involvement in health-enhancing behavioral practices, including eating a healthy diet, engaging in regular exercise, getting adequate sleep, engaging in safety practices such as seatbelt use, and practicing good dental hygiene.

Broad influences on adolescent health behavior, such as the proliferation of soft drink vending machines in schools and an increasingly sedentary lifestyle that includes more TV viewing and recreational use of video games and computers, have been widely noted in the literature, especially in regard to concern about eating, exercise, and obesity, not only in the United States but worldwide (see, e.g., Bell, Ge, & Popkin, 2002; Caballero & Popkin, 2002; Hill, Wyatt, Reed, & Peters, 2003; Horgen & Brownell, 2002; Wadden, Brownell, & Foster, 2002; World Health Organization, 2002). Recently, there has been increased recognition that health-related behavior in adolescence is influenced by more immediate social and

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environmental factors, such as family members, peers, schools, and communities. Social context characteristics, such as parental models and encouragement for physical activity, family closeness, and parental support and warmth, have been shown to be associated with greater participation in exercise behavior among adolescents (Cowell & Marks, 1997; DiLorenzo, Stucky-Ropp, Vander Wal, & Gotham, 1998; Field, Diego, & Sanders, 2001; Sallis, Prochaska, & Taylor, 2000). Family connectedness (perceived parental support and caring) has also been linked with adolescents' fruit and vegetable intake (Neumark-Sztainer, Story, Resnick, & Blum, 1996), whereas characteristics of the neighborhood context, such as poverty, crime level, and social disorganization, have been associated with poorer dietary habits (Lee & Cubbin, 2002) and lower levels of physical activity (Gordon-Larsen, McMurray, & Popkin, 2000) among youth.

The theories most commonly used to predict variation in health behavior, the theory of reasoned action (Ajzen & Fishbein, 1980) and the theory of planned behavior (Ajzen, 1991; Godin & Kok, 1996), give primary emphasis to individual-level psychosocial attributes highly proximal to (i.e., directly implicating) health behaviors. Although social-contextual correlates of health behaviors are also engaged by these theoretical approaches, they are mostly proximal to health behaviors and include such contextual characteristics as parental and peer models for dietary and exercise behaviors (e.g., Woodward et al., 1996; Zakarian, Hovell, Hofstetter, Sallis, & Keating, 1994), perceived social norms for engaging in health-enhancing behaviors (e.g., Baker, Little, & Brownell, 2003; Lytle et al., 2003), and parental and peer support for and/or encouragement of health behaviors (e.g., McGuire, Hannan, Neumark-Sztainer, Cossrow, & Story, 2002; Zakarian et al., 1994).

The explanatory model of adolescent health-enhancing behavior used in the present research emphasizes social-contextual as well as individual-level protective factors and risk factors, and it delineates protective and risk factors in the family, the peer group, the school, and the neighborhood contexts. The model derives from Problem Behavior Theory (Jessor, Donovan, & Costa, 1991; Jessor, Graves, Hanson, & Jessor, 1968; Jessor & Jessor, 1977), but constructs of controls and instigations in that theory have been reformulated into constructs of protection and risk, and three types of each have been specified.

Conceptually, protective factors increase the likelihood of engaging in health-enhancing behavior by providing models for health-enhancing and prosocial behaviors, by providing personal and social controls against health-compromising behaviors, and by providing a supportive social environment. Risk factors, in contrast, decrease the likelihood of engaging in health-enhancing behavior by providing models for health-compromising behaviors or for problem behaviors that are incompatible with health-enhancing behaviors, by providing greater opportunity for engaging in health-compromising behavior or problem behavior, and by constituting greater personal vulnerability to health-compromising or problem behavior involvement. The protection-risk model, thus, consists of three types of protection and three types of risk that together, and in interaction, provide an account of variation in adolescent behavior and development. The reformulated model was initially explicated in Jessor (1991), and the particular protection and risk constructs it includes have evolved from a systematic series of studies over the past decade

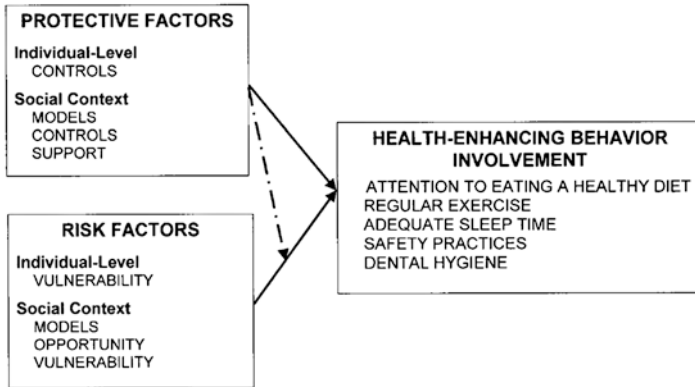


Fig. 28.1 Explanatory model of main effects of individual-level and social context protective and risk factors on adolescent health-enhancing behavior as well as the moderator effect of protection on risk

(Costa, Jessor, & Turbin, 1999; Jessor, Turbin, & Costa, 1998a, 1998b; Jessor et al., 2003; Jessor, Van Den Bos, Vanderryn, Costa, & Turbin, 1995) as well as from the larger developmental literature (e.g., Barber & Olsen, 1997).

The model takes into account not only the main effect of protective factors in promoting positive health-enhancing behavior and deterring health-compromising behavior, but also the Protection \times Risk interaction or the moderator effect that protection can have on the impact of exposure to risk. That is, it posits that high protection can attenuate the impact of risk. The conceptual model as applied to health-enhancing behavior in the present paper, and illustrating both the main and moderator effects, is shown in Fig. 28.1.

An invitation to undertake a collaborative study of adolescent behavior and development in the People's Republic of China (see Jessor et al., 2003) resulted in the present cross-national, longitudinal research. This collaboration provided the opportunity to test the generality of the model of protection and risk by extending it to adolescents growing up in a society very different from the United States. An earlier report from this research (Jessor et al., 2003) demonstrated that the model of psychosocial protection and risk provided a substantial account of adolescent problem behavior (delinquency, problem drinking, and cigarette smoking) in both the United States and China samples, even though average levels of problem behavior, protection, and risk differed between the two settings. In those analyses, protective factors and risk factors accounted for approximately equal proportions of variance in adolescent problem behavior. Controls protection and models risk were found to be the most important predictors in both samples.

The present study was designed to test the applicability of the same theoretical model to a domain different from adolescent problem behavior, namely, health-enhancing behavior. A successful outcome for the model in this domain could have important implications for the design of health promotion programs. Data on various health-enhancing behaviors were available from the same samples of adolescents described in the earlier report noted above. Such local, school-based samples in

China and the United States cannot, of course, represent those countries as a whole; what they do allow is an examination of the generality of the explanatory model for health-enhancing behavior across samples from two very different societies with different political and economic systems and different immediate social ecologies, thus permitting a very strong test of the model's applicability or reach.

In sum, the present study seeks to advance understanding about the role of protective and risk factors—both individual-level and social-contextual—in accounting for variation in health-enhancing behavior in samples of adolescents drawn from two very diverse societies. Four major research questions are addressed:

1. Does the protection and risk model provide an account of variation in adolescent health-enhancing behavior in school-based samples from both China and the United States?
2. Do social context protective and risk factors alone provide a significant account of variation in health-enhancing behavior when variation in individual-level attributes is controlled?
3. Does change in protective and risk factors over time account for change in health-enhancing behavior in adolescence?
4. Does change in social context protective and risk factors over time account for change in health-enhancing behavior in adolescence when change in individual-level attributes is controlled?

Method

Participants

The analyses reported in this paper use data from two successive waves—a year apart—of a questionnaire survey of samples of adolescents in Beijing, China, and in a large urban area in the Rocky Mountain region of the United States. At the first wave of data collection (Fall 2000), the 1,739 study participants from Beijing (883 boys, 856 girls) and 1,596 participants from the United States (753 boys, 843 girls) were students in Grades 7, 8, and 9. In each country, the sample was drawn from schools chosen in consultation with the school district administration to best represent variation in the socioeconomic backgrounds of the students and, in the United States, to reflect the racial/ethnic composition of students in the district. In Beijing, seven junior high schools (Grades 7, 8, and 9) were selected from two districts—one within the city and the other in the suburbs—and, in each district, schools known to vary in educational quality were selected. In the United States, six middle schools (for Grades 7 and 8) and three high schools (for Grade 9) were selected. In each school, students were randomly sampled within grade for participation in the study.¹

¹To address the possible nonindependence of observations on the criterion measure within schools and the possible need for hierarchical linear modeling, we computed the intraclass correlations of all the criterion measures within schools. They ranged from .00 to .05 and all had 95% confidence intervals (adjusted for unequal cluster sizes) that included zero, so they were deemed negligible, and the students' responses were treated as independent observations.

In both research sites, active parental permission and personal assent were required, and confidentiality was explained and guaranteed. Each student received a token payment for filling out the questionnaire—in the United States, \$5 at Wave 1 and \$10 at Wave 2; in China, \$2 each time plus a gift to each school. More details regarding the composition of the samples were reported in Jessor et al., (2003).

Materials

A 36-page Adolescent Health and Development Questionnaire was used to assess a broad range of behaviors as well as protective and risk factors in five domains: the individual (including beliefs, values, attitudes, and expectations) and four key social contexts—the family, the peer group, the school, and the neighborhood or community. The Adolescent Health and Development Questionnaire had been developed over the past several decades, with its content theoretically derived from the constructs in Problem Behavior Theory, and was translated into Chinese (and back-translated) with great care to ensure meaning equivalence (see Jessor et al., 2003).

