Chapter 3
The Stress Process: Its Origins, Evolution, and Future

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Over the past several decades, the Stress Process Model has provided the predominant theoretical foundation for sociological research into the effects of stress on mental health and empirical research continues to substantiate its account of how society shapes the mental health of its members. Its core elements remain as originally formulated by Pearlin et al. (1981) some thirty plus years ago: the influence of the social system on exposure to stressors; parallel effects on access to social and personal resources; and, the role of these resources as mediators and moderators of the effect of stressors on mental health. Wheaton (2010) contends that the Stress Process Model has remained the leading paradigm in sociological stress research at least in part because it is an open system that invites elaboration, extension, and innovation—a potential that has been actualized to a large extent over time. As a result, the Stress Process Model now offers a coherent explanation of why people's chances of having a mental disorder depend upon their location within systems of stratification and their participation in social institutions and relationships—its quintessentially sociological characteristic (Pearlin 1989).[1]

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[1] There are, of course, other productive sociological approaches to understanding the unequal distribution of mental disorder throughout society. As a case in point, McLeod (2013) attributes mental health disparities partly to social evaluative processes.

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The ubiquitous use of the word stress in everyday conversation makes the concept both familiar and amorphous because its boundaries seem to include much of daily life. For this reason, it is useful to first define the term stressor, which refers to: (1) the *presence* of environmental threats, challenges, or demands that tax or exceed the individual's ordinary capacity to adapt, and (2) the *absence* of the means to attain sought-after ends (Lazarus 1966; Pearlin 1983; Menaghan 1983; Aneshensel 1992; Wheaton et al. 2013). Stress refers to the arousal of internal physiological responses to the occurrence of a stressor. These responses include activation of key areas of the brain that initiate biological processes designed to protect the organism—fight, flight, or freeze—and to then return the body to homeostasis—an internal state of equilibrium. Key regulatory systems of the body that are involved in this process include the hypothalamic-pituitary-adrenocortical (HPA) axis, the autonomic nervous system and the immune system. Typical psychological responses to stressors include, for example, feeling endangered, besieged, or frustrated. These responses are called distress when they become maladaptive in the form of symptoms of anxiety, depression, and behavioral disorders such as substance abuse (Wheaton et al. 2013). In contrast, the term stressor refers to the external circumstances that challenge or obstruct.

Research on stress and health originated with Selye's (1936) biological model of stress based on laboratory studies with animals using exposure to aversive physical and mental stimuli (e.g., extreme changes in ambient temperature). Selye described the short- and long-term responses to stressors, collectively referred to as the General Adaptation Syndrome and consisting of: (1) an initial stage of alarm and defense, (2) a subsequent stage of resistance or adaptation, and (3) a final stage of exhaustion, the breakdown of physiological systems, or death if exposure persists. Recent research in this tradition focuses on the extent to which constant or repeated exposure to stressors creates structural and functional alterations in systems of the body, such as the cardiovascular and autonomic nervous system and the HPA axis. The cumulative overuse and wearing down of these regulatory systems is referred to as allostatic load (McEwen and Steller 1993) and has been linked to physical and cognitive decline (Karlamangla et al. 2002), symptoms of Post-Traumatic Stress Disorder (Glover 2006), and all-cause mortality (Seeman et al. 2004).

Wheaton (1994; Wheaton et al. 2013) presents an alternative model developed by Smith (1987; cited in Wheaton 1994) as a heuristic device for conceptualizing potential stress responses. "Elastic limit" is a key concept, referring to situations where the level of force exceeds the limits of the structural integrity of a material, leading to strain—its elongation or compression. The material (1) returns to its original shape after the stress is removed if the initial elastic limit is not exceeded, (2) achieves a greater elastic limit by adjusting to elongation or compression up to a finite point, (3) after which it cannot adaptively respond and fractures or breaks down. Wheaton (1994) finds this model useful for conceptualizing responses to stressors because it encompasses the effects of both catastrophic forces (e.g., hurricane-force winds) and continuous forces (e.g., rust), analogous to major life events and chronic stressors—the foci of most sociological stress research (see below). When applied to people, the model implies that coping capacity

may increase in response to a stressor, but only until a breaking point is reached. Although this model provides an alternative conceptualization of stress responses, the key ideas of elastic limit, increased coping capacity, and breaking points have yet to be systematically tested.

The propensity to evoke stress inheres within the stressor as the amount of threat or obstruction it would pose on average to most people most of the time, but the extent to which it does elicit a stress response depends upon a number of factors such as the meaning that it is attributed to it or the context in which it occurs. As a result, there typically exists substantial variation among people in responses to the same objective event or circumstance. Some of this variation is idiosyncratic—unique to each individual, and calls for personal explanations as might be sought through introspection.[2] Sociological explanation, in contrast, focuses on the explanation of social patterns in these responses (Pearlin 1989). As a concrete example, women are more affected psychologically than men by boundary-spanning work demands—demands to perform one social role while enacting another role—that lead to a "blurring" of work and family roles (Glavin et al. 2011).

