Chapter 6
Problem Behavior Theory and the Problem Behavior Syndrome

John E. Donovan and Richard Jessor

The primary concern of the present studies was the structure or organization of the interrelations among various self-reported adolescent problem behaviors such as illicit drug use, problem drinking, delinquent behavior, and precocious sexual intercourse. The present studies also explored the generality of the syndrome of problem behavior that was found.

Problem behavior has been defined as "behavior that is socially defined as a problem, a source of concern, or as undesirable by the norms of conventional society . . . and its occurrence usually elicits some kind of social control response" (Jessor & Jessor, 1977, p. 33). According to this definition, a variety of different adolescent behaviors can be considered problem behaviors, including alcohol use, cigarette smoking, marijuana use, use of other illicit drugs, delinquent behavior, and precocious sexual intercourse.

There is considerable evidence that all of these different behaviors are associated in samples of adolescents from the normal population. The relations among these behaviors have been replicated in several independent nationwide samples of American adolescents as well as in numerous local community surveys, using a

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J.E. Donovan,
University of Pittsburgh, School of Medicine, Pittsburgh, USA

R. Jessor (✉)
Institute of Behavioral Science, University of Colorado at Boulder, Boulder, CO, USA
e-mail: jessor@Colorado.edu

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variety of self-report measures.[1] Most of these studies have examined only the bivariate relations among these behaviors, however, so little is actually known concerning the structure or organization underlying the obtained correlations.

The Jessor and Jessor research on Problem Behavior Theory (1977) suggested that drinking, problem drinking, marijuana use, delinquent behavior, and sexual intercourse may well constitute a "syndrome" of problem behavior in adolescence. Support for this syndrome notion emerged from the Jessors' analyses of data from two parallel longitudinal studies: one of junior high school students and one of college students. First, all of the problem behaviors were found to be positively associated in both samples; second, a composite index of multiple problem behaviors, encompassing all of the behaviors, correlated in the negative direction with measures of conforming or conventional behaviors, such as attendance at religious services and school performance; and third, the various problem behaviors correlated in a similar fashion with a number of personality and social environment variables that reflect unconventionality in the social-psychological framework of Problem Behavior Theory (Jessor & Jessor, 1977).

On the basis of these findings, it was suggested that the relations among the various problem behaviors were due to an underlying construct or latent variable of unconventionality in adolescence. Thus far, however, no analytic technique more rigorous than bivariate correlation has been used to test this proposition. The primary aim of the present studies, then, was to reanalyze the Jessor and Jessor (1977) data from their samples of high school and college-age youth to test more conclusively than before the hypothesis that the various problem behaviors reflect a single underlying common factor. To the extent that maximum likelihood factor analytic

[1] Alcohol use, cigarette smoking, marijuana use, and the use of other illicit drugs have been shown to be correlated among adolescents; that is, teenagers who are heavily involved with one of these drugs tend to be involved with others as well (Bachman, O'Malley, & Johnston, 1980; Block & Goodman, 1978; Hindelang, 1971; Huba, Wingard, & Bentler 1981; Hundleby, 1979; Istvan & Matarazzo, 1984; Jessor, Donovan, & Widmer, 1980; Jessor & Jessor, 1977; Johnson, 1973; Johnston, 1973; Miller et al., 1983; Single, Kandel, & Faust, 1974; Weitman, Scheble, Johnson, & Abbey, 1972; Zucker & Barron, 1973; Zucker & Devoe, 1975).

Marijuana use and other illicit drug use have also been found to correlate with problem drinking, a particular pattern of alcohol use that is characterized by frequent drunkenness and negative personal and social consequences (Donovan & Jessor, 1978; Jessor, Chase, & Donovan, 1980; Jessor, Donovan, & Widmer, 1980; Jessor & Jessor, 1977; Prendergast & Schaefer, 1974; Wechsler, 1976; Wechsler & Thum, 1973; Zucker & Barron, 1973; Zucker & Devoe, 1975).

Alcohol use, problem drinking, cigarette smoking, and illicit drug use also correlate with involvement in self-reported delinquent behavior (Donovan & Jessor, 1978; Hindelang, 1971; Hitachi 1969; Hundleby, 1979; Jessor, Donovan, & Widmer, 1980; Jessor & Jessor, 1977; Zucker & Barron, 1973; Zucker & Devoe, 1975) and with precocious involvement in sexual intercourse (Hundleby, 1979; Jessor & Jessor, 1977; Zucker & Barron, 1973; Zucker & Devoe, 1975).

Only a few of the studies have been concerned with the structure underlying the observed correlations. Their attention has been limited, however, to alcohol and drug use behavior (Hays, Widaman, DiMatteo, & Stacy, 1987; Huba, 1983; Huba & Bentler, 1979, 1982; Huba, Wingard, & Bentler, 1981). Delinquent or deviant behavior and precocious sexual intercourse have not been included in those analyses.

methods confirm that the relations among diverse problem behaviors do indeed reflect a single common factor, this would provide more compelling support for the notion of a syndrome of problem behavior in adolescence.