Measurement of Health-Enhancing Behavior

Measures of five self-reported health-enhancing behaviors were included in the Adolescent Health and Development Questionnaire: Attention to Eating a Healthy Diet, Regular Exercise, Adequate Sleep Time, Safety Practices, and Dental Hygiene. The measure of Attention to Healthy Diet is the average of seven items (Cronbach's alpha = .87 in the U.S. sample, .85 in the China sample) that start with the stem "Think about your usual eating habits. Do you pay attention to:" and follow with "seeing that your diet is healthy," "keeping down the amount of salt you eat," "keeping down the amount of fat you eat," "eating some fresh vegetables every day," "eating in a healthy way even when you're with friends," "eating healthy snacks like fruit instead of candy," and "eating foods that are baked or broiled rather than fried?" Response options are 1 (*none*), 2 (*some*), and 3 (*a lot*). Typical (mean and median) scores on each item were around 2 (*some*). Regular Exercise is measured as the sum of three items ($\alpha = .63, .71$) asking how many hours each week are spent playing sports, working out, and practicing physical activities. Six response options ranged from 1 (*none*) to 6 (*8 or more hours a week*), and the most typical scores for each item were around 2 (*one hour a week*). Adequate Sleep Time was measured by averaging two indicators assessing number of hours of sleep ($\alpha = .77, .74$). One indicator is an item that asks, "How much sleep do you usually get each night?" The other indicator is computed from two items—usual time to go to sleep during the school week and usual time to wake up on school days. Scores ranged from 5 to 11.5 hrs, with a mean of 8.3. Carskadon et al., (1980) have reported that adolescents need over 9 hrs of sleep for optimal alertness, and 99% of our participants reported

sleeping less than 10 hrs. Within the range of these data, therefore, we considered more sleep to be more health-enhancing. Safety Practices is a two-item scale ($\alpha = .74, .75$). In the United States sample, it assesses frequency of using a seatbelt when riding with a parent and when riding with a friend; and in the China sample, it assesses frequency of waiting for red lights when biking and when walking. The modal response was 4 on a scale ranging from 1 (*hardly ever*) to 4 (*almost always*). Dental Hygiene is a two-item scale in the U.S. sample ($\alpha = .57$) assessing frequencies of brushing teeth and using dental floss; in the China sample, a single item asked about tooth brushing.² Four response options vary from 1 (*every couple of days*) to 4 (*after every meal*) for brushing, and from 1 (*almost never*) to 4 (*once a day or more*) for flossing. The most typical responses (mean, mode, and median) were 3.

Most of these measures have high internal consistency, with Cronbach's alpha in the .70s (range = .57–.87), and considerable stability over time, with 1-year stability coefficients in the .40s and .50s. Although the alpha for the Dental Hygiene component scale was lower than desirable (.57), that measure was nevertheless retained in the analyses to maintain a more comprehensive assessment of the health-enhancing behavior domain. For the most part, alpha reliabilities of the behavior measures are very similar between the two samples.

Group means for the five health behavior measures were compared in a 2 (sex) \times 2 (sample) analysis of variance, followed by post hoc Scheffe tests among the four sex-by-sample groups (not tabled; table available from the authors). In the China sample, the boys or the girls, or both, reported significantly higher levels than in the U.S. sample on three of the five health-enhancing behavior measures: Attention to Healthy Diet, Regular Exercise, and Safety Practices. The U.S. sample had a significantly higher mean on Dental Hygiene, and there was no significant difference on Adequate Sleep Time. The main effect for sex was significant for four of the five health-enhancing behaviors but not in the same direction for all four behaviors. The boys had significantly higher means than the girls on Regular Exercise and Adequate Sleep Time. The girls had significantly higher means than the boys on Safety Practices and Dental Hygiene. Overall, then, there was no consistent sex difference across all the health-enhancing behaviors in either sample.

A composite index of involvement in the five health-enhancing behaviors, the Health-Enhancing Behavior Index (HEBI), was calculated as the mean of the five component behavior scores, standardized to provide equal weighting in the continuous composite score. A factor analysis of the five health behavior measures was conducted within each sample; it showed that just one common factor was obtained (by the scree test) and that single factor accounted for about 30% of the items' variance. The com-

²Societal differences precluded using identical behavior measures in the case of Dental Hygiene and Safety Practices. Dental floss is not widely used in China, and many more adolescents in China ride bicycles than ride in cars. For each sample, therefore, we used health-enhancing behaviors clearly relevant to the experience of the participants. In that regard, for Safety Practices and Dental Hygiene, we sought to make the measures more comparable in meaning, rather than making them identical, as is the case for all the other behavior measures.

posite measure should be considered a cumulative index of involvement in the five different domains of health-enhancing behavior rather than a scale of parallel items. As with all such indexes, high internal consistency is not to be expected (Babbie, 1998), and indeed, the factor analysis showed only modest covariation.

The stability of the HEBI across a 1-year interval was substantial: .62 in the U.S. sample, and .51 in the China sample. The correlation of the HEBI with a self-rating of general health (“In general, how is your health?”) was significant, .27 and .25 in the U.S. and China samples, respectively. The HEBI also correlated negatively, as expected, with a summary index of adolescent problem behavior involvement (delinquency, problem drinking, and cigarette smoking): $-.33$ (United States) and $-.19$ (China). On the basis of this stability and validity information, the HEBI was used as the primary criterion measure to summarize health-enhancing behavior in the present study. Analyses of each of its behavioral components were also conducted.

Measurement of Protective Factors and Risk Factors

Composite measures of protective factors (models, controls, and support) and risk factors (models, opportunity, and vulnerability) were computed as averages of equally weighted, standardized (within each sample) items with means of zero. A factor analysis, for each protective and risk factor, showed each measure’s items to load on a single factor, which accounted for 26% to 78% of the items’ total variance.

Individual-Level Protective and Risk Factor Measures

Although the major emphasis of this study is on the unique contribution of social context protection and risk factors to variation in adolescent health-enhancing behavior, the full explanatory model also includes individual-level protective and risk factors. Two individual-level summary measures of protection and risk were used.

Individual-level protective factor: Controls Protection—Individual is a summary measure of personal controls against health-compromising behavior; it is composed of 11 items that assess both personal value on health (e.g., “How important is it to you to keep yourself in good health all year round?”) and perceived health effects of health-compromising behaviors (e.g., “Do you think not getting enough exercise can have an effect on the health of young people your age?”). Individual-level controls are protective because they indicate the personal importance of health and a commitment to health-promotive behaviors as well as a perception of negative outcomes that should serve to discourage health-compromising behaviors.

Individual-level risk factor: Vulnerability Risk—Individual is an 18-item summary measure assessing depression (e.g., “In the past six months, have you just felt really down about things?”), low self-esteem (e.g., “How well do you make decisions

about important things in your life?”), and low expectations for future success in life (e.g., “What are the chances that you will have a happy family life?”). Vulnerability constitutes individual-level risk because it can compromise the maintenance of health and can instigate coping behaviors, such as drug use, that may be incompatible with health-enhancing behaviors.

Perceived Social Context Protective and Risk Factor Measures

The respondent was asked to report on protection and risk in each of the four social contexts, that is, the questionnaire essentially placed the adolescent in the role of “quasi ethnographer” describing the settings of everyday life. Thus, all of the context measures are actually *perceived* context measures.

Context protective factors. Models Protection—Family assesses maternal and paternal models for four health-enhancing behaviors: eating a healthy diet, getting enough exercise, getting sufficient sleep, and using seat belts (e.g., “Does your mother pay attention to eating a healthy diet?”). Models Protection—Peers assesses peer models for those same four health-enhancing behaviors (e.g., “How many of your friends make sure they get enough exercise?”). Models for health-enhancing behaviors are protective in providing opportunities to learn those behaviors and indicate that they are characteristic of two important reference groups.

Controls Protection—Family includes two items about the strictness of rules “about what time you go to bed at night” and “about when and how much TV you can watch.” Controls Protection—Peers is a single item asking “If you were doing something that is bad for your health, would your friends try to get you to stop?” Informal social controls serve to protect against or discourage engaging in health-compromising behavior.

Support Protection—Family consists of four items, three of which ask whether parents show interest in the adolescent (e.g., “Are your parents interested in what you think and how you feel?”), and the fourth asks “When you are having problems, can you talk them over with your parents?” Support Protection—Peers consists of two items: “Are your friends interested in what you think and how you feel?” and “When you have personal problems, do your friends try to understand and let you know they care?” Support Protection—School includes four items about teachers’ interest in, caring about, and helpfulness to students (e.g., “Do teachers at your school try to help students when they are having problems?”). Support Protection—Neighborhood includes three items about neighbors’ friendliness and helpfulness (e.g., “In your neighborhood, do people help each other out and look after each other?”). Perceived support is protective in providing a context in which reference group models and controls would be expected to be influential.

Context risk factors. Models Risk—Family consists of two items, “Does anyone in your close family smoke cigarettes?” and “How many of the people in your family eat a lot of ‘junk food’ instead of a healthy diet?” Models Risk—Peers consists of three items assessing peer models for smoking cigarettes, for eating junk food,

and for sitting around a lot rather than getting some exercise. Models Risk—School is a single item, “How many of the students at your school smoke cigarettes?” Models Risk—Neighborhood is a single item, “How much cigarette smoking is there among adults in your neighborhood, as far as you know?” Models for health-compromising behaviors constitute risk because they facilitate learning those behaviors and practicing them as well.

Opportunity Risk—Family is a single item, “If you wanted some cigarettes to smoke, would you be able to get some at home?” Availability of health-compromising substances makes engaging in health-compromising behavior more likely.

Vulnerability Risk—Family is a six-item scale assessing emotional distance and conflict among family members (e.g., “Is there tension or stress at home in your family?”). Vulnerability Risk—Peers is a single item, “In the past six months, how much stress or pressure have you felt in your personal or social life?” Vulnerability Risk—School is a single item, “In the past six months, how much stress or pressure have you felt at school?” Vulnerability can compromise the maintenance of health and can instigate coping behaviors such as drug use that are incompatible with health-enhancing behaviors.

Reliabilities of the protective and risk factors are for the most part quite similar between the two samples, and except for two measures, all were in the range of .62 to .89. Stability coefficients were mostly in the .30s and .40s, showing considerable stability over a 1-year period of time, even for the single-item measures.

Correlations among the eight social context protective factor measures are similar in the two samples, mostly in the .20s. The only nonsignificant correlation between protective factors in both samples is between Support Protection—Peers and Controls Protection—Family. Correlations among the eight social context risk factors are also similar between the two samples, mostly smaller than .20 but ranging up to .46. There is one nonsignificant correlation between risk factors in the U.S. sample (Models Risk—School with Vulnerability Risk—Peers), and there are two in the China sample (Vulnerability Risk—Peers with Models Risk—Family and Opportunity Risk—Family). Correlations between the eight protective factors and the eight risk factors are mostly smaller than .20 in absolute value, ranging from $-.52$ to $-.03$ in the U.S. sample and $-.49$ to $.06$ in the China sample, negative as expected (with that one exception). Protection and risk are considered to be conceptually distinct, rather than opposite ends of the same dimension, and they have been shown to relate differently to various external criterion measures (see Jessor et al., 1995). Overall, the correlations are of similar magnitude in the two country samples.