In this paper, we first describe the Stress Process Model as originally formulated by Pearlin et al. (1981). We then chronicle four pivotal points in its evolution, describing their impact as manifest in current research. These developments are: (1) the articulation of the nature of sociological inquiry into stress, (2) the conceptualization and measurement of the stress universe, (3) the debate about psychological distress as a continuum versus discrete disorders as appropriate outcomes for sociological research, and (4) the proposition that multiple outcomes are required to ascertain the mental health consequences of stressors. Given the rich history of innovation in this field, the selection of these developments was a difficult one necessitated by space constraints and it inevitably reflects our own predilections. Several other major advances that contributed to or flowed from these three developments also are identified, including: the differential exposure and differential vulnerability hypotheses, the concept of stress proliferation, and research on the social epidemiology of the stress process. We end with a call for more systematic research into the ways in which the components of the Stress Process Model are related to one another in order to more fully realize its explanatory potential as a system.

3.1 The Stress Process Revisited

In *The Stress Process*, Pearlin et al. (1981) identified a set of core constructs and, most importantly, a system of relationships among these constructs—set within an overarching goal of elaborating the mechanisms through which the organization of

[2] Statistically, this unique variation is captured in the error term of regression models, an ironic operationalization of individuality, especially when applied to the very personal experience of mental illness.

society becomes manifest in the mental health of its members. The stated motive was specifying the interconnections among the discrete and disparate findings that were emerging at the time from the rapidly expanding body of research on stress and its health effects.

3.1.1 Conceptualizing the Elements of the Stress Process

The article examined the relationship between life events and chronic stressors, as shown in Fig. 3.1, and in doing so expanded the conceptual boundaries of stressors beyond the contemporary practice of equating stressors with life change events—although it would take quite some time for chronic stressors to gain equal prominence (Wheaton 2010). Life change events were defined at the time as objective occurrences of sufficient magnitude to change the usual activities of most persons or alter their social setting (Rabkin and Streuning 1976; Dohrenwend et al. 1978). Examples are death of a loved one and home foreclosure. The initial conceptualization of any change as stress-provoking soon gave way, however, because undesirable events were found to be most psychologically distressing (Ross and Mirowsky 1979; Thoits 1983). Also, stressors do not necessarily entail change but can be found in the persistence of difficult conditions over time. These chronic stressors typically have a slow and insidious onset, remain problematic over a lengthy time, and have an uncertain ending (Pearlin 1983;

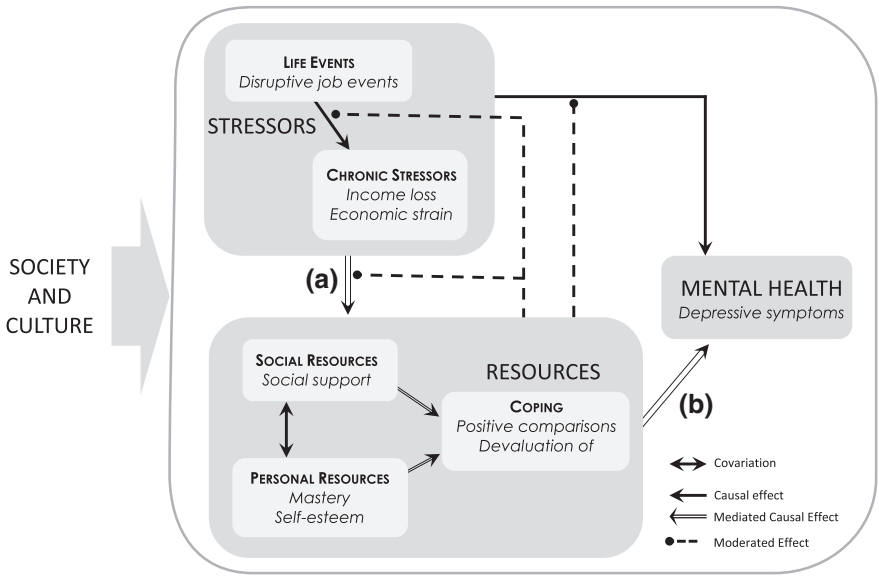

Fig. 3.1 The original stress process model. Based on Pearlin et al. (1981)

Wheaton 1994). Examples include ongoing financial problems and seemingly interminable conflict between spouses.[3]

The Stress Process Model also synthesized emergent concepts in the stress literature pertaining to social and personal resources that may offset the deleterious mental health effects of stressors, honing in on three that were to become mainstays of stress research: social support—the belief that others care about you; and, self-concept in the forms of mastery—the belief that your life-chances are under your own control instead of being determined by fate, chance, or powerful others; and, self-esteem—positive views of oneself. These resources were seen as affecting coping (see Fig. 3.1), which refers to steps people take to avoid or lessen the impact of stressors (Pearlin and Schooler 1978). These actions include: avoiding the stressor in the first place, successfully resolving the stressor when it is unavoidable, managing the meaning of the stressor in ways that reduce its threat; and, keeping adverse emotional reactions within manageable bounds (Pearlin and Aneshensel 1986; Pearlin 1989).