Beyond this primary objective were two further objectives for the present investigation. The second objective was to determine the generality of the factor-analytic results across adolescent samples. It is conceivable that the factor structure characterizing the problem behaviors may be specific to the Jessors' largely middle-class Anglo sample. The generality of this single-factor model, therefore, was tested using data collected on a more heterogeneous sample of adolescents by the Research Triangle Institute as part of the 1978 National Study of Adolescent Drinking (Rachal et al., 1980). Previous analyses of these data (Jessor, Donovan, & Widmer, 1980) supported the bivariate findings reported earlier by Jessor and Jessor (1977).

The third objective of the present studies was to determine whether the syndrome notion has developmental generality and can be demonstrated in data from young adults. Relatively little research has focused on problem behavior at this older age level, and even less research has investigated the relations among more than two or three problem behaviors (e.g., Bachman, O'Malley, & Johnston, 1984; Gove, Geerken, & Hughes, 1979; Kandel, 1984; Mechanic & Cleary, 1980; O'Donnell, Voss, Clayton, Slatin, & Room, 1976). In the present examination of the underlying structure of relations among various problem behaviors in young adulthood, we analyzed data collected as part of a follow-up study of the high school and college-age samples who had previously participated in the Jessors' study as adolescents or youth (Donovan, Jessor, & Jessor, 1983; Jessor, 1983; Jessor, Costa, Jessor, & Donovan, 1983; Jessor & Jessor, 1984).

Study I

The primary aim of this investigation—to determine whether diverse problem behaviors constitute a syndrome among the adolescents and college-age youth in the Jessor and Jessor (1977) data—was addressed in Study I.

Method

Because both the adolescent data dealt with in Study I and the young adult data addressed in Study III derived from the same larger study, the overall design of that study is presented briefly here.

Overall design of the Jessors' longitudinal study. The larger study was a six-wave, longitudinal study of psychosocial development that followed two parallel panel samples from adolescence through young adulthood. The high school sample consisted of 384 young adults (163 men, 222 women) who had participated in all six waves of data collection from junior high school through young adulthood.

These participants were initially selected in 1969 as part of a random sample of 1126 students stratified by sex and grade who were drawn from three junior high schools in a single school district in a small city in Colorado. Of the 1126 students initially sampled, 589 (53 %) participated with parental permission in the first of four annual data collection waves, A total of 432 of them (188 men, 244 women) completed all four annual questionnaires between 1969, when they were in Grades 7 through 9, and 1972, when they were in Grades 10 through 12.[2] These 432 young people were recontacted in 1979, when they were between 23 and 25 years old, and were asked to resume participation in the study; 403 of them (94 %) returned completed questionnaires. In 1981, 384 of these young adults participated in the sixth wave of data collection, when they were between 25 and 27 years old.

The parallel college sample consisted of 184 young adults (84 men, 100 women) who had participated in all six waves of data collection from freshman year of college through age 30. These participants were initially selected in 1970 as part of a random sample of freshman students in the College of Arts and Sciences of a large university in the same city. Of the 462 students initially contacted, 276 (approximately 60 %) completed questionnaires in the spring of 1970, and a total of 205 (92 men, 113 women) participated in all four annual waves of data collection (1970 through 1973).[3] In 1979, the 205 former participants, then approximately 28 years old, were recontacted, and 192 of them (94.1 %) returned completed questionnaires. In 1981, 184 of these young adults participated in the sixth wave of data collection, when they were around 30 years old.

Behavior measures. The questionnaires administered in all six data collections were about 50 pages long and consisted of a set of psychometric instruments developed to measure the personality, perceived environment, and behavior variables of Problem Behavior Theory (Jessor & Jessor, 1977). The measures of the behavior variables, all self-report, were generally very similar for both the high school and college sample questionnaires in all years.

The following problem behavior measures were examined in the data from the high school or college years: Times Drunk in the Past Year, a measure of the frequency with which a respondent had been drunk or "very, very high" on alcohol in

[2] In 1972, the fourth year of testing, 483 students completed questionnaires. This group comprised 82 % of the sample who participated in the first year of the study. Of these 483, 432 had taken the annual questionnaires in all 4 years. Comparisons on a variety of personality, social environment, and behavior measures assessed in 1969 showed that these 432 students were not different on most measures from those who participated in the research for fewer than 4 years (see Jessor & Jessor, 1977, pp. 46-47).

[3] A total of 226 young people participated in the fourth year of testing in 1973, when they were either seniors, transfer students, graduates, or college drop-outs. This group comprised 82 % of those who took the questionnaire in the first year of the study. Of these 226, 205 had completed all four annual questionnaires. Comparisons between this 4-year sample and those who participated only 1 or 2 years demonstrated that there were no real differences in conventionality between these groups in the 1970 data (see Jessor & Jessor, 1977, p. 51).

the past year, was used to represent problem drinking (range, 0–99)[4]; Frequency of Marijuana Use in the Past Six Months assessed how often a respondent had used marijuana or hashish in the designated time interval (range, 0–99); Frequency of Sexual Experience measured how often a respondent had engaged in sexual intercourse ("ever" for the high school sample; "in past year" for the college sample); General Deviant Behavior in the Past Year is a 26-item summative scale assessing how frequently in the past year a respondent had engaged in socially disapproved behaviors including shoplifting, vandalism, lying, truancy, fighting, parental defiance, and other behavior (range, 0–104; $\alpha = .8$).[5] For the most part, the measures focus on recent patterns of behavior rather than on "ever" experience.[6]

Conforming or conventional behavior was also included in certain of the analyses to provide a general test of the discriminant validity of the problem behavior measures and to serve as an anchor in the interpretation of the underlying common factor. Conventional behavior was represented in these analyses by the following two measures: Church Attendance Frequency in the Past Year, a measure of the number of times respondents attended religious services (range, 0–99); and School Performance, a self-report of grade point average (GPA; 0.0 to 4.0) for the previous semester (fall). These two conventional behavior measures were the only ones included in these analyses because they were the only measures in the category that were assessed in all of the high school and college questionnaires. The self-report measure of GPA was found to correlate .8 with GPA as recorded in school records. The four problem and two conventional behavior measures are described further in the Jessor and Jessor (1977) study.