Procedures

In both research sites, administration of the questionnaire was conducted in large groups at school by research staff with teachers absent. At Wave 1, questionnaires were filled out by 98% of the China sample and by 74% of the U.S. sample. At the

Wave-2 data collection in the Fall of 2001, questionnaires were completed by 2,985 of the original participants (1,364, 85% of the U.S. sample; 1,621, 93% of the China sample). The Wave-1 cross-sectional analyses were conducted on the complete Wave-1 sample, and the Wave-2 replications and the analyses of change were conducted on the two-wave longitudinal sample.

Results

Presentation of the results is organized according to the four research questions posed in the introduction. First, we present hierarchical multiple regression analyses to explore the cross-sectional account of variation in adolescent health-enhancing behavior involvement provided by the theoretical set of protective factors and risk factors in the two country samples. Second, we present results that show the proportion of variance accounted for uniquely by social context protection and risk, beyond that accounted for by protection and risk at the individual level. Third, we apply the explanatory model to account for developmental changes in health-enhancing behavior involvement from Wave 1 to Wave 2. Fourth, we show the proportion of variance accounted for uniquely by change in social context protection and risk, beyond that accounted for by change in protection and risk at the individual level.

Accounting for Cross-Sectional Variation in Health-Enhancing Behavior Involvement

Hierarchical multiple regression analyses were conducted, for each country sample, to examine the relations of individual-level and social-contextual protective and risk factors with health-enhancing behavior involvement. First, the HEBI criterion measure was regressed on sociodemographic background measures to partial out effects of sex, school attended, grade in school, intact family (both biological parents living together), socioeconomic status (father's job level and father's and mother's education), and ethnicity (United States only). Then, at Step 2, the two individual-level protective and risk factor measures were entered. At Step 3, the eight social context protective factors and, at Step 4, the eight social context risk factors were entered. Detailed regression results are presented first for the HEBI criterion measure in Table 28.1. Subsequently, we present regression results for the measures of the five component health-enhancing behaviors separately.

The bivariate correlations in Table 28.1 show the expected positive relations between the protective factor measures and the HEBI and the expected negative relations between the risk factor measures and the HEBI. All but one of the correlations were significant (one-tailed, $p < .05$). Correlations of the individual-level measures of protection and risk (Controls Protection—Individual and Vulnerability

Table 28.1 Hierarchical Regression of the Health-Enhancing Behavior Index on Individual-Level and Social Context Protective and Risk Factors, Wave 1 (2000)

	U.S. sample				China sample			
	<i>r</i>	β , final step	ΔR^2	R^2	<i>r</i>	β , final step	ΔR^2	R^2
Step and measures entered								
1 Sociodemographic background			.07***	.07			.08***	.08
Gender (-1 = boys, 1 = girls)	.01	.07*			-.06*			
Grade in school	-.21***	-.04			-.26***			
Intact family	.08*	.05			.07**			
Socioeconomic status	.06*	.02			.04			
School attended ^a								
Ethnic group ^b								
2 Individual-level measures			.26***	.33			.19***	.27
Controls	.45***	.22***			.41***			
Protection—Individual								
Vulnerability	-.44***	-.17***			-.36***			
Risk—Individual								
3 Social context protective factors			.11***d	.44			.13***d	.40
Models	.47***	.20***			.46***			
Protection—Family								
Models Protection—Peers	.44***	.18***			.45***			
Controls	.27***	.06*			.20***			
Protection—Family								
Controls	.30***	.05*			.24***			
Protection—Peers								

(continued)

Table 28.1 (continued)

	U.S. sample				China sample			
	<i>r</i>	β , final step	ΔR^2	R^2	<i>r</i>	β , final step	ΔR^2	R^2
Step and measures entered								
Support Protection—Family	.37***	.05			.36***	.03		
Support Protection—Peers	.08***	-.07**			.17***	.01		
Support Protection—School	.29***	-.01			.28***	-.03		
Support Protection—Neighborhood	.32***	.06*			.29***	.02		
4 Social context risk factors								
Models Risk—Family	-.29***	-.02	.01***	.45	-.14***	-.01	.01***	0.41
Models Risk—Peers	-.35***	-.07*			-.22***	.00		
Models Risk—School	-.21***	-.02			-.19***	-.07**		
Models Risk—Neighborhood	-.13***	.01			-.14***	-.05**		
Opportunity Risk—Family	-.23***	-.03			-.18***	-.05*		
Vulnerability Risk—Family	-.34***	.01			-.29***	-.05*		
Vulnerability Risk—Peers	-.15***	-.06*			-.04	.01		
Vulnerability Risk—School	-.18***	-.05*			-.09***	-.01		

Note: *N* = 1,209 (U.S. sample), 1,582 (China sample). All R^2 values are significant at $p < .001$

^aDummy variables for 9 schools (U.S. sample) and 7 schools (China sample) were entered here to partial out school differences; only 1, in the China sample, has a significant regression weight, as a suppressor variable, having zero correlation. ^bDummy variables entered to partial out small mean differences across 4 non-white ethnic groups (U.S. sample); only Hispanic, as a suppressor variable, has a significant positive regression weight. ^cVariance accounted for uniquely by individual-level protective and risk factors = .06*** (U.S. sample), .05*** (China sample). ^dVariance accounted for uniquely by social context protective factors = .08*** (U.S. sample), .09*** (China sample)

* $p < .05$; ** $p < .01$; *** $p < .001$

Risk—Individual) with the HEBI were .45 and $-.44$, respectively, in the U.S. sample and .41 and $-.36$ in the China sample. The social context protection measures with the largest bivariate correlations (.30 to .50), in both samples, were Models Protection—Family, Models Protection—Peers, and Support Protection—Family. Among the social context risk factors, moderate correlations (at least in the .20s) were found in both samples for Models Risk—Peers, Vulnerability Risk—Family, and, in the U.S. sample only, for Models Risk—Family, Models Risk—School, and Opportunity Risk—Family.

With regard to the hierarchical regression results, the sociodemographic measures, entered at Step 1, accounted for 7% of variance in the HEBI in the U.S. sample and 8% in the China sample, primarily reflecting the effect of grade in school (7, 8, or 9), the only background measure with even a moderate correlation with the criterion ($-.21$, United States; $-.26$, China). The negative sign of the correlations shows that scores on the HEBI were lower among older adolescents than among younger adolescents.

The measures of individual-level protection and risk, entered at Step 2, accounted for an additional 26% of the variance in the U.S. sample and 19% in the China sample, both substantial increments. The eight measures of social context protection were then entered at Step 3, accounting for an additional 11% of the variance in the U.S. sample and 13% in the China sample. Finally, the eight measures of social context risk factors, entered at Step 4, accounted uniquely for another 1% of variance in each sample, over and above the variance accounted for by the already-entered social context measures of protective factors, the individual-level measures of protection and risk, and the sociodemographic measures. Altogether, the final regression model accounted for a substantial proportion of the variance in the HEBI in both countries—45% in the U.S. sample and 41% in the China sample. These results provide strong support for the explanatory model and also for its generality across samples from two such diverse societies.

Because the social context protective and risk factors share common variance, their order of entry was reversed in supplementary analyses to establish the unique variance accounted for by each. When entered after the social context risk factors, the social context protective factors accounted uniquely for 8% of variance in the U.S. sample and 9% in the China sample, much greater than the unique influence shown at Step 4 in Table 28.1 for the risk factors (1%). Similarly, because some portion of the variance accounted for by individual-level protection and risk measures was shared with the social context measures, an additional regression was run reversing their order of entry and entering the individual-level measures after the social context measures. That analysis showed the unique variance of the individual-level measures to be 6% for the U.S. sample and 5% for the China sample. This contrasts with the unique variance shown for the social context measures in Table 28.1, 12% (11% + 1%) for the U.S. sample and 14% (13% + 1%) for the China sample, two to three times that of the individual-level measures.

Key social context protective factors in both samples, as shown by their beta weights in Table 28.1, were Models Protection—Family and Models Protection—Peers. Also significant, but not as strong, were Controls Protection—Family,

Controls Protection—Peers, and Support Protection—Neighborhood (U.S. sample only). Four social context risk factors were significant in the China sample, and three others were significant in the U.S. sample, as shown by the beta weights in Table 28.1; no single social context risk factor was significant in both samples in the final regression model. In the U.S. sample, Support Protection—Peers was a suppressor variable; its beta weight was $-.07$, but its bivariate correlation was $.08$. A suppressor effect is evident when a significant independent variable's correlation with the dependent variable is essentially zero or has a sign opposite that of its regression weight (see Wills, Resko, Ainette, & Mendoza, 2004, for further discussion of suppressor effects of peer support).

In previous work, applying a similar theoretical model to the analysis of adolescent problem behavior (Jessor et al., 2003, 1995), we established that protective factors, beyond their main effect, also moderated the impact of risk factors. To examine moderator effects in the present analyses of health-enhancing behavior, we relied on both the theory and our prior moderator findings to specify a set of 15 key interactions out of the possible 81 (9 [protection] \times 9 [risk]). We tested the interactions of models protection and controls protection in both the family and peer contexts and Controls Protection—Individual (five protective factors) as moderators of Models Risk—Peers, Vulnerability Risk—Peers, and Vulnerability Risk—Individual (three risk factors). Those 15 interaction tests yielded six moderator effects that were significant ($p < .05$) in one or both country samples. In both samples, Controls Protection—Family and Controls Protection—Peers moderated Models Risk—Peers. Also in both samples, Models Protection—Peers moderated Vulnerability Risk—Individual. Controls Protection—Individual in the U.S. sample and Models Protection—Peers in the China sample also moderated Models Risk—Peers. Finally, in the China sample, Controls Protection—Individual moderated Vulnerability Risk—Peers. The findings do, indeed, establish moderator effects in the health behavior domain.

To examine the applicability of the model across sexes and grade cohorts, we tested the interactions of sex and of cohort with all of the individual-level and social context protective and risk factors. Among all the sex interactions and cohort interactions, there was just one significant ($p < .05$) interaction: In the U.S. sample, Vulnerability Risk—Individual was not significant in the 7th-grade cohort, although it was significant in the 8th- and 9th-grade cohorts. With that one exception, there was no evidence that the model differs across sexes or grade cohorts.