The mental health outcome studied in the original article was depression as indexed by a symptom measure, a choice that foreshadowed the direction followed by the preponderance of subsequent work on the stress process, although major depressive disorder also has figured prominently as an outcome, and as discussed below, these outcomes have been the subject of debate.

3.1.2 A System of Relationships

The Stress Process also presented a system of relationships leading from stress exposure through resources to adverse mental health outcomes, and put the hypothesized system to an empirical test (Pearlin et al. 1981). The investigators posited that the occurrence of life events could lead to the subsequent emergence of chronic stressors, as shown in Fig. 3.1. Making this connection altered the prevailing practices of equating stressors with life change events and conceptualizing life change events as independent occurrences. Analysis of survey data from a sample of Chicago adults substantiated this hypothesis, revealing that disruptive job events, such as involuntary job loss, lowered income and thereby increased economic strain.

In addition, both sources of stress were shown to be depressing to the extent that they diminished the person's self-concept, specifically lessening self-esteem and mastery—thereby incorporating *mediators* into the stress process. Mediation is shown in Fig. 3.1 as the pair of arrows leading (a) from stressors to resources and (b) from resources to mental health outcomes.[4] Equally important, resources

[3] However, as Avison and Turner (1988) demonstrated, some events follow the same lengthy time course as chronic stressors so that duration should be measured.

[4] The diminishment of self-concept was conceived of as a mechanism through which life events and chronic strains become stressful, but it has since been considered in the domain of resources, a consequential shift in thinking, as discussed below.

were found to act as *moderators*, weakening the effects of stressors on depressive symptoms. Moderation is shown as the dashed line that intersect a pathway, signifying that it is the pathway that is affected by the moderator, not the constructs that anchor the pathway.[5] Notably, coping and social support also curtailed the effects of disruptive job events at other points in the model, lessening its effects on chronic stressors and mastery. In this way, *The Stress Process* called attention to the interconnections among social and personal factors that influence the impact of stressors on mental health, as distinct from the more common approach of focusing on each factor's distinct contribution to explaining variation in mental health. By tracing indirect effects of stressors on mental health, instead of considering only their main effects, as was the usual practice at the time, these empirical results revealed a more substantial impact of stressors on mental health than was accepted canon at the time.

Finally, although emphasizing the internal workings of the stress process, Pearlin et al. (1981) situated these processes within the organization of society, countering prevailing psychological perspectives that largely ignored the social origins of stressors by treating life events as independent variables.

3.2 The Evolution of the Stress Process

3.2.1 The Structural Context of the Stress Process

Perhaps the most significant turning point in the sociological study of stress was the publication of a paper bearing that title by Pearlin (1989). This manifesto admonished sociologists for ignoring the structural context of the stress process, in particular (1) systems of stratification that cut across society—social and economic class, race/ethnicity, gender, and age; (2) social institutions and their arrangements of statuses and roles; and, (3) interpersonal relationships. These interrelated levels of social structure, Pearlin asserted, mold the experience of individuals and, therefore, are not extraneous to the stress process but are fundamental to it:

> They are the sources of hardship and privilege, threat and security, conflict and harmony. In searching for the origins of stress, we may begin fruitfully by scrutinizing the social arrangements of society and the structuring of experience within these arrangements. This search, I believe, will reveal how ordinary people can be caught up in the disjunctures and discontinuities of society, how they can be motivated to adopt socially valued dreams and yet find their dreams thwarted by socially erected barriers, and how as engaged members of society they come into conflict with others and themselves (Pearlin 1989: 242).

Pearlin went on to declare that sociological stress research should direct its attention to the socially patterned distribution of components of the stress process, focusing on how people's placement in society and participation in social

[5] Although the resources of social support and coping were conceptualized as mediators, moderating effects also were hypothesized and tested.

institutions and interpersonal relationships shape: exposure to stressors, access to resources that may influence the impact of stressors, and mental health outcomes.

The social epidemiology of the stress process emerged as one of the discipline's responses to this ground-breaking research agenda (Turner et al. 1995; Turner and Lloyd 1999). This line of research also applied the differential exposure and differential vulnerability hypotheses, which posit, respectively, that the concentration of mental disorder within low status groups can be attributed, at least in part, to disproportionate exposure to stressors, or disproportionate vulnerability to stressors, or both (Kessler 1979a, b). Earlier tests had failed to find much support for the exposure hypothesis, but the life events inventories used in this research were poorly suited to the task for several reasons: (1) the selection of events was arbitrary, such that events occurring to young adults were overrepresented, while those occurring to women, minorities, and the poor were underrepresented (Thoits 1983); (2) stressors that were not eventful had been excluded (Pearlin 1983); and, (3) the exclusion of stressors that might be affected by the person's mental health (to avoid contamination in the measurement of the independent variable by the dependent variable) had the unintended effect of also excluding socially caused stressors, thereby removing the concept of stressors from social structure and processes (Wheaton 1990; Aneshensel 1992). As a result, early tests of the exposure hypothesis were biased in favor of the null hypothesis. The resolution of these issues awaited a reconceptualization of the universe of stressors and an operationalization of it that sampled the full spectrum of stressors to which people are exposed.