Data analysis strategy. In both the adolescent and college data, the analyses were carried out separately on data from the third and fourth waves of data (referred to as Year 3 and Year 4, respectively) for each of four Sex by Sample groups (high school men and women and college men and women). Within each sample, the factor analyses were first carried out on the Year 4 data (1972 for the high school sample, 1973 for the college sample) and then replicated using the Year 3 data (1971 for the high school sample, 1972 for the college sample). Members of the youngest grade-cohort in the high school sample (60 men, 81 women) were dropped from the analyses because they had not been asked about sexual intercourse in Year 3. This is also the

[4] For these analyses, scores on the Times Drunk in the Past Year measure were recoded from blank to zero for abstainers and noncurrent drinkers. A similar strategy was also used for reported frequency of marijuana use. Adolescents who had never used marijuana or hashish or who had not used it in the past 6 months received scores of zero on the measure rather than a blank.

[5] The variety of behaviors in the General Deviant Behavior scale were dealt with as a summative scale rather than as separate items in the factor analyses because of the greater reliability of the scale and the restricted variances on the individual behavior items.

[6] Some of the behaviors occur so infrequently for most adolescents that standard short-term recall periods would result in scores with very low means. For this reason, Frequency of Marijuana Use asks about a shorter time period than do Times Drunk and General Deviant Behavior. The question on sexual intercourse was limited to reports of ever experiencing it because of the sensitivity of this question for the high school population.

reason why our factor analyses excluded the first and second waves of data. The factor analyses for the high school sample were therefore based on data from 102 men and 142 women; the factor analyses for the college sample were based on data from 84 men and 100 women.

In each factor analysis, the hypothesis was tested that a single common factor can account for the correlations among the problem behaviors. Basically, this was determined through a comparison of the observed correlations among the behaviors with the correlations among the behaviors predicted from the one-factor model. If the one-factor model were correct, the observed correlation between any two behaviors in the matrix would be equal to the product of these behaviors' estimated loadings on the common factor. The Jöreskog factor analysis procedure, available as part of the Statistical Package for the Social Sciences, Version 8.3 (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975), was used to compute a large-sample chi-square test of the discrepancy between the two matrices of observed and predicted correlations among the behaviors. A nonsignificant ($p > .05$) chi-square value would provide evidence in support of the hypothesis of a single common factor; a significant chi-square value would suggest that more than one common factor underlies the behaviors.

Results

The Pearson correlations on which the factor analyses were based are presented in Table 6.1 for the high school men and women and for the college men and women. For the high school sample, in both the Year 4 (1972) and Year 3 (1971) data, the correlations among all four measures of problem behavior—Times Drunk, Frequency of Marijuana Use, Frequency of Sexual Experience, and General Deviant Behavior—were statistically significant except for two correlations in the Year 4 data for women. The correlations between the problem behavior measures and the measures of conventional behavior were generally in the negative direction, as predicted, but were neither sizable nor consistent. For the college sample data, the correlations among the behavior measures were not as large or as consistent as those observed for the younger high school sample. In the Year 3 data, the correlations among the problem behaviors were more similar to the Year 4 correlations for the high school sample than were the correlations for the college sample in the Year 4 data. Overall, the correlations in the eight adolescent data matrices presented in Table 6.1 were adequate for the proposed maximum likelihood factor analyses, given that application of Bartlett's test of sphericity (Bartlett, 1950) to each of these matrices resulted in a significant chi-square value ($p < .01$) in all cases.

Maximum likelihood tests for one common factor. Table 6.2 presents the results of the factor analyses. All four of the chi-square tests on the Year 4 data demonstrated that only a single common factor was needed to account for the correlations among the problem behaviors. There were no statistically significant discrepancies ($p < .05$) between the observed correlation matrices and the matrices of correlations derived from the one-factor model. In all cases, the problem behaviors loaded positively on the underlying common factor, and all but one of the loadings—for Frequency of

Table 6.1 Correlations among selected measures of problem and conventional behavior in years 4 and 3 by sex and sample in each year