To determine whether the theoretical model differed significantly between the two country samples, we carried out supplementary analyses, combining the two samples and testing for the interaction of each of the 15 significant protective or risk factors (see betas in Table 28.1) with a dummy variable for country sample. Only 1 interaction out of the 15 tested was significant (the effect of Models Risk—Peers was significantly stronger in the U.S. sample [$-.07$] than in the China sample [$.00$], $p < .05$). Thus, the model is essentially the same in the two country samples.

In summary, the protection-risk theoretical model accounted for similar and substantial amounts of variance in the HEBI in both country samples. The social context protective and risk factor measures were important, accounting uniquely for

more variance than did the individual-level protective and risk factors. Protective factors, as measured, accounted for much more unique variance than did the risk factors, as measured. The most important social context protective factors in the account, Models Protection—Family and Models Protection—Peers, were the same in both samples. Social context protective factors moderated both context and individual-level risk factors in both countries. The explanatory model has demonstrated substantial cross-national, cross-sex, and cross-grade-cohort generality.³

Replication of the analyses of the HEBI were carried out on the second wave of data, collected from most of the same participants 1 year later (not tabled; table available from the authors). As in the Wave-1 findings, the protective factors were more strongly correlated with the HEBI criterion measure than were the risk factors. Although smaller proportions of variance were accounted for overall (40% in the U.S. sample, 27% in the China sample) compared with the Wave-1 analysis (45% and 41%, respectively), similar proportions were accounted for uniquely by the social context protective factors (10%, U.S. sample; 8%, China sample) and risk factors (1%, each sample). Key social context protective factors were, again, Models Protection—Family, Models Protection—Peers, and Controls Protection—Family. One social context risk factor was significant in each sample: Vulnerability Risk—Family in the China sample and Vulnerability Risk—School in the U.S. sample. Together, the social context protective and risk factor measures accounted for about three times as much variance in the HEBI as did the individual-level protective and risk factor measures. There was one significant moderator effect in the Wave-2 analyses: Controls Protection—Individual moderated Models Risk—Peers in the U.S. sample. In general, the pattern of the Wave-1 results was largely supported by the findings from the second data wave of the study.

Accounting for Developmental Change in Health-Enhancing Behavior Over Time

The availability of two waves of longitudinal data permitted an examination of developmental changes in health-enhancing behavior involvement over a year-long interval. Mean change from Wave 1 to Wave 2 in the five health-enhancing behaviors was tested for significance by paired-sample *t* tests within each sex group in each country sample (not tabled; tables available from the authors). From Wave 1 to Wave 2, the mean level of the measures of Attention to Healthy Diet and of Adequate Sleep Time decreased significantly for both sexes in both the U.S. and China samples. Significant declines also obtained, for both sexes, for Regular Exercise and Safety Practices in the China sample and for Dental Hygiene in the U.S. sample. Thus, involvement in each health-enhancing behavior declined over the span of 1

³To examine cross-behavior generality, we applied the same explanatory model separately to each of the five component behaviors of the HEBI and found very similar results (tables available from the authors).

year in either one or both of the two samples, and neither group showed a significant increase in any health-enhancing behavior.⁴

To account for developmental change (the overall decline) in health-enhancing behavior over the 1-year interval, we examined the role of changes in protective and risk factors. Change in involvement in health-enhancing behavior was operationalized by entering the Wave-1 HEBI at Step 1 of a hierarchical regression analysis, with the Wave-2 HEBI as the criterion (not tabled; table available from the authors). This yields a Wave-2 HEBI criterion measure, the variance of which is unrelated to the Wave-1 HEBI, that is, a measure of change in the HEBI criterion over time (see Cohen & Cohen, 1983; Dalecki & Willits, 1991).

At Step 2 of the regression, sociodemographic background measures were entered. At Step 3, the Wave-1 individual-level protective and risk factor measures were entered, followed by their Wave-2 measures at Step 4. The Wave-1 and Wave-2 measures of social context protective factors were then entered at Steps 5 and 6, respectively. Wave-1 measures of the social context risk factors were entered at Step 7, followed by their Wave-2 measures at Step 8. The Wave-2 theoretical predictors, entered at Steps 4, 6, and 8, reflect variation in Wave-2 protection and risk that is unrelated to their Wave-1 protection and risk measures. Their regression coefficients represent the relation of change in protective and risk factors to change in the HEBI.

A significant proportion of variance in the Wave-2 HEBI (with Wave-1 HEBI controlled) was accounted for by change in the individual-level protective and risk factors at Step 4 (7% U.S. sample, 6% China sample, $p < .001$) and by change in the social context protective factors at Step 6 (6% and 5%, $p < .001$). Very little additional variance (0.5% in both samples, nonsignificant) was accounted for by change in the social context risk factors at Step 8. In both country samples, 4% of the variance in change in health-enhancing behavior was uniquely accounted for by change in the protective factors when they were entered after the risk factors. When individual-level protection and risk measures were entered after the social context protection and risk measures, change in the individual-level measures accounted uniquely for 2% of variance ($p < .001$) in each sample, about half as much as the variance accounted for by change in the social context measures.

To examine the generality of this analysis of change across sexes and grade cohorts, we tested the interactions of sex and the interactions of cohort with all of the Wave-2 social context protective and risk factors in each sample. Neither set of interactions provided a significant ($p < .05$) increment in the squared multiple correlation in either sample. Thus, there is no evidence that the explanation of change differs across sexes or grade cohorts.

⁴Theoretically, the decline in health-enhancing behavior should be paralleled by declines in protective factors, increases in risk factors, or both. Paired-sample *t* tests within each sex group in each country sample (not tabled; tables available from the authors) showed that, in both samples, an erosion in health-enhancing behavior over time was, indeed, paralleled by erosion in social context protective factors and, to a lesser extent, an increase in social context risk factors.

Consistent with the cross-sectional findings, the key social context protective factors in these longitudinal analyses were change in Models Protection—Family, change in Models Protection—Peers, change in Controls Protection—Family (U.S. sample only), and change in Support Protection—Neighborhood (U.S. sample only). Additional significant context protective factors were change in Support Protection—Family, change in Controls Protection—Peers (China sample only), and change in Support Protection—Peers (China sample only). The significant social context risk factors in the U.S. sample were change in Models Risk—Family and change in Vulnerability Risk—Family; in the China sample, change in Models Risk—Peers was significant. In sum, these results show that change in individual-level protective and risk factors and in social context protective factors accounts for significant variation in change in health-enhancing behavior over time in these adolescent samples.

Discussion

The key conclusions of the present study are that a differentiated model of psychosocial protection and risk accounts for substantial variation in adolescent involvement in health-enhancing behavior and that protection and risk in the social context of everyday adolescent life play an especially important role. Protective and risk factors assessed across the family, peer, school, and neighborhood contexts add a substantial increment to the account of variation in involvement in health-enhancing behaviors beyond that provided by individual-level protection and risk and by sociodemographic background. Further, and importantly, social context protection was shown to moderate social context risk and individual-level risk. Changes in those same social context protective and risk factor measures over a year-long interval were also shown to add significantly and uniquely to the explanation of developmental change (decline) in adolescent health-enhancing behavior involvement.

The articulation of both protection and risk in adolescent social contexts and of three types of protection—models, controls, and supports—and three kinds of risk—models, opportunity, and vulnerability—revealed that protection accounted for more variation in involvement in health-enhancing behavior than did risk. In both the cross-sectional and the developmental analyses, social context protective factors contributed a considerably larger amount of unique variance than the social context risk factors. Additional analyses showed that the relative importance of protection versus risk also held at the individual level; individual-level protection contributed 3.5% unique variance in each sample, whereas individual risk contributed only 1%. These differentials may well reflect the differential adequacy of the measurement of protection and risk: several of the risk factor measures were single-item measures; two were indexes with low internal consistency, rather than scales of parallel items; the protective factor measures were generally more reliable; and it is possible that risk was simply not measured as well as protection in this study. However, the greater importance of protection is conceptually consistent with the

promotive role of protective factors when the behavioral criterion is positive or pro-social behavior. The findings also illuminate the kinds of protection and the kinds of risk that are most important in relation to adolescent involvement in health-enhancing behaviors. What emerges consistently from both the cross-sectional and the longitudinal analyses is the preeminent role of models protection, in both the family and the peer contexts. Although controls protection in those contexts is also significant in the final regression model, and in both country samples, its contribution is considerably weaker. From a social-psychological perspective, these findings suggest that engagement in health-enhancing behavior is more readily fostered by the modeling of such behavior by family and peers, rather than by their efforts to control engagement in health-compromising behavior. This conclusion is of particular interest in contrast with earlier findings about adolescent problem behavior that showed controls protection as substantially more influential—both directly and as moderators—than models protection (Jessor et al., 2003). Findings such as these attest to the propaedeutic importance of the articulation of protection and risk in the explanatory model.

The findings were strengthened by the multiple tests across two different data waves a year apart, across both sexes, across grade cohorts, across diverse health-enhancing behaviors, and in samples from two very different societies—the People's Republic of China and the United States—as well as by the demonstration of longitudinal and cross-sectional predictiveness. Both the consistency of the findings and the generality of the explanatory model are noteworthy.

The consonance of the present findings with the larger literature about the role of the social context (e.g., Cowell & Marks, 1997) is encouraging, especially because work in the health behavior field has tended to emphasize individual-level attributes. In our effort to establish the salience of social context variables in accounting for health-enhancing behavior involvement, we measured individual-level variables as well. Although the individual-level protection and individual-level risk measures were single measures, each was a composite of well-established subscales, and each had good alpha reliability. When entered into the hierarchical regression at Step 2 (see Table 28.1), they indeed accounted for a substantial increment in variance explained—26% in the U.S. sample and 19% in the China sample. However, when entered after the social context measures in additional regression analyses, the individual-level measures were shown to account for much less unique variance (6% and 5% in the United States and China, respectively) than the social context measures (12% and 14%, respectively). Although differential adequacy of measurement needs to be considered, these findings nevertheless strengthen the claim that social context variables are important and suggest that future research on adolescent health behavior would do well to give increased attention to the social context of adolescent life.