3.2.2 The Universe of Stressors

As the limits of life change inventories became apparent (e.g., Thoits 1983), attention increasingly turned to other types of stressors. In counterpoint to the idea that stress resides in change, Pearlin (1983) asserted that it also arises from enduring problems encountered in the enactment of major social roles, such as worker, spouse, and parent. The sources of role strain he identified are: role overload, excessive role demands; role captivity, being an unwilling incumbent of a role, such as caregiver; role restructuring, which occurs when long-standing relationships among members of a role set are renegotiated, for example, adult children providing care for their parents; inter-role conflict, incompatible demands across social roles; and, interpersonal conflict within role sets.

Wheaton (1994) expanded the domain of a chronic stressor beyond role strains to incorporate, for example, barriers in the achievement of life goals; inadequate rewards relative to effort or qualifications; excessive or inadequate environmental demand; frustration of role expectations; and resource deprivation. Other structural sources of chronic stress include inconsistency among dimensions of social status consisting of: status inconsistency—discrepancy between occupation and income, goal-striving stress—discrepancy between aspirations and achievements,

and life-style incongruity—consumption patterns and cosmopolitan behaviors inconsistent with social class (Dressler 1988). Overtime, the concept of a chronic stressor has become enlarged further and now includes, for example: enduring interpersonal difficulties; social and economic hardship including poverty, crime, violence, overcrowding, and noise; homelessness, and; chronic physical disability.

As chronic stressors gained traction in stress research, Wheaton (1994) published a description of the "stress universe" that further reoriented thinking about the nature of stressors by expanding its boundaries. The first dimension he distinguishes is the chronicity or *duration* of the stressor, which extends from sudden, one-time unanticipated events to difficulties that are built into everyday life, as illustrated in Fig. 3.2. The second dimension made explicit the idea that stressors occur at multiple *levels* of social organization from (1) the micro-level of the individual and primary social relationships, such as disagreements among co-workers; through (2) the meso- or intermediate-level of organizations and institutions, such as a workplace climate tolerant of sexual harassment; to (3) to the macro-level of society, as exemplified by economic downturns. Most stress research focuses on a single level, usually the micro-level. However, research on macroeconomic factors provides an example of cross-level research, such as studies linking

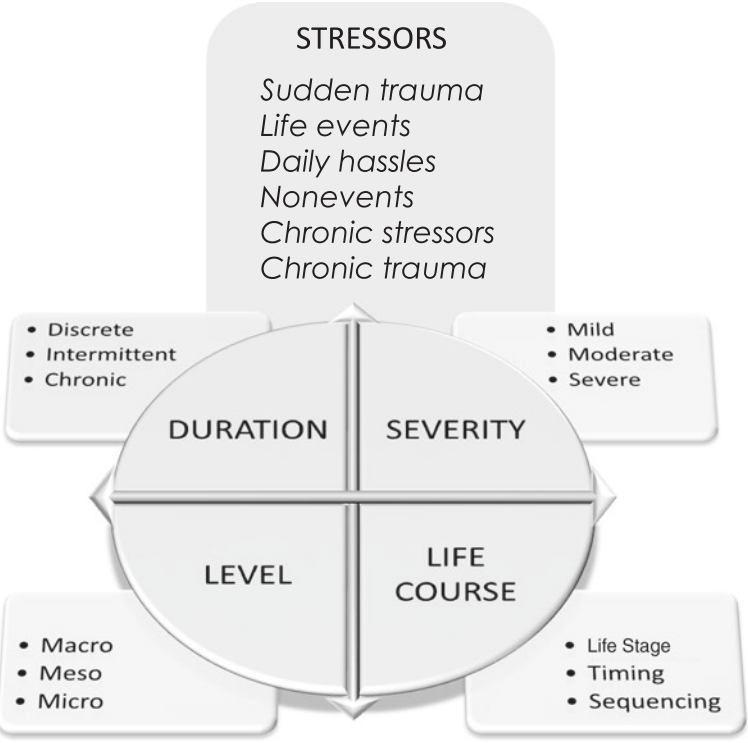

Fig. 3.2 Dimensions of the stress universe. Based on Wheaton (1994) and Wheaton et al. (2013)

recession-induced job insecurity to adverse mental health outcomes even among workers who do not lose their jobs during the recession (see Tausig 2013).

Two additional dimensions also were identified. One is *severity*—how much threat the stressor poses or the extent to which it impedes the attainment of one's goals. The other is a life course dimension, which acknowledges that stressors occurring early in the life course are consequential to mental health later in life, and also that the timing and sequencing of life transitions matters, as when events occur earlier or later than the norm, for instance, early entry into marriage or spousal bereavement in early adulthood (Pearlin and Skaff 1996; Pearlin et al. 2007).