	High school men\women[a]						College men\women[b]					
Measure	1	2	3	4	5	6	1	2	3	4	5	6
Year 4												
Problem Behavior												
1. Times Drunk in the Past Year		.07	.23***	.23***	−.04	−.02		.12	.19*	.17*	−.13	−.18*
2. Frequency of Marijuana Use in the Past 6 Months	.25**		.12	.29†	−.24***	.09	.26**		.35†	.07	−.20**	−.26***
3. Frequency of Sexual Experience	.24**	.25***		.41†	−.18**	−.04	.03	−.11		.19*	−.33†	−.08
4. General Deviant Behavior in the Past Year	.41†	.54†	.36†		−.13	−.15*	.41†	.19*	.06		−.15	.29***
Conventional Behavior												
5. Church Attendance Frequency in the Past Year	.03	−.04	−.16	−.19*		.02	−.17	−.26**	−.33***	−.12		−.05
6. School Performance in the Past Year	−.28***	−.27***	−.37†	−.28***	.15		.07	−.16	.03	−.02	.08	
Year 3												
Problem Behavior												
1. Times Drunk in the Past Year		.22***	.34†	.31†	−.10	−.36†		.10	.18*	.19*	−.13	.01
2. Frequency of Marijuana Use in the Past 6 Months	.67†		.23***	.38†	−.08	−.14*	.36†		.34†	.34†	−.20**	.00
3. Frequency of Sexual Experience	.38†	.30***		.29†	−.05	−.08	.04	.20*		.20**	−.30***	−.19*
4. General Deviant Behavior in the Past Year	.41†	.34†	.37†		−.03	−.30†	.31***	.22**	.32***		−.10	−.10
Conventional Behavior												
5. Church Attendance Frequency in the Past Year	−.16*	−.11	−.19*	−.07		.20**	−.12	−.16	−.44†	−.20*		.01
6. School Performance in the Past Year	−.04	−.02	−.13	−.06	.15		.11	−.12	−.02	.06	.14	

[a]Correlations based on data from 102 men and 141 women
[b]Correlations based on data from 84 men and 100 women
*$p \leq .10$. ** $p \leq .05$. *** $p \leq .01$. †$p \leq .001$, two-tailed

Table 6.2 Maximum likelihood test for one common factor underlying problem behaviors by sex and sample in years 4 and 3

	High school				College			
	Men ($n=102$)		Women ($n=141$)		Men ($n=84$)		Women ($n=100$)	
Measure	Loading	h^2	Loading	h^2	Loading	h^2	Loading	h^2
Year 4								
Times Drunk in the Past Year	.46	.21	.31	.10	.73	.54	.28	.08
Frequency of Marijuana Use in the Past 6 Months	.60	.36	.33	.11	.35	.12	.46	.21
Frequency of Sexual Experience	.41	.17	.52	.27	.03	.00	.74	.55
General Deviant Behavior in the Past Year	.89	.80	.80	.63	.56	.31	.25	.06
Variance Portion	1.54		1.11		0.97		0.91	
% of Variance	38.6		27.8		24.2		22.7	
X^2 (2)	0.7 ($p=.72$)		2.0 ($p=.37$)		1.3 ($p=.51$)		1.6 ($p=.45$)	
Year 3								
Times Drunk in the Past Year	.88	.77	.52	.27	.54	.30	.25	.06
Frequency of Marijuana Use in the Past 6 Months	.75	.56	.51	.26	.53	.28	.66	.43
Frequency of Sexual Experience	.44	.20	.50	.25	.34	.12	.49	.24
General Deviant Behavior in the Past Year	.48	.23	.64	.40	.55	.31	.50	.25
Variance Portion	1.77		1.19		1.00		0.98	
% of Variance	44.1		29.8		25.0		24.6	
X^2 (2)	4.1 ($p=.13$)		3.1 ($p=.21$)		6.2 ($p=.05$)		2.2 ($p=.33$)	

Sexual Experience in the college male sample—were statistically significant by the Burt-Banks formula (Burt & Banks, 1947). These results were generally replicated in the analyses of the Year 3 data. In three of the four analyses in the replication year (Year 3), a single common factor accounted for the correlations among the problem behaviors. Only for the college sample men did the chi-square test indicate that the one-factor model failed to account for the observed correlations among the behaviors. The discrepancy was just large enough to reach significance.

Several other outcomes of these factor analyses should also be noted. First, the average percentage of the variance on the observed variables that was explained by the single common factor was considerably larger for the men than for the women in the high school analyses, and only slightly larger for the men than for the women in the analyses of the college data. Second, for both sexes and in both waves of data, this percentage was higher in the high school sample than in the comparable college sample. Third, there was considerable variation between the Year 4 and the Year 3 results in the size, if not in the significance, of the factor loadings for the different problem behaviors.

These analyses of the two separate waves of Year 3 and Year 4 data suggest that problem drinking, illicit drug use, precocious sexual behavior, and delinquent-type behavior do indeed reflect a single underlying factor in these samples of senior high school adolescents and college-age youth.

Study II

The second aim of the present investigation was to determine the generality of the factor-analytic results obtained in the high school sample in Study I for a more representative sample of adolescents, those who participated in the 1978 National Study of Adolescent Drinking. These data were collected by the Research Triangle Institute under the primary sponsorship of the National Institute on Alcohol Abuse and Alcoholism (Rachal et al., 1980).

Method

Overall design of the 1978 National Study of Adolescent Drinking. A sample of 5638 students in Grades 10 through 12 in the 48 contiguous states and the District of Columbia was drawn using a multistage stratified random sampling design. In each of 50 counties selected from strata that differed in geographic region and population size a sampling frame was established that consisted of all senior high schools, and at least one senior high school was selected in each county. A total of 74 different schools participated in the study. One classroom of 10th-, 11th-, and 12th- grade students was selected in each school, and all students in the selected classrooms were contacted and asked to participate in the survey. Self-administered questionnaires were completed in a classroom situation by 4918 students between March and April 1978. The overall response rate for the 1978 National Study of Adolescent Drinking was 86% (see Rachal et al., 1980).