Beyond findings about the applicability and generality of the explanatory model, the descriptive findings about the various health behaviors, especially about their change over-time, are also of interest. As pointed out earlier, there was evidence of a decline in involvement in the various health-enhancing behaviors between Wave 1 and Wave 2. Evidence for this over-time decline was buttressed by cross-sectional

analyses that showed Wave-1 mean levels of involvement in health-enhancing behavior significantly lower in the older (9th-grade) cohort than in the younger (7th-grade) cohort, in both the U.S. and China samples and for both sexes. These findings are also similar to those previously reported for a different U.S. sample of adolescents (Jessor et al., 1998a), and together they suggest a developmental erosion of involvement in health-enhancing behavior during adolescence, now seen in a sample from China as well.

That erosion between Wave 1 and Wave 2 was shown to be predictable from changes in protective and risk factors over the same time interval. Changes in Models Protection—Family and Models Protection—Peers were, again, the most important predictors in both country samples. The possibility that declining involvement in health-enhancing behavior during adolescence is paralleled by the declining importance or impact of parental and peer models for such behavior is important to consider in thinking about efforts to promote healthy behavior. Efforts to sustain the importance of such models would be apposite, but it also may be that a different kind of protection, controls protection, becomes developmentally more important later on in adolescence and that efforts need to focus in that direction as well. Studies in the later segment of the adolescent life stage are obviously needed to clarify this issue.

The demonstration that protective factors can moderate the impact of exposure to risk on adolescent health-enhancing behavior is important and, to our knowledge, novel for a non-U.S. sample. The findings have obvious implications for those prevention and/or intervention efforts that have tended to emphasize risk reduction. What the present findings suggest is that attention to enhancing protective factors can increase their effectiveness because they actually play a dual role: promoting adolescent health behavior involvement and buffering the impact of exposure to risk factors.

Further with regard to prevention/intervention, the present findings call for a greater contextual-level focus, particularly on modeling processes in the family and peer contexts. Modeling health-enhancing behavior, for example, whether at home (e.g., parental healthy eating), at school (e.g., teachers' eating behavior in the cafeteria or their soft drink consumption), or in the media would seem an apposite effort. Changing informal social controls about health-compromising behavior and the opportunity structure to engage in it also gains support from the thrust of our contextual findings.

The generality of findings for societies as different as the United States and China is less remarkable than it may at first seem. At a descriptive level, the differences are wide-ranging—from economic system, to cultural tradition, to food preferences. Indeed, in regard to the various health behaviors themselves, there were differences in mean level of involvement between the two country samples. However, the present study was undertaken at a theoretical rather than a descriptive level, and it would be strange if a special theory were needed for each descriptively different country, any more than for different ethnic or sex subgroups within a given country. What the findings suggest is that the underlying processes determining

adolescent involvement in health-enhancing behavior have a degree of commonality in both societies.

The inferences that can be drawn from the present results are constrained by the study's limitations. First, as pointed out in the Method section earlier, our samples were drawn from local, urban, school-based settings in each country, and they do not represent either China or the United States as nations. The data are appropriate only for inferences about the samples assessed and the urban, school-based populations they may represent.

A second limitation is that, despite the care taken with the translation process and favorable reviews of the translation by native Chinese scholars fluent in English, some of the measures could still have different meanings for the Chinese and the U.S. adolescent respondents. The congruent pattern of explanatory findings in both country samples, and for both sexes in the present analyses, is a source of reassurance about meaning equivalence (see Jessor et al., 2003, for further discussion of this issue).

A third limitation is that measures of both the predictor and criterion variables are based on self-reports, and the obtained relationships could have been influenced by common method variance. However, tests of the validity of self-report data about health behaviors have generally indicated that self-reports are reliable and valid indicators in adolescent samples (see, e.g., Booth, Okely, Chey, & Bauman, 2001, 2002; Prochaska, Sallis, & Rupp, 2001; Sirard & Pate, 2001; Smith et al., 2001; Wolfson et al., 2003). Furthermore, we were able to compare participants' self-reports of their perceived social contexts with independent reports of those same social contexts obtained from the parents of a subsample of the adolescent participants (see Jessor et al., 2003). Those comparisons revealed a significant degree of consistency, with most correlations in the range of .15 to .34, providing some indication of the external validity of the self-reported perceptions of social contexts.

Despite these limitations on the inferences that can be drawn from the present findings, it should be noted that the results are consistent across two waves, both sexes, three grade cohorts, multiple behaviors, and in two samples from very different countries. The study has provided support for the usefulness of the protection-risk explanatory model and added to its generality in accounting for adolescent involvement in health-enhancing behavior. A greater focus on the delineation and assessment of social context protective factors in future research on adolescent health behavior, especially in regard to the role of family and peer models, should enhance understanding and contribute to the design of more effective initiatives to promote adolescent health behavior.

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Chapter 29

Explaining Developmental Change in Health Behavior in US and Chinese Adolescents

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This chapter seeks to advance understanding of the psychosocial and behavioral protective and risk factors associated with developmental change in healthy eating and regular exercise behaviors in adolescent samples from two very diverse societies, the People's Republic of China and the United States. Achieving a better grasp on adolescent dietary and exercise behaviors has gained greater urgency because of what is now commonly known as an “obesity epidemic,” not only in the United States but in other industrialized countries and in developing countries as well (Centers for Disease Control [CDC], 2004; Wadden, Brownell, & Foster, 2002; World Health Organization, 2002). There have been dramatic increases in the prevalence of overweight among children and adolescents (Kohn & Booth, 2004; Kohn et al., 2006; Lytle, 2002; Ogden, Flegal, Carroll, & Johnson, 2002). Between 1976–1980 and 2003–2004, the percentage of overweight adolescents (aged 12–19) tripled (CDC, 2007); 17% of young people aged 12–19 in this country were overweight in 2003–2004 (CDC, 2007). Furthermore, overweight adolescents stand a 70–80% chance of becoming overweight adults (Dietz, 2004; U.S. Surgeon General, 2003).

It is largely variation in behavior—in dietary patterns and in physical activity—that is associated with observed differences in overweight and obesity. Higher levels of caloric and fat intake and lower levels of physical activity (and/or higher levels of inactivity) have been shown to be positively associated with overweight/obesity among adolescents (e.g., Berkey et al., 2000; Crespo et al., 2001; Giammattei, Blix, Marshak, Wollitzer, & Pettitt, 2003). In addition, data indicate that adolescents' involvement in various health-enhancing behaviors, including healthy eating and

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physical exercise, tends to decline as adolescents age (Duncan, Duncan, Strycker, & Chaumeton, 2007; Harris, King, & Gordon-Larson, 2005; Jessor, Turbin, & Costa, 1998; Pate et al., 2009; Turbin et al., 2006).

Only a few studies have examined psychosocial and behavioral factors associated with developmental change in adolescent health-enhancing behaviors. Longitudinal studies of small samples of adolescent girls and boys indicate that changes in exercise-specific social contextual factors (e.g., social support and models for exercise) are associated with change in physical activity (DiLorenzo, Stucky-Ropp, Vander Wal, & Gotham, 1998; Duncan et al., 2007; Motl et al., 2005; Neumark-Sztainer, Story, Hannan, Tharp, & Rex, 2003). Our own earlier work has shown that antecedent psychosocial protective and risk factors are associated with subsequent development of health-enhancing behavior in adolescence (Jessor et al., 1998), and that changes in social contextual protective and risk factors are associated with a 1-year developmental decline in adolescent involvement in health-enhancing behavior (Turbin et al., 2006).

Unlike theoretical approaches that have focused on predominantly *proximal* influences on health behavior, that is, influences that directly and obviously implicate or reference those behaviors (Ajzen, 1985; Bandura, 1986; Fishbein et al., 2001; Rosenstock, Strecher, & Becker, 1994), the framework used in the present study also examines *distal* influences, that is, those that do not directly or obviously implicate the health-related behaviors and that are linked to those behaviors only theoretically. Examples of proximal influences on health-related behavior include self-efficacy for healthy eating or for physical activity; intention to eat a healthful diet or to exercise; and social models for eating healthy/unhealthy foods or for exercise (Salovey, Rothman, & Rodin, 1998). Examples of distal influences include religiosity, sense of self-worth, school achievement, and family closeness, among others (see Jessor & Jessor, 1977).

Earlier theory-based work that included both proximal and distal protective and risk factors showed that distal psychosocial factors accounted for unique variation in adolescent health behavior, as well as in developmental change in that behavior over time (Donovan, Jessor, & Costa, 1991; Jessor et al., 1998; Turbin et al., 2006). That is, conceptually distal protective and risk factors remained significant correlates of health behavior in adolescence, even after the effects of the proximal factors had been accounted for (see Turbin et al., 2006).

The explanatory model used in the present study articulates protective and risk factors in multiple conceptual domains: those that are distal and proximal; those that are psychosocial and behavioral; and those at the individual level as well as at the social contextual level. Protective factors are variables that promote positive, prosocial, or health-enhancing behavior. Risk factors, on the other hand, are variables that instigate problem or risk behaviors or behaviors that are health compromising. Although there is considerable questioning in the literature about the relation between protective factors and risk factors, our theoretical framework posits them as orthogonal (see Jessor, Van Den Bos, Vanderryn, Costa, & Turbin, 1995). That is, to take the protective factor of religiosity as one example, whereas high religiosity is theoretically promotive/protective, low religiosity is considered simply as low

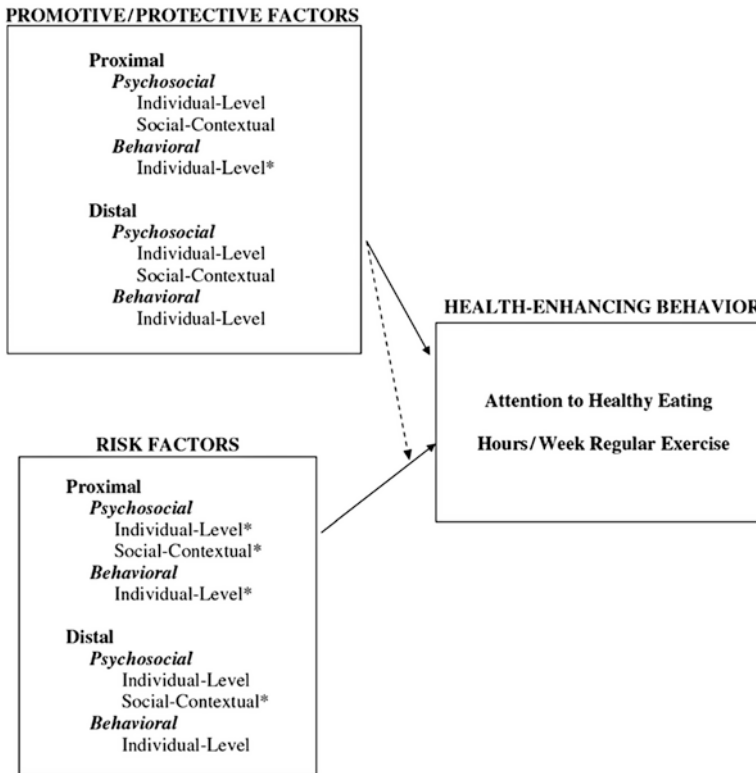


Fig. 29.1 Protective and risk factor conceptual framework (*Variables not assessed in this study)

protection rather than as a risk factor, because low religiosity does not, theoretically, instigate problem or health-compromising behavior. In short, low protection simply does not, theoretically, imply high risk. Both protection and risk factors are specified only by their theoretical properties, not by their opposite positions on a particular dimension.