Wheaton (1994) unified an extensive array of distinct types of stressors by locating them within the stress universe and in doing so reset its boundaries. In addition to life change events and chronic stressors, he included several sources of stress that were emergent at the time but not fully integrated into research on the structural contexts of the stress process: traumas, daily hassles, and nonevents. Wheaton et al. (2013) cite the American Psychiatric Association (1987: 250) in describing traumas as stressors of such overwhelming severity that they are "outside the range of usual human experience" and "markedly distressing to almost anyone". Conversely, "daily hassles" are day-to-day irritations and frustrations, such as traffic and waiting in lines (Kanner et al. 1981). Although similar to chronic stressors in their persistent and recurrent nature, daily hassles are distinct in that they are less severe. "Nonevents" are expected or sought-after changes that do not occur, such as being passed over for an anticipated promotion at work (Gersten et al. 1974); they are the mirror opposites of life change events. Current research continues to expand the stress universe, such as several recent examples from non-Western societies including family disruption due to labor out-migration (Lu et al. 2012), food insecurity (Tsai et al. 2012), and large-scale population displacements (Cao et al. 2012).

The dimensions of the stress universe (see Fig. 3.2) can be illustrated with the stressor of perceived discrimination (Harrell 2000; Clark et al. 1999). Discrimination refers to biased behavior toward members of a social group who share an attribute that is devalued and stigmatized in a particular society (Link and Phelan 2001). When conceptualized as a stressor, exposure to discrimination typically is classified into two types (e.g., Williams et al. 1997). The first is major lifetime events, which are discrete incidents of a magnitude sufficient to impact important aspects of a person's life, such as the ability to earn a living, for example, being unfairly denied a promotion. This type of discrimination is usually assessed for any occurrence over the course of one's life. In contrast, everyday experiences of discrimination tend to be repeated or continual and often are ambiguous occurrences, such as receiving poor service at restaurants, and are typically assessed for current experiences. Discrimination occurs at multiple levels, for instance institutional practices like a hiring preference for low wage workers that leads to de facto age discrimination for potentially large numbers of job applicants compared to racial slurs directed at an individual. Most research addresses perceived discrimination at the micro-level, such as a recent study by Grollman (2012) finding that multiple disadvantaged statuses lead to encountering multiple

forms of discrimination, which then is associated with worse mental health above the effect of only one form of discrimination. There are exceptions, however, such as Gee's (2002) study of redlining, which is an institutional discriminatory lending practice for mortgages.

As attention focused on the nature of stressors, it became apparent that these sources of stress often are not independent of one another, but instead share a causal connection to one another. Pearlin described these connections as a process of stress proliferation, in which an original or primary stressor leads to a secondary or consequent stressor, which then exerts its own effect on mental health (Pearlin et al. 1997). Proliferation can occur among different types of stressors, for instance: life events can lead to chronic stressors, traumas can result in life events, and so on. For example, Cao et al. (2012) find that the large scale population displacement resulting from China's Three Gorges Dam Project was associated with higher levels of depressive symptoms in part because displacement resulted in a significant decline in living standards.[6] Pearlin and Bierman (2013) argue that stress proliferation directs our attention away from examining one stressor at one particular point in time and toward configurations of multiple stressors occurring at the same time or in a series over time. Failure to fully account for the full spectrum of exposure, they note, may lead to biased estimates of the effect of the primary stressor and may masquerade as differential vulnerability to the primary stressor.

Thus, not only did the boundaries of the stress universe expand, but there was growing awareness that stressors are not necessarily independent occurrences but instead often are woven into the fabric of people's lives. As a result of charting the boundaries and content of the stress universe, it became possible to develop measures that more fully capture the spectrum of stressors to which people may be exposed (e.g., Wheaton 1994; Turner et al. 1995).

Based on these developments, Turner et al. (1995) initiated a line of research on the social epidemiology of the stress process, pursuing the research agenda laid out by Pearlin (1989) as described above. They started by declaring that the differential exposure hypothesis had never been effectively tested because extant research has not used adequate measures of stress exposure (as discussed above). Using a more comprehensive measure, the investigators found that the distribution of stressors varied by social status and that these distributions aligned precisely with that of depressive symptoms and major depressive disorder. Most importantly, differences in exposure accounted for a substantial proportion of the observed status differences in depressive outcomes. Their results also discounted the efficacy of differential vulnerability as an explanation of status differences in depressive outcomes. The investigators concluded that chronic stressors rather than life events are of primary importance to explaining depressive states and their social distributions. It soon became evident that failure to take into account the full

[6] Similar indirect effects were found for loss of social integration, which is conceptualized as a secondary stressor, but also could be conceptualized as resources that are depleted by displacement.

array of stressors to which people may be exposed had underestimated the role of stressors in explaining social status differences in depressive symptoms and provided biased estimates of differences in exposure to stressors by race/ethnicity, socioeconomic status, and gender (Avison and Turner 2003).