The resulting sample obtained for the 1978 national drinking study was 46 % male, and its self-reported ethnic distribution was white (Anglo), 72 %; black, 10 %; Spanish American, 5 %; Native American, 3 %; Asian American, 1 %; and other (or no answer), 9 %.

To increase the comparability between this sample and the high school sample examined in Study I, only data from the 11th- and 12th-grade students in the national sample were used in Study II. These were the same two grades that were involved in the Year 4 analyses of the local high school sample in Study I. There were 1208 boys and 1444 girls in these grades in the 1978 national sample data who also had scores on all of the behavior measures.[7]

Behavior measures. The 37-page questionnaire administered to the national sample contained abridged versions of the psychosocial and behavior measures of Problem Behavior Theory used in the earlier longitudinal study (Jessor & Jessor, 1977). The following behavior measures were included in this replication on a national sample of the factor analyses described in Study I: Number of Cigarettes Smoked per Day in the Last Month (range, 0–8 from *none* to *almost 3 packs a day*); Times Drunk in the Past Year (range, 0–8 from *none* to *weekly or more often*); Frequency of Marijuana Use in the Past Six Months (range, 1–10 from *never or not in past six months* to *every day*); Number of Other Illicit Drugs Ever Used (range, 0–7); General Deviant Behavior in the Past Year, a 12-item version of the longer scale used in the longitudinal study (range, 0–48; $\alpha = .80$); Church Attendance Frequency in the Past Year (range, 1–7 from *have not gone* to *twice or more weekly*); and School Performance (range, 1–7; usual grades from *mostly Ds and Fs* to *mostly As*). Questions regarding sexual behavior could not be included in the national study questionnaire. All of these measures except the measure of smoking are described elsewhere (Jessor, Donovan, & Widmer, 1980).

Results

The correlations among the problem behavior measures and conventional behavior measures are presented in Table 6.3 for each sex separately. As may be seen, all of the correlations among the problem behaviors, between the problem behavior measures and the conventional behavior measures, and between the conventional behavior measures were statistically significant for both sexes.

Maximum likelihood tests for one common factor. Because models tested on large samples are often disconfirmed on the basis of essentially trivial perturbations in the data, the single-factor model was not tested using the full sample available for each sex. Instead, four small random samples of adolescents of each sex were selected

[7] The 4918 students in the national sample divided equally into 10th, 11th, and 12th graders. Of the 3279 students in the two older grade cohorts, 1540 were men and 1739 were women. When students who were missing scores on any of the behavior measures to be examined in the factor analyses were deleted from the sample, there were 1208 men (78 % of those in Grades 11 and 12) and 1444 women (83 % of those in Grades 11 and 12) remaining with complete data on the seven behavior measures.

Table 6.3 Correlations among selected measures of problem and conventional behavior by sex in 1978 National Sample Data (11th–12th graders only)

Measure	1	2	3	4	5	6	7
Problem Behavior							
1. Number of Cigarettes Smoked Per Day in the Last Month	–	.39	.42	.36	.40	−.24	−.24
2. Times Drunk in the Past Year	.32	–	.65	.53	.52	−.25	−.23
3. Frequency of Marijuana Use in the Past 6 Months	.34	.59	–	.58	.49	−.27	−.28
4. Number of Other Illicit Drugs Ever Used	.33	.43	.59	–	.43	−.26	−.21
5. General Deviant Behavior in the Past Year	.32	.46	.43	.36	–	−.20	−.28
Conventional Behavior							
6. Church Attendance Frequency in the Past Year	−.16	−.24	−.26	−.21	−.16	–	.17
7. School Performance	−.22	−.25	−.22	−.14	−.28	.12	–

Note: All correlations are statistically significant at the .001 level (two-tailed test). The lower triangular matrix contains the correlations for the men ($n = 1208$) with no missing data; the upper triangular matrix contains the correlations for the women ($n = 1444$).

from the larger sample. Ten-percent subsamples were used to obtain groups of approximately the same size as the sex groups studied in the local sample in Study I. The fit of the single-factor model was then tested in each of the eight random subsamples. Bartlett's test of sphericity showed that all of these matrices were appropriate for factor analysis.

The results of the eight maximum likelihood factor analyses are presented in Table 6.4. As may be seen, in all four analyses for each sex, the chi-square tests indicated that the singlefactor model can account for the correlations among this array of diverse problem behaviors. There were nonsignificant differences in each subsample between the observed correlations and the correlations predicted by the one-factor model. Of the 40 loadings of the problem behaviors on the underlying common factor, only one factor loading was below .3, and all were significant by the Burt-Banks formula. These results offer strong confirmation of the findings obtained from the local high school sample of adolescents in Study I.

Study III

The concern of the third study was the developmental generality of the previous findings from Studies I and II. Basically, the question was whether a similar syndrome of problem behavior would be evident in a sample of young adults in their middle to late 20s. The young adults, it will be remembered, were the same people who earlier had provided the data for the analyses presented in Study I.