The content of the present explanatory model was derived from the constructs of Problem Behavior Theory (Jessor, 1984; Jessor, Donovan, & Costa, 1991; Jessor & Jessor, 1977), including its more recent extension to adolescent behaviors in other domains (Jessor et al., 1995, 1998). Both psychosocial protective factors and psychosocial risk factors have been articulated. In addition, *other behaviors* have been specified theoretically as either protective factors, for example, attendance at religious services, or risk factors, for example, problem drinking.

The conceptual structure of the explanatory framework is shown in Fig. 29.1. As can be seen, the differentiated sets of promotive/protective factors and of risk factors have direct relationships with the two health-enhancing criterion behavior measures, attention to healthy eating and hours per week of regular exercise. Because the theoretical framework also posits a moderating effect of protection on the

impact of exposure to risk (see Jessor et al., 1995), that is illustrated by the dotted arrow between the protective factors and the arrow representing the effects of the risk factors on health-enhancing behaviors. The actual measures of the differentiated protective and risk factors used in the present study reflect considerable prior research in which their validity and predictability have been established. As will be seen in Table 29.1 below, however, not all of the measures needed to assess the various categories of risk factors were available in the present data set, and the asterisks in Fig. 29.1 indicate the missing measurement domains.

The general hypothesis of the study is that variation in protection and risk can provide a significant account of variation in adolescent health-enhancing behavior as well as in its developmental change from early to mid-adolescence. Further, because the account is at the theoretical or underlying or causal level, rather than at the descriptive level, it should have generality across adolescent samples from even so widely differing societal contexts as those of the People's Republic of China and the United States (see Jessor, 2008).

Method

Participants

The data in this paper are from two waves—2 years apart—of a questionnaire survey of adolescents in Beijing, China, and in a large urban area in the Rocky Mountain region of the United States. At the first wave, the participants were in early adolescence, ranging in age from 13 to 15; at the second wave, they were in mid-adolescence, age 15–17. In each country, the sample was drawn from schools chosen in consultation with the school district administration to best represent variation in the socioeconomic backgrounds of the students and, in the United States, to reflect the racial/ethnic composition of students in the district. In Beijing, seven junior high schools (grades 7, 8, and 9) were selected from two districts—one within the city and the other in the suburbs—and, in each district, schools known to vary in educational quality were selected. In the United States, six middle schools (for grades 7 and 8) and three high schools (for grade 9) were selected. In each school, classrooms were randomly sampled within grade for participation in the study.¹

In both research sites, research staff administered the questionnaire in large groups at school, with teachers absent. Active parental permission and personal assent were required, and confidentiality was explained and guaranteed by a Confidentiality Certificate from the U.S. Department of Health and Human Services.

¹ To address the possible nonindependence of observations on the criterion measure within schools and the possible need for hierarchical linear modeling, we computed the intraclass correlations of all the criterion measures within schools. They ranged from .00 to .05, and all had 95% confidence intervals (adjusted for unequal cluster sizes) that included zero, so they were deemed negligible, and the students' responses were treated as independent observations.

Table 29.1 Description of Measures

Measure	# of Items	Cronbach's α		Example Item	
		United States	China	Question	Response Scale
Health-enhancing behavior					
Attention to healthy eating	5	.87	.85	Do you pay attention to eating some fresh vegetables every day?	1 (<i>none</i>), 2 (<i>some</i>), 3 (<i>a lot</i>)
Hours per week of regular exercise	3	.63	.71	About how many hours do you usually spend each week taking part in an organized sport or recreation program (like soccer or karate)?	1 (<i>none</i>), to 6 (8 or more hours a week)
Psychosocial protection: proximal-individual					
Value on health	5	.88	.73	How important is it to you to keep yourself in good health all year round?	1 (<i>not too important</i>) to 4 (<i>very important</i>)
Perceived effects of unhealthy diet	2	.72	.78	Do you think eating a lot of "junk food" can have an effect on the health of young people your age?	1 (<i>almost not effect</i>) to 4 (<i>very serious effect</i>)
Perceived effects of insufficient exercise	1	–	–	Do you think not getting enough exercise can have an effect on the health of young people your age?	1 (<i>almost not effect</i>) to 4 (<i>very serious effect</i>)
Psychosocial protection: proximal-contextual					
Models for healthy diet	3	.52	.59	Do your parents (or the adults you live with) pay attention to eating a healthy diet themselves?	1 (<i>almost no attention</i>) to 3 (<i>a lot of attention</i>)
Models for adequate exercise	3	.56	.62	How many of your friends make sure they get enough exercise?	1 (<i>none</i>) to 4 (<i>all of them</i>)
Friends controls for unhealthy behavior	1	–	–	If you were doing something that is bad for your health, would your friends try to get you to stop?	1 (<i>definitely would not</i>) to 4 (<i>definitely would</i>)
Psychosocial protection: distal-individual					
Intolerance of deviance	10	.90	.94	How wrong do you think it is to shoplift from a store?	1 (<i>not wrong</i>) to 4 (<i>very wrong</i>)
Attitude toward school	4	.80	.82	I am learning a lot from being in school	1 (<i>strongly disagree</i>) to 4 (<i>strongly agree</i>)

(continued)

Table 29.1 (continued)

Measure	# of Items	Cronbach's α		Example Item	
		United States	China	Question	Response Scale
Psychosocial protection: distal-contextual					
Models for conventionality	8	.72	.78	How many of your friends do volunteer work in the community?	1 (<i>none</i>) to 4 (<i>all of them</i>)
Friends controls for unconventionality	3	.79	.72	If you were going to do something that is against the law, would your friends try to talk you out of it?	1 (<i>definitely would not</i>) to 4 (<i>definitely would</i>)
Behavior protection: distal-individual					
Multiple prosocial behavior index (MPSBI)	13 ^a	.46 ^b	.33 ^b	How many times have you gone to church or religious or spiritual services during the past 6 months?	1 (<i>none</i>) to 6 (<i>once a week or more</i>)
Psychosocial risk: distal-individual					
Depressive mood	4	.86	.85	In the past 6 months, have you just felt really down about things?	1 (<i>not at all</i>) to 4 (<i>a lot</i>)
Felt stress	3	.76	.70	In the past 6 months, how much stress or pressure have you felt at home?	1 (<i>none at all</i>) to 4 (<i>a lot</i>)
Low self-esteem	6	.65	.66	On the whole, how satisfied are you with yourself?	1 (<i>very satisfied</i>) to 4 (<i>not satisfied at all</i>)
Low expectations	9	.90	.87	What are the chances that you will have a job that pays well?	1 (<i>very high</i>) to 5 (<i>very low</i>)
Behavioral risk: distal-individual					
Multiple problem behavior index (MPBI)	20 ^c	.61 ^b	.49 ^b	During the past 6 months, how often have you hit another student because you did not like what he or she did?	1 (<i>never</i>) to 5 (<i>or more times</i>)

^aThe MPSBI is the sum of z-scores on four components—usual grades, school and community activities, family activities, and attending religious services; each comprised from 1 to 6 items

^bTwo-year stability coefficients are given in place of Cronbach's α for the behavior indexes, because α is not appropriate for an index

^cThe MPBI is the sum of *T*-scores on three components—delinquent behavior, cigarette smoking, and problem drinking; each comprises from 2 to 10 items

Each student received a token payment for filling out the questionnaire, in the United States, \$5 at Wave 1 and \$10 at Wave 2; in China, \$2 at each wave, plus a gift to each school.

At the first wave of data collection (Fall 2000), questionnaires were completed by 1,739 study participants from Beijing (98% of the designated sample; 883 boys, 856 girls) and by 1,596 participants from the United States (74% of the designated sample; 753 boys, 843 girls). At the Wave-2 data collection (Fall 2002), questionnaires were completed by 2,533 of the original participants (1,392, 80% of the Wave-1 China sample; 1,141, 71% of the Wave-1 U.S. sample). The 2002 data have not hitherto been reported. More details regarding composition of the samples were reported in Jessor et al., (2003).

Measures

A 36-page Adolescent Health and Development Questionnaire (AHDQ) was used to assess a broad range of risk behaviors and protective (positive, prosocial) behaviors, as well as psychosocial protective and risk factors in five domains: the individual (including personal beliefs, values, attitudes, and expectations), and four key social contexts—family, peer group, school, and neighborhood/community. The AHDQ had been developed over the past several decades, with its content theoretically derived from the constructs in Problem Behavior Theory. It was translated into Chinese and back translated twice by bilingual Chinese scholars to insure that *meaning equivalence* (Knight & Hill, 1998) had actually been achieved (see Jessor et al., 2003).

Measurement of attention to healthy eating and hours/week regular exercise behaviors. Measures of two health-enhancing behaviors relevant to adolescent overweight/obesity were included in the AHDQ: self-report of attention to eating a healthy diet and hours per week of regular exercise; both are shown in Table 29.1. The full AHDQ can be found at http://www.colorado.edu/ibs/jessor/questionnaires/questionnaire_ahdq3.pdf

Measurement of protective factors and risk factors. Measures of protection and risk were based on the theoretical properties described earlier; comprehensive descriptions of their rationale as indicators of protection and risk are presented elsewhere (Costa et al., 2005; Jessor et al., 2003; Turbin et al., 2006). A description of each measure is presented in Table 29.1. Protective factors and risk factors were assessed by multiple items for the most part, and scores for each measure were computed as averages of equally weighted items. For the social-contextual measures, the adolescent respondent characterized protection and risk as perceived in the social settings navigated in his/her everyday life. Thus, all of the social context measures in the AHDQ are *perceived* context measures.