Related research then considered the extent to which social patterns in personal and social resources exist, and if so, whether these patterns account for parallel patterns in mental disorder, an endeavor that has yielded mixed results. Turner and Marino (1994) found that social support differences by social status parallel the distribution of depressive outcomes (with the exception of gender), but that social support contributes little to the explanation of most status differences in depressive outcomes. Mastery and self-esteem also did little to explain status differences in mental disorder, with the notable exception that the relatively low level of mastery among persons of low SES fully accounts for their tendency to have relatively high levels of depressive outcomes (Turner et al. 1999). Collectively, these results imply that social and personal resources generally do not substantially mediate the association between social status and depressive outcomes; although these resources do have beneficial effects on mental health (see also Turner and Lloyd 1999).

Although existing research has demonstrated that stressors and resources are not distributed randomly but are more concentrated in some social strata than others, the precise nature of these differences and their contribution to explaining social patterns in mental health outcomes continues to be at the forefront of stress research. As a case in point, Boardman et al. (2011) recently examined trajectories of exposure to stressors from adolescence to young adulthood, finding that Blacks have higher rates of exposure than Whites for three of four stress trajectories, including chronic exposure, while Whites have higher rates than Blacks for only one trajectory, being relatively stress free over this time in the life course. However, race differences in exposure accounted for only a modest amount of the higher level of depressive symptoms among Blacks compared to Whites. However, the field has moved away from comprehensive assessments of the influence of multiple stressors in favor of disaggregated studies of single stressors, limiting the extent to which findings are informative about the domain of stressors in general (Wheaton et al. 2013) and the extent to which differential exposure to stressors accounts for status differences in mental health.

Moreover, recent research indicates that high social status is not invariably associated with low exposure to stressors. The stress of higher status hypothesis argues that some desirable characteristics of higher status occupations—such as controlling one's work schedule and working independently—are associated with greater exposure to stressors, such as conflict at the interface between work life and home life (Schieman et al. 2006, 2009; Schieman and Reid 2009) and interpersonal conflict at the workplace (Schieman and Reid 2008, 2009). Similarly, Grzywacz et al. (2004) recently found that better educated persons encounter more frequent daily stressors; however, these stressors were objectively and subjectively less severe, on average, for college graduates than for those with less than a high school degree; and, differential exposure did not account for educational differences in psychological distress.

These exceptions notwithstanding, Thoits (2010) concludes that differential exposure to stress is a central mechanism in generating mental health disparities based on gender, race/ethnicity, marital status, and social class. She also maintains that discrimination is a stressor that adds to the already disproportionately high level of stress exposure among lower status, disadvantaged groups. These same groups generally have lower levels of coping resources too, which means that the groups that could benefit most from resources because of their relatively high exposure to stressors are the same groups that have the least resources.

3.2.3 Outcomes of the Stress Process: A Continuum of Distress Versus Discrete Disorders

Like stressors, the nature of the mental health outcomes of the Stress Process Model also has garnered considerable attention over the years, a particular instance of a larger debate about the most appropriate outcomes for sociological research into mental health, specifically a continuum of psychological distress versus discrete disorder. The latter is based on the medical model, which defines mental disorder as a disease or a disease-like condition that is explained by genetic defects, biochemical imbalances, hormonal dysregulation and neuronal deficits that can be treated through medical means (see Aneshensel et al. 2013). Problematic thoughts, feelings, and actions are seen as signs and symptoms of underlying pathology, and words like mental illness are used literally, not metaphorically. The designation of these states as "signs and symptoms" of a discrete disorder that is either present or absent, such as major depressive disorder, is the quintessence of the medical model.

An alternative perspective, one favored by many sociologists, is that psychopathology is at the extreme negative end of a continuum with similar feelings, thoughts, and behaviors that fall into the realm of normality. Mirowsky and Ross (1989a, b, 2002), staunch critics of the diagnostic approach, argue forcefully that the diagnostic approach impedes scientific understanding by "reifying diagnostic categories", that is, treating observable attributes (such as hallucinations and delusions) as indicators of hypothetical underlying entities (such as Schizophrenia). This practice diverts attention away from the causes of real experiences, they contend, and toward the hidden and possibly nonexistent biological causes of socially constructed psychiatric entities. Mirowsky and Ross (1989a, b, 2002) also have enumerated substantial methodological shortcomings to reducing a measurement of a continuous phenomenon into a dichotomous variable, including: treating everyone who meets diagnostic criteria as if they had the same symptom profile, and ignoring differences in symptomatology among those who do not meet criteria; and, the resulting loss of statistical power that makes it more difficult to detect an association between mental health outcomes and risk factors.

In point and counterpoint, one side of the debate contends that disorder is qualitatively distinct from seemingly similar normal states and that symptom checklists measure "problems in living," which are ephemeral and of limited clinical importance; the other side maintains that diagnostic-type measures trivialize

the psychological distress that is most common and consequential in the general population. This debate has been aired in special issues of two journals: *Journal of Health and Social Behavior* (Horwitz 2002a) and *Health: An Interdisciplinary Journal for the Social Study of Health, Illness and Medicine* (Ritter 2007).