Method

Behavior measures. In general, the measures assessed in young adulthood were similar to the measures assessed in the earlier phase of the longitudinal study. However, in recognition of the more mature, adult status of the participants by 1979 and 1981, some changes were made in the set of behavior measures examined: Two of the behavior measures used in Study I, School Performance and Frequency of Sexual Experience, were omitted, and a measure of the number of illicit drugs other than marijuana used in the past 6 months was substituted (drugs included stimulants, barbiturates, tranquilizers, psychedelic drugs, cocaine, heroin, other narcotic drugs). Measures included in the analyses of the young adult data were the following: Times Drunk in the Past Six Months (range, 0–90); Frequency of Marijuana Use in the Past Month (range, 0–60); Number of Other Illicit Drugs Used in the Past Six Months (range, 0–7); General Deviant Behavior in the Past Year, assessed by a shorter, 12-item index consisting of behaviors more appropriate to young adulthood (range, 0–12); and Church Attendance Frequency in the Past Year (range, 0–90). (Both the Times Drunk and Church Attendance measures were assessed in 1981 using categorical response options.)

As in Study I, separate analyses were carried out on each of the four Sex by Sample groups. In these young adult data, factor analyses based on the 1979 data were used as a check on the results of analyses of the 1981 data.

Table 6.4 Maximum likelihood tests for one common factor underlying problem behavior in four random 10 % subsamples selected from the 1978 National Study of Adolescent Drinking

	High school men								High school women							
	$n=105$		$n=113$		$n=136$		$n=129$		$n=145$		$n=148$		$n=156$		$n=141$	
Behavior Measure	Loading	h^2	Loading	h^2	Loading	h^2	Loading	h^2	Loading	h^2	Loading	h^2	Loading	h^2	Loading	h^2
Number of Cigarettes Smoked Per Day in the Last Month	.24	.06	.40	.16	.53	.28	.39	.15	.45	.20	.64	.41	.44	.19	.65	.43
Times Drunk in the Past Year	.62	.39	.65	.42	.74	.55	.61	.37	.90	.81	.73	.53	.78	.61	.77	.59
Frequency of Marijuana Use in the Past 6 Months	.85	.72	.90	.81	.82	.67	.78	.60	.80	.64	.86	.74	.74	.55	.82	.67
Number of Other Illicit Drugs Ever Used	.72	.53	.73	.53	.74	.55	.61	.37	.45	.20	.69	.47	.61	.37	.65	.42
General Deviant Behavior in the Past Year	.50	.25	.49	.24	.61	.38	.41	.17	.58	.33	.47	.23	.58	.33	.70	.49
Variance Portion	1.93		2.17		2.42		1.68		2.18		2.37		2.06		2.59	
% of Variance	38.7		43.4		48.4		33.5		43.7		47.4		41.3		51.9	
X^2 (5)	8.0 ($p=.16$)		8.2 ($p=.15$)		5.1 ($p=.40$)		5.5 ($p=.36$)		7.8 ($p=.17$)		5.0 ($p=.41$)		4.4 ($p=.49$)		5.1 ($p=.40$)	

Results

The Pearson correlations among the behaviors selected for inclusion in the young adult factor analyses are presented in Table 6.5 by sex and by sample for the 1981 data and for the 1979 data. For the high school sample data in both 1981 and 1979, the great majority of the correlations were statistically significant ($p < .05$). Of the four nonsignificant correlations, two reflected at least trends ($p <$. 10) of a relation between Marijuana Use and Deviant Behavior for the women in both years. The measure of conventional behavior, Church Attendance Frequency, correlated in the negative direction, as expected, with all of the young adult problem behaviors, and most consistently with lower scores on the illicit drug use measures. For the college sample data, the correlations among the problem behaviors were strongest for the men in the 1981 data and weakest for this same group in the 1979 data. Only for the college sample men in 1981 did Times Drunk and Deviant Behavior correlate significantly with Frequency of Marijuana Use, and General Deviant Behavior failed to relate to the other problem behaviors in the 1979 data for the men. Although Church Attendance Frequency was negatively correlated with all but one of the problem behaviors, the relations generally were not statistically significant The eight young adult correlation matrices in Table 6.5 appeared appropriate for factor analysis. Bartlett's test of sphericity was highly significant ($p < .001$) in all cases.

Maximum likelihood tests for one common factor. The results of the maximum likelihood factor analyses of Times Drunk, Frequency of Marijuana Use, Number of Other Illicit Drugs Used, and Deviant Behavior are shown in Table 6.6. In both the key year (1981) and the replication year (1979), the chi-square tests of the discrepancy between the observed correlation matrix and the matrix predicted by the one-factor model were nonsignificant, supporting the hypothesis that one common factor subtends the correlations among the different behaviors.

All of the problem behavior measures loaded positively on the underlying common factor, and all of the loadings were significant except for two loadings in the 1979 data. In contrast to Study I, greater consonance occurred in Study III across data waves and subsamples in the relative magnitude of the factor loadings for the different problem behaviors. For example, Number of Other Illicit Drugs Used was found to be the behavior most strongly determined by the common factor in seven of the eight analyses, and Frequency of Marijuana Use was the next most strongly determined behavior in seven of the eight young adult analyses.

Discussion

The major aim of the present research was to test the hypothesis that the interrelations among different adolescent problem behaviors can be accounted for by a single common factor. This hypothesis was supported by a variety of maximum likelihood factor analyses carried out in three studies.