Wave-2 reliabilities of the protective- and risk-factor measures are, for the most part, quite similar between the two country samples and were in the range of .52–.90. Stability coefficients were mostly in the .30s and .40s, showing considerable stability over a 2-year period for the two health-enhancing behavior criterion measures and for the protection and risk predictors.

Correlations among the protective factor measures are mostly in the .20s; correlations among the risk-factor measures are mostly in the .20s or smaller. Correlations between the protective factors and the risk factors were mostly negative, as expected, and mostly smaller than .20 in absolute value. Overall, the correlations are of similar magnitude in the two country samples.

Results

Accounting for Variation in Attention to Healthy Eating and Hours Regular Exercise: Cross-Sectional Analyses

The theoretical model was applied cross-sectionally to each Wave-2 criterion measure before analyzing Wave-1 to Wave-2 developmental change in those measures. Sociodemographic background measures were included in each analysis to partial out effects of sex, grade in school, intactness of family (both biological parents living together at both waves), SES (father's job level and father's and mother's education at Wave 2), and ethnicity (U.S. only, White/non-White).

Regressing the attention to healthy eating criterion measure on the sets of protective and risk factors accounted for 29% of the variance in each country sample. Regression weights were significant in both samples for the proximal protective factors of value on health, perceived effects of unhealthy diet, and models for healthy diet, and for the distal protective factor, friends controls for unconventionality. Felt stress and the multiple prosocial behavior index (MPSBI) were also significant in the U.S. sample; attitude toward school, models for conventionality, and low expectations were also significant in the China sample (not tabled; tables are available from the authors).

The same analysis for the hours per week regular exercise measure accounted for 25% of the variance in the U.S. sample and 23% in the China sample. Significant regression weights were obtained, in both country samples, for the proximal protective factors of perceived effects of insufficient exercise and models for adequate exercise, for the distal protective factor of the MPSBI, and for the distal risk factor of low self-esteem. In the U.S. sample, an additional proximal protective factor, value on health, and an additional distal risk factor, depressive mood, were also significant.

Accounting for Developmental Change in Attention to Healthy Eating and Hours Regular Exercise Over Time: Longitudinal Analyses

Repeated-measures, multivariate analysis of variance within each country-by-sex subgroup revealed a significant decline over the 2-year interval in mean scores on the attention to healthy eating measure for both sexes in both country samples; in

addition, there was a significant decline on the hours regular exercise measure for both sexes in the China sample (not tabled; tables available from the authors). Thus, involvement in each criterion behavior declined over the 2-year interval in either one or both of the two country samples, and no group showed a significant increase on either behavior measure.

In order to provide a systematic account of change—largely decline—in healthy eating and regular exercise behavior, *changes in protective and risk factors* were used as predictors in a hierarchical regression analysis for each criterion measure in each country sample. Change in each behavioral criterion variable was operationalized by entering its Wave-1 measure at Step 1 of the regression analysis, with its Wave-2 measure as the dependent variable to be predicted (see Table 29.2). This procedure yields a Wave-2 criterion measure the variance of which is unrelated to the Wave-1 measure, that is, it provides a measure of *change* in the criterion measure between Wave 1 and Wave 2 (see Cohen & Cohen, 1983, pp. 414–423; Dalecki & Willits, 1991).

At Step 2 of each regression, the sociodemographic background measures were entered. At Step 3, all nine Wave-1 protective factor measures were entered, followed at Step 4 by the Wave-2 measures of those same nine variables.² The Wave-1 and Wave-2 measures of the five risk factors were then entered at Steps 5 and 6, respectively. Thus, the Wave-2 theoretical predictors, entered at Steps 4 and 6, reflect variation in the Wave-2 protective and risk factors that is unrelated to the variation in their respective Wave-1 measures. That is, they reflect variation in *change* in protection and risk, and their regression coefficients represent, therefore, the relation of *change* in the protective and risk factors to *change* in the two criterion measures.

As the Wave-2 bivariate correlations of the theoretical predictors with the two criterion measures indicate in Table 29.2, for nearly all the predictors, the expected positive relations between the protective factor measures and the health-enhancing behaviors and the expected negative relations between the risk-factor measures and the health-enhancing behaviors hold, although a few correlations are essentially zero, and the multiple problem behavior index has a positive correlation (.14) with hours regular exercise in the China sample.

A significant proportion of variance in change in each criterion variable was accounted for at Step 4 by change in the nine protection measures, as shown by the ΔR^2 in Table 29.2 (14% U.S. sample, 17% China sample for the attention to healthy eating criterion measure; 7% United State, 6% China for the hours regular exercise measure, all significant at $p < .001$). At Step 6, change in the five risk-factor measures added another significant increment in variance accounted for in change in the attention to healthy eating criterion variable in the China sample only (1%, $p < .001$)

²For each criterion measure, the proximal protective factor measures specific to the other criterion behavior were excluded from the analysis, that is, perceived health effects of inadequate exercise and models for adequate exercise were not included as predictors of attention to healthy eating, and perceived health effects of unhealthy diet and models for healthy diet were not included as predictors of hours regular exercise.

Table 29.2 Hierarchical Regression of Wave-1 to Wave-2 *Change* in Attention to Healthy Eating and in Hours Regular Exercise on Wave-1 to Wave-2 *Change* in Protective and Risk-Factor Measures, Final Model

		U.S. Sample (N = 894)				China Sample (N = 1,154)			
Steps and Measures Entered		r	β	ΔR ²	R ^{2a}	r	β	ΔR ²	R ^{2a}
Change in attention to healthy eating									
1	Wave-1 attention to healthy diet	.47	.34***	.22***	.22	.34	.22***	.11***	.11
2	Sociodemographic background			.01	.23			.01*	.12
	Sex	-.02	-.03			.01	.02		
	White/non-White	-.13	-.01			-	-		
	Grade in school	-.13	-.02			-.06	.03		
	Socioeconomic status	-.04	.06			.09	.03		
	Intact family	-.04	-.07*			-.02	-.04		
3	Wave-1 protective factors			.02*	.24			.03***	.15
4	Wave-2 protective factors			.14***	.39			.17***	.32
	Value on health	.37	.17***			.24	.06*		
	Perceived effects of unhealthy diet	.36	.20***			.37	.19***		
	Models for healthy diet	.38	.19***			.41	.22***		
	Friends control for unhealthy behavior	.18	-.07			.17	-.07		
	Intolerance of deviance	.25	.04			.17	.01		
	Attitude toward school	.24	.00			.29	.07**		
	Models for conventionality	.29	.01			.28	.06*		
	Friends controls for unconventionality	.21	.10*			.23	.09*		
	Multiple prosocial behavior index (MPSBI)	.19	.09**			.15	.04		
5	Wave-1 risk factors			.01*	.40			.01	.33
6	Wave-2 risk factors			.002	.40			.01***	.34
	Depressive mood	-.03	.00			-.06	-.02		
	Felt stress	-.10	-.02			.04	.05		
	Low self-esteem	-.14	.03			-.22	-.03		
	Low expectations	-.17	-.01			-.24	-.10***		
	Multiple problem behavior index (MPBI)	-.15	.05			-.14	-.05		

Change in hours/weeks regular exercise

1	Wave-1 regular exercise	.49	.38***	.24***	.24	.42	.29***	.18***	.18
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(continued)

Table 29.2 (continued)

		U.S. Sample (<i>N</i> = 894)				China Sample (<i>N</i> = 1,154)			
Steps and Measures Entered	<i>r</i>	β	ΔR^2	R^{2a}	<i>r</i>	β	ΔR^2	R^{2a}	
2 Sociodemographic background			.03***	.27			.04***	.22	
Sex	-.17	-.07*			-.30	-.18***			
White/non-White	.07	.02			-	-			
Grade in school	-.03	.00			.07	.04			
Socioeconomic status	.21	.04			.06	.01			
Intact family	.08	.04			.04	.06*			
3 Wave-1 protective factors			.02***	.29			.02**	.23	
4 Wave-2 protective factors			.07***	.35			.06***	.29	
Value on health	.25	.17***			.09	.04			
Perceived effects of insufficient exercise	.18	.02			.21	.07*			
Models for adequate exercise	.24	.05			.21	.06*			
Friends controls for unhealthy behavior	.04	-.03			.04	.04			
Intolerance of deviance	.04	-.02			-.02	.01			
Attitude toward school	.13	.03			.05	-.08			
Models for conventionality	.21	.01			.22	.07**			
Friends controls for unconventionality	.04	-.01			.05	.03			
MPSBI	.29	.13***			.20	.17***			
5 Wave-1 risk factors			.00	.35			.01	.30	
6 Wave-2 risk factors			.02***	.37			.02***	.32	
Depressive mood	-.19	-.09**			-.06	-.06*			
Felt stress	-.08	.00			-.06	-.05			
Low self-esteem	-.34	-.11**			-.27	-.10***			
Low expectations	-.22	-.01			-.09	.03			
MPBI	-.02	.06			.14	.10			

Note: All bivariate correlations with absolute magnitude greater than .05 are significant at $p \leq .05$ (one-tailed test). All R^2 are significant at $p < .001$

*One fourth of the variance in *change* in attention to healthy eating (the residual variance after Step 1) was accounted for (23% United States, 26% China) and one sixth of the variance in *change* in regular exercise was accounted for (17% in each sample; See text)

** $p \leq .05$; *** $p \leq .01$; **** $p \leq .001$

and in change in the hours regular exercise criterion variable in both samples (2% in each sample, $p < .001$).

Those last three percentages indicate the proportions of variance accounted for *uniquely* by change in the risk factors because they were entered in the last step, Step 6, of the hierarchical regressions, after all other predictors had already been entered. Because the protective and risk factors share common variance, supplementary regression analyses were carried out to establish the variance accounted for uniquely by change in the protective factors. In these supplementary analyses, the Wave-2 measures of protective factors were now entered at the last step of the regression model, after all other protective- and risk-factor measures had been entered. This analysis showed that the protective factors accounted uniquely for 13% of variance in change in the attention to healthy eating measure in the U.S. sample and 12% in the China sample, both substantially more than the 1% or less accounted for uniquely by the risk factors, as indicated above. The protective factors accounted uniquely for 4% (United States) and 6% (China) of variance in change in the hours regular exercise measure, again more than the 2% accounted for uniquely by the risk factors.