In recent years, an arsenal of statistical models—confirmatory factor analysis, latent structural analysis, latent class factor analysis, factor mixture analysis, and growth mixture analysis, and so on—has been applied to symptom data in an attempt of adjudicate this dispute. For instance, taxometric analysis—which uses the distribution and empirical covariation of symptoms to draw inferences about the probable nature of the underlying state as continuous, discrete, or mixed—yields results for symptoms of depression are consistent with both a dimensional model (symptoms of distress, e.g., depressed mood) and a discrete entity (somatic symptoms, e.g. sleeplessness) (Beach and Amir 2003). Although discussion of this issue in sociology has focused on depression and psychological distress, it applies to other conditions as well. For example, van Os and associates (van Os et al. 2009) describe a proneness–persistence–impairment continuum model for psychosis as well as an underlying latent categorical structure, concluding that the population of affected persons may be composed of two types of people. Recent work posits dimensional higher order constructs, such as internalizing and externalizing disorder, for families of discrete disorders with common biological, genetic, environmental, and psychosocial risk factors (Kessler 2013). Although the statistical analysis of quantitative data may yet provide scientific consensus about the nature of disorder, such consensus lies in the future, and many are likely to be persuaded by other criteria, such as the subjective views of the persons who experience these conditions, a position advocated by Mirowsky and Ross (2002)—Descartes versus Locke.

Although the discrete/dimensional debate has been presented at times as an either/or choice, this perspective is inconsistent with the empirical evidence supporting both aspects of mental illness. It seems unnecessarily restrictive to anoint one approach as superior for all sociological research questions, even all studies on the Stress Process Model. A single conceptualization of disorder and mode of assessment simply does not fit all types of inquiries (Aneshensel 2002).

3.2.4 Outcomes of the Stress Process: Single Versus Multiple Outcomes

Research on the stress process historically has emphasized depressive outcomes and continues to do so, although it is now somewhat more common to study multiple outcomes, such as depression and substance abuse. As a result, our knowledge of the mental health consequences of exposure to stressors is thin in comparison to what we know about how stressors function as antecedents of depression. In this regard, Aneshensel et al. (1991) demonstrate that research on a single disorder is inherently inadequate for identifying the overall or total mental health consequences of exposure to stressors. The latter, they argue, requires a dependent variable that captures

the full range of disorders for which stress is a plausible etiological factor. When one particular disorder is tacitly treated as a proxy for the universe of all stress-related disorders, people with other stress-related disorders are in essence misclassified because they do not have the disorder under investigation. This misclassification results in biased estimates of the overall effect of stressors on mental health.

An important corollary is that estimates of group differences in the impact of stress for a particular disorder cannot be equated with whether stress exerts a more harmful effect on mental health among some social groups than others, the differential vulnerability hypothesis. Aneshensel et al. (1991) provide an empirical example demonstrating that estimates for two separate disorder-specific models—affective/anxiety and substance-use disorders—are not good approximations of the effect of stressors for a composite category of any psychiatric disorder and provide misleading results with regard to differential vulnerability. Horwitz (2002b) similarly concludes that studying single outcomes misrepresents comparisons of group differences in response to stress when these groups have different psychological responses to stressors, for instance, depression versus substance abuse.

The necessity of examining multiple outcomes is demonstrated by a recent study by Ueno (2010) that applies the stress process model and the minority stress model to explain the relatively high levels of depressive symptoms and drug use among young adults who have had same-sex sexual contact. In this study, stressors and resources contribute to the explanation of the association between sexual minority status and depressive symptoms, but not its association with drug use. Thus, the mental health effects of stressors and resources would have been misrepresented if only depressive symptoms or only drug use had been studied.

Wheaton (2010) enumerates several outcomes that extend beyond mental health to areas of interest to mainstream sociology, including: differential risk for entry into and exits from social roles, such as marriage and divorce; disparity in life outcomes, including those that stem from achievement in the status attainment process, such as attenuated education; differential access to desirable social statuses; and, turning points in the life course. As a concrete example, a recent study by (Boswell et al. 2004) examined the impact of work stress on multiple work outcomes—loyalty, withdrawal from work (e.g., absenteeism), job search, and intent to quit. As another example, Boynton-Jarrett and colleagues (Forthcoming) link "turbulent" life transitions during adolescence—such as frequent residential mobility, school transitions, family structure disruptions, and homelessness—to multiple outcomes in young adulthood including high school completion and cumulative exposure to violence. For these reasons, Wheaton (2010) cites multiple outcomes as a key development in the evolution of the Stress Process Model.

3.3 Future Directions: Mediators and Moderators

Although mediation and moderation figure prominently in research on the stress process, it is our contention that these terms are too often applied in a semi-automatic manner with insufficient attention to the theoretical reasons for why these

processes should occur within the context of the types of stressors, resources, and outcomes being studied. Extant research tends to employ a commonsense approach, often post hoc, to explaining why resources act as mediators and/or moderators—as distinct from testing a formal theory about these processes. In particular, we find fault with the application of the concept of mediators as it pertains to the idea that resources *counteract* the mental health effects of stressors because it appears that resources typically do not perform this function. Given this provocative conclusion, some explanation is warranted.