Table 6.5 Correlations among selected measures of Problem and Conventional Behavior in 1981 and 1979 by sex and sample

	High school sample men\women[a]					College sample men\women[b]				
Measure	1	2	3	4	5	1	2	3	4	5
1981										
Problem Behavior										
1. Times Drunk in the Past 6 Months		.20**	.38†	.22***	−.26***		.16	.43†	.54†	−.15
2. Frequency of Marijuana Use in the Past Month	.53†		.51†	.15*	−.17**	.35***		.24**	.07	−.08
3. Number of Other Illicit Drugs Used in the Past 6 Months	.52†	.55†		.29†	−.25***	.39†	.55†		.29***	−.15
4. General Deviant Behavior in the Past Year	.31***	28***	.46†		−.14*	.15	.37†	.33***		−.10
Conventional Behavior										
5. Church Attendance Frequency in the Past Year	−.33†	−.14	−.32***	−.13		−.17	−.07	−.30***	−.06	
1979										
Problem Behavior										
1. Times Drunk in the Past 6 Months		.05	.05	.22***	−.03		.16	.15	.29***	−.13
2. Frequency of Marijuana Use in the Past Month	.36†		.45†	.14*	−.17**	.10		.38†	.15	−.16
3. Number of Other Illicit Drugs Used in the Past 6 Months	.26***	.48†		.21***	−.22***	.37†	.38†		.21**	−.15
4. General Deviant Behavior in the Past Year	.26***	.24**	.37†		.26***	.07	.07	.07		−.23**
Conventional Behavior										
5. Church Attendance Frequency in the Past Year	−.11	−.25**	−.25**	−.08		−.12	−.20*	−.26**	.19*	

[a]Correlations based on data from 102 men and 141 women
[b]Correlations based on data from 84 men and 100 women
*$p \leq .10$. **$p \leq .05$. ***$p \leq .01$. †$p \leq .001$, two-tailed

Table 6.6 Maximum likelihood test of one common factor underlying behaviors by sex and sample in 1981 and 1979

	High school				College			
	Men ($n=102$)		Women ($n=141$)		Men ($n=84$)		Women ($n=100$)	
Measure	Loading	h^2	Loading	h^2	Loading	h^2	Loading	h^2
1981								
Times Drunk in the Past 6 Months	.68	.47	.41	.17	.47	.23	.88	.77
Frequency of Marijuana Use in the Past Month	.70	.49	.54	.30	.74	.55	.20	.04
Number of Other Illicit Drugs Used in the Past 6 Months	.79	.63	.92	.85	.75	.57	.50	.25
General Deviant Behavior in the Past Year	.50	.25	.32	.10	.45	.20	.61	.37
Variance Portion	1.84		1.42		1.55		1.42	
% of Variance	46.0		35.6		38.7		35.6	
X^2 (2)	4.2 ($p=.12$)		1.6 ($p=.46$)		1.0 ($p=.60$)		3.3 ($p=.19$)	
1979								
Times Drunk in the Past 6 Months	.46	.21	.10	.01	.37	.14	.33	.11
Frequency of Marijuana Use in the Past Month	.67	.45	.58	.33	.38	.14	.56	.32
Number of Other Illicit Drugs Used in the Past 6 Months	.70	.49	.77	.59	.99	.99	.61	.37
General Deviant Behavior in the Past Year	.47	.22	.28	.08	.07	.00	.37	.14
Variance Portion	1.37		1.01		1.28		0.93	
% of Variance	34.3		25.4		32.1		23.3	
X^2 (2)	3.8 ($p=.15$)		5.9 ($p=.053$)		0.5 ($p=.78$)		4.6 ($p=.10$)	

In Study I, the correlations among alcohol misuse, the use of marijuana, the commission of different delinquent-type behaviors, and precocious involvement in sexual intercourse were accounted for by a single underlying common factor. The observed correlations among these self-reported behaviors were not significantly different from the correlations predicted by the single-factor model. This result was found to demonstrate considerable generality across sex, across samples differing in educational level (high school vs. college), and across two different waves of longitudinal data within each subsample.

In Study II, factor analyses of data from a national sample of adolescents showed that the single-factor model is not limited only to Anglo middle-class adolescents but has generality for adolescents of widely differing socioeconomic and ethnic backgrounds from all over the country. These results, because they are based on data collected in 1978, also suggest that the single-factor explanation of the correlations among the different problem behaviors is not the result of a cohort effect, that is, it is not an artifact of the late-60s/early-70s "counter-culture."

In Study III, the results demonstrated the developmental generality of the earlier findings. A single common factor accounted for the correlations among several problem behaviors in the samples of young adults in their middle to late 20s who had participated previously in the Jessors' (1977) study of high school and college youth.

One interpretation of the present results is that they provide further support for the notion of a syndrome of problem behavior in both adolescence and young adulthood. Such support derives from the definition of a syndrome as "a set of behaviors believed to have a common cause or basis" (English & English, 1958) and from the capability of factor analysis to reveal the presence of underlying common causative factors.