Because the residual variance in each Wave-2 criterion measure ($1 - R^2$) after the Step 1 entry of its Wave-1 measure is not related to the variance in its Wave-1 measure, it can be considered *the total variance in change* in that criterion measure to be accounted for. Increments in R^2 at subsequent steps of the regression should, therefore, be divided by that residual variance in order to represent appropriately the proportion of variance accounted for in change in the criterion variable. Thus, the variance accounted for in change in attention to healthy eating is the total increase in R^2 after Step 1 (.18) divided by $(1 - .22)$, or 23%, in the U.S. sample and $.23/(1 - .11)$, or 26%, in the China sample. This is a substantial account, about a quarter of the variance in developmental change in attention to healthy diet, and it has generality across both country samples. Similarly, the total variance accounted for in change in hours regular exercise is $.13/(1 - .24)$ in the U.S. sample, and $.14/(1 - .18)$ in the China sample, or 17% in each country sample, again substantial.

With respect to change in the criterion measure of attention to healthy eating, change in the protective factors of value on health, perceived effects of unhealthy diet, models for healthy diet, and friends controls for unconventionality were significant in both samples. Changes in the distal protective factors of attitude toward school and models for conventionality and in the distal risk factor of low expectations were also significant in the China sample; change in the distal protective factor, the MPSBI, was also significant in the U.S. sample.

In the regression analysis of change in the hours regular exercise criterion measure, changes in the distal protective factor, the MPSBI, and in the distal risk factors, depressive mood and low self-esteem, were significant in both samples. Change in value on health was also significant in the U.S. sample, and in the China sample, changes in perceived effects of insufficient exercise, in models for adequate exercise, and in models for conventionality were also significant.

Interactions of sex and of grade cohort with each of the 14 Wave-2 protective- and risk-factor measures were examined for each criterion measure in each country

sample. Adding the 14 sex interaction terms at the final step of each hierarchical regression model accounted for no significant increment in variance accounted for. Adding the 14 cohort interactions at the final step provided a significant ($p < .05$) increment in the R^2 for change in the attention to healthy eating measure in the U.S. sample and showed that depressive mood was a significant risk factor only for the youngest grade cohort in that sample. The cohort interactions also provided a significant ($p < .05$) increment in the R^2 for change in the hours regular exercise measure in the China sample and showed that value on health and models for adequate exercise were significant protective factors only for the youngest cohort in that sample. All together, then, there was no significant sex interaction for either measure in either sample, and only 3 of the 56 cohort interaction terms tested in the four regression analyses of change were significant. Thus, these results suggest that the explanatory model of developmental change in health-enhancing behavior has generality across both sexes and, for the most part, across the three grade/age cohorts.

Testing for moderator effects of protection on the impact of exposure to risk yielded no significant interactions for either criterion measure in either country sample.

The key proximal, psychosocial protective factors in these longitudinal analyses, for both country samples, were at the individual level (changes in value on health and in perceived effects of unhealthy diet) and at the contextual level (changes in models for healthy diet). Key distal measures included individual-level psychosocial risk (depressive mood and low self-esteem), contextual-level psychosocial protection (friends controls for unconventionality), and individual-level, behavioral protection (the MPSBI). Five additional psychosocial protective and risk factors, both individual and contextual and both proximal and distal, were significant for the China sample: changes in perceived effects of insufficient exercise, in attitude toward school, in low expectations, in models for adequate exercise, and in models for conventionality.

In summary, the application of a theory-derived, systematic approach to developmental change in adolescent health-enhancing behavior yielded a significant account based on changes in proximal and distal psychosocial and behavioral protective and risk factors. There is considerable generality of the developmental account across the two health-enhancing behaviors, across sex and grade cohort, and, of especial importance, across adolescent samples from two such different societies.

Discussion

The social-psychological explanatory framework employed in the present study has been helpful in advancing understanding of variation in adolescent health-enhancing behaviors. A substantial account of that variation—both cross-sectional and developmental—was provided by a systematic set of protective- and risk-factor measures, and the account was shown to have considerable generality across samples from the People's Republic of China and the United States. The articulation, in the

explanatory framework, of protective and risk factors that are psychosocial and behavioral, proximal and distal, and at both the individual and social-contextual level has provided a more differentiated and more comprehensive account of adolescent health behavior.

In both the cross-sectional and the longitudinal analyses, the proximal, individual-level protection measures of value on health and of perceived effects of unhealthy diet were important in both country samples; the proximal, social contextual protection measures of models for healthy diet and adequate exercise were also important. These findings are consistent with much other research; because the measures are proximal, such findings are not surprising. Of greater interest, theoretically, are the findings for the distal measures: the distal contextual protection measure of models for conventionality was significant in the China sample, and friends controls for unconventionality was important in both country samples; the distal, individual-level risk measure of low self-esteem was important in both countries; and the distal, individual-level index of prosocial behavior, a protection measure, was also important in both country samples. These findings for the distal measures strengthen the claim for their explanatory role in accounting for variation in adolescent health-enhancing behavior.

The important role that the MPSBI played in the account of both criterion behavior measures warrants special comment. What it makes apparent is that health-enhancing behaviors are not an isolated or unique aspect of an adolescent's repertoire; rather, those behaviors are significantly associated with other behaviors, namely, prosocial behaviors, including achieving academically in school, spending time doing things with family, taking part in school and community activities, and attending religious services. These findings suggest that health-enhancing behaviors are part of a larger adolescent lifestyle, one that reflects a generalized conventional orientation. That characterization of the larger lifestyle is supported by the significant regression coefficients for the measures of models for conventionality (China only) and of friends controls for unconventionality in both country samples when the criterion measure was attention to healthy eating.

Several of the distal, individual-level psychosocial risk measures, measures of psychosocial vulnerability in the explanatory framework—depressive mood, felt stress, low self-esteem, low expectations—had significant regression weights in Table 29.2 for one or both criterion measures in one or both of the country samples. Psychosocial vulnerability, especially as reflected here in depressive mood and low self-esteem, seems important to consider as a correlate of or influence on health-enhancing behavior in both societies and for both sexes.

In light of the conceptual differentiation of protective and risk factors relied upon in this research, it was of interest to examine their relative contributions to the explanatory account. The set of protective factors accounted for a considerably larger portion of unique variance than did the set of risk factors in both country samples. While this finding undoubtedly reflects, at least in part, the larger number of protective-factor predictors, it is also consonant with our earlier findings that protection matters more than risk when the criterion is a positive or prosocial behavior, a reflection of its promotive property.

The availability of data on adolescents from a society as different from the United States as the People's Republic of China is provided a rare opportunity to examine the reach or generality of the explanatory framework. Beyond such societal-level differences as, for example, the one-child family policy in China, its socialist economic system, its status as a developing country, etc., there were also mean differences in prevalence of the two criterion measures, attention to healthy eating (China higher) and regular exercise (U.S. girls higher than girls in China). Such differences permitted a rather stringent test of the generality of the explanatory framework; notwithstanding such differences, the explanatory model proved to be apposite for both country samples. The amount of variance accounted for by the protective factors and risk factors in both country samples was similar; perhaps more important, the pattern of significant regression coefficients was similar for both country samples, with some exceptions as noted above. Within-country generality was also established across sex and grade cohorts by the lack of significant interactions of the predictors with either of those attributes. Such findings make clear that, while differences may obtain between groups on background measures and in mean levels or prevalence, those differences are merely *descriptive*. Despite such descriptive, "surface" differences, the same explanatory model may apply equally well at the analytic, underlying, or "causal" level of analysis (Jessor, 2008).

The finding that most of the same protective and risk measures that explained cross-sectional variation in health-related behaviors were also the predictors that accounted for developmental change (largely decline) in those behaviors is noteworthy. Change in those predictors over the 2-year interval was shown to be associated with change in both criterion measures, at least at this stage of the developmental trajectory when the cohorts were moving from early adolescence (13–15) to mid-adolescence (15–17). Whether that would apply to a later stage of developmental change awaits further research. For this developmental stage, however, the identification of attributes, change in which is associated with change in health-related behaviors, is information that has relevance for the design of intervention efforts to promote healthy behavior.

There are, obviously, shortcomings in the present research that limit the inferences that can be drawn as well as constrain the applicability of the findings. Foremost at the explanatory level is the fact that the model that was operationalized was somewhat truncated. Psychosocial risk was not as exhaustively assessed in the regression model as was psychosocial protection, and it is difficult to estimate how different the outcome would be either in magnitude or pattern of the explanatory account had those measures been included. The fact that all of the measures of protection and risk are based on self-report is another obvious limitation, especially for the social context measures that derived from the adolescent being placed in the role of quasi-ethnographer. Some reassurance in this regard stems from the literature on self-report of dietary behavior and physical activity indicating that self-reports are a reliable and valid indicator of those behaviors (Berkey et al., 2000; Booth, Okely, Chey, & Bauman, 2001, 2002; Pate et al., 2009; Prochaska, Sallis, & Rupp, 2001; Rockett & Colditz, 1997; Sallis & Saelens, 2000). In addition, the evidence in this study that the adolescent reports about the social context added unique variance to

the explanatory account earns them an added degree of credibility. Finally, the inability to establish moderator effects of protection on risk, that is, protection-by-risk interactions, in the present study is a departure from previous findings with both problem and health behaviors. It may be due to the limited assessment of risk factors; it may be due to the employment of somewhat different protection and risk measures in the current analyses; it may be due to the use, for the first time, of the later wave of adolescent data, Wave 2, when the adolescents were older, having reached mid-adolescence; or it may be due to inclusion, for the first time, of measures of behavioral protection and risk in the predictor set.

These limitations notwithstanding, the findings in the present study have enlarged understanding of adolescent involvement in health-enhancing behavior. They have identified some of the key psychosocial and behavioral variables in the adolescent and in the adolescent's social context that are associated with involvement in health-enhancing behavior, and they have provided an account of the development of such behaviors across the early- to-mid-adolescent life stage. Such findings constitute the contribution of theory-guided inquiry about adolescent health-related behavior.

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