Because factor analysis is based on correlational data, it cannot do more than suggest the nature of the underlying causal factor that accounts for the interrelations among the target behaviors. On the basis of our previous research, however, we can hypothesize that the common factor underlying the syndrome of problem behavior reflects a general dimension of *unconventionality*—in both personality and the social environment. Support for this interpretation of the underlying factor derives from several sources. First, previous analyses have shown that a consistent set of personality and social environment variables reflecting unconventionality correlates similarly with diverse adolescent behaviors such as marijuana use, problem drinking, delinquent-type behavior, and precocious sexual intercourse (Jessor & Jessor, 1977).[8] Similar findings have emerged from analyses of the data from both the 1974 and the 1978 National Study of Adolescent Drinking (Jessor, Chase, & Donovan, 1980;

[8] Involvement in each of these problem behaviors has been shown to be associated with the following psychosocial attributes: lower value on academic achievement; higher value on independence; greater value on independence relative to achievement; lower expectation for academic recognition; lower religiosity; greater tolerance of socially disapproved behavior; greater weight placed on the positive relative to the negative reasons for drinking, drug use, and sex; greater orientation toward friends than toward parents; less perceived compatibility of interests and values between parents and friends; greater perceived parental approval of problem behavior; and greater friends' approval and models for involvement in problem behavior.

Jessor, Donovan, & Widmer, 1980). Second, factor analyses found that a composite index of personality and social conventionality—indicated by greater religiosity, greater intolerance of deviance, more conservative sociopolitical attitudes, stricter friends' controls, fewer models and less approval for drug use, and more friend models for involvement with religion—loaded strongly on the underlying common factor in the opposite direction from that of the problem behavior measures in 12 of 12 analyses, and the common factor accounted for the intercorrelations among these variables in 10 of 12 analyses. (Analyses based on this composite measure were carried out on the Year 4 data from Study I and on the 1979 and 1981 young adult data from Study III.) Third, the conforming behavior measures of Church Attendance and School Performance were found to load in the negative direction on the common factor underlying the problem behaviors.[9]

Several important limitations of the present research must be mentioned. The first limitation derives from our exclusive reliance on self-report measures of behavior as the basic data for the analyses. Previous research that has compared self-reports of adolescent problem behaviors with official police records, reports of peer informants, and results of polygraph examinations generally supports the validity of such self-report behavior measures (Blackmore, 1974; Clark & Tifft, 1966; Gibson, Morrison, & West, 1970; Gold, 1966; Midanik, 1982). It is possible, however, that the use of these behavioral self-reports may have increased the likelihood of finding a single factor due to the influence of common method (common source) variance.

A second limitation of the present research lies in the nonrepresentative nature of the samples examined in Study I and Study III. Although this does constrain the generalizability of the findings beyond these samples, it does not limit the testing of theoretical or developmental issues.

The evidence in the young adult data that there is a syndrome of problem behavior implies a considerable degree of continuity between adolescence and young adulthood in the interrelations among the different problem behaviors. This continuity over time in the relations among the problem behaviors contrasts sharply with the evidence for noncontinuity in levels of involvement in these behaviors. For instance, Donovan, Jessor, and Jessor (1983) found that the majority of problem drinkers in these adolescent samples were no longer involved in abusive drinking as young adults. Together, these two different trends suggest that young adults may tend to disengage from involvement in multiple problem behaviors at the same time, rather than giving up their involvements one at a time as they grow older.

[9] In Study I, these loadings were statistically significant only for Church Attendance Frequency in the college sample analyses. In seven of the eight analyses, the chi-square tests indicated that the correlations among the problem behaviors and conforming behaviors could be accounted for by a single factor. In Study II, factor analyses in eight new random subsamples found that the conforming behaviors loaded negatively on the common factor in all cases. The chi-square tests, however, indicated a lack of fit with the single-factor model in three of the four male subsamples and in one of the female subsamples, which suggests that the conforming behaviors may constitute a correlated second factor for the men. In Study III, Church Attendance Frequency loaded negatively on the common factor in all eight analyses, and the chi-square tests showed that the single-factor model accounted for the data in all cases.

Further research aimed at understanding the structure of behavior among adolescents is clearly needed. For example, while adolescent alcohol misuse, drug abuse, cigarette smoking, and precocious sexual intercourse are all problem behaviors, they are also behaviors with important implications for adolescent health and well-being (Califano, 1979). Little is currently known, however, regarding their relations to the wider array of health-related behaviors among adolescents, for example, eating and exercise behavior. It would be important for future research to determine the perimeter of a possibly larger syndrome of health-related behavior in adolescence.

The factor analyses presented in this article imply that a sizable proportion of the common variance among the different problem behaviors can be accounted for by their common relations to unconventionality in personality and social attributes. But the behaviors may be correlated for other reasons as well, for example, because they are seen by young people as substitutable or interchangeable means of achieving valued goals; because they are learned together and continue to be performed together; or because of linkages in the social ecology of adolescence (in certain socially structured situations there is considerable peer approval, pressure, and expectation for involvement in multiple problem behaviors such as alcohol use, cigarette smoking, marijuana use, and precocious sex in a single setting, such as an unchaperoned party). Research examining these alternative explanations of the structure of problem behavior could provide a more finely textured understanding of adolescent behavior.

Finally, the implication of the findings in this article for prevention programs should be emphasized. Prevention programs may well benefit by broadening their focus beyond their traditional concern with individual problem behaviors, for example, drug use, drunk driving, or unprotected sexual activity. Given the interrelations that obtain among drug abuse, problem drinking, cigarette smoking, and delinquent behavior, such programs might well focus more generally on the larger behavior syndrome.

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