In research on the stress process, mediation typically is inferred when (1) the magnitude of the direct effect of the stressor on the mental health outcome is decreased with the addition of the resource to the model, and (2) the resource has a statistically significant effect on the outcome.[7] This finding, however, does not indicate that the resource counteracts exposure. On the contrary, it shows that the resource is depleted, as when married friends sever ties with couples who divorce, and that the resource is the means through which the stressor exerts its damaging effect on mental health. This dynamic quite clearly runs counter to the idea that the resource counteracts the effects of exposure.

The direct effect of the stressor may instead increase with the addition of a mediator to the model, and it is this pattern that conforms to the idea of resources qua resources. This pattern is the result of a positive sign between the occurrence of the stressor and the resource, indicating mobilization of the resource, for instance, when being fired or laid off from a job prompts former co-workers to help in a job search. Wheaton (1985) identifies this dynamic as an additive form of stress buffering (as distinct from buffering as moderation) because its indirect effect via the resource is opposite to its direct effect such that its total effect is smaller than it would be if the resource had not been activated by the stressor.[8]

Although exceptions exist to the following generalization, studies usually find stress-induced depletion of resources, the opposite of the theoretical function of resources as counteracting stressors. Instead, there are fewer resources when they

[7] As noted earlier, the original conceptualization of the Stress Process Model treated self-esteem and mastery as the means through which stressors damage mental health, a conceptualization that evolved over time to the role of resources, perhaps because these concepts, along with social support, do generally counteract the effects of stressors when considered as moderators.

[8] In statistical terms, this is an instance of inconsistent mediation, which means that the indirect effect of the independent variable is opposite in sign to its total effect (MacKinnon 2008). In this case, the indirect pathway from stressors to resources to disorder has a negative sign ($+ \times - = -$) such that an increase in the stressor indirectly produces a decrease in disorder, whereas the total effect of stressors on mental health has a positive sign. Theoretical and analytic neglect of the sign of the relationship between stressors and resources may be the result of the tendency of stress researchers to assess mediation using the difference of coefficients method (instead of the product of coefficients method; MacKinnon 2008), in that it is not necessary to examine the effect of the stressor on the resource. Also, stress researchers often do not test the statistical significance of the mediated effect, an oversight that may lead to the erroneous conclusion that mediation has occurred when it probably has not. Mediation also can be assessed with structural equations models (SEMs), in which case the sign is obvious and tests of statistical significance are parts of the routine output.

are most needed. For instance, Thoits (2013) notes that while self-esteem sometimes increases in response to a stressor, the dominant pattern is decreased self-esteem, leading to the conclusion that the diminishment of self-esteem is one of the pathways through which stressors damage mental health. Our point is not that findings are misinterpreted; this is not the case. Instead, these findings do not seem to have congealed sufficiently to propel the further evolution of the Stress Process Model toward explaining why the depletion of resources occurs more often than mobilization.

At this stage in the evolution of research on the stress process, it is opportune to expand the model to more fully include the theoretical basis for how stressors affect resources and to test these mechanisms. That is, identifying the processes that transmit the effect of the stressor on the resource should become a research objective in its own right. As shown in Fig. 3.3, this elaboration concerns the juncture between stressors and resources, specifically the intermediary factors and processes that mediate mediation.

As an example of the type of theory we have in mind, Thoits (2013) applies symbolic interactionist theory about the derivation and maintenance of self-esteem from perceptions of the reactions of others to the self, including the impact of threats to self-identities on stress appraisal. McLeod's (2013) discussion of social evaluation processes with regard to the impact of social stratification on mental health can be applied to the effects of stressors on resources too. For instance, the application of theory on social comparisons and reference groups to the explanation of why negative appraisals from advantaged groups do not invariably result in low self-esteem among disadvantaged groups is relevant to social psychological processes that might transmit the mental health effects of the types of identity-relevant stressors discussed by Thoits (2013).

Parenthetically, more attention is required regarding the theoretical implications of findings in which hypothesized mediation is not found. In general, these null findings are not addressed sufficiently in favor of interpreting other positive findings of the study. Often these other findings reveal that stressors and resources have separate and opposite effects on the mental health outcome. Wheaton (1985) describes this pattern as an illusory stress-buffering model: Resources offset the stressor, but do not buffer it because the resource operates even in the absence of the stressor. When mediation is hypothesized, these findings disconfirm this aspect of the theory and merit more serious consideration than is often given.

We have parallel observations and recommendations to make about the concept of resources and moderation, although in this instance the idea that resources counteract exposure is merited. In the case of stress-buffering as moderation, the resource plays a protective function, dampening the effect of the stressors relative to having less of the resource. This form of stress-buffering usually is operationalized as a product interaction term between the stressor and the resource. The most firmly established instance of moderation is the stress-buffering function of social support in which exposure to stressors has a stronger adverse effect on mental health among people who derive little support from their social relationships compared to those who feel they are cared for, loved, and esteemed (see Thoits 2011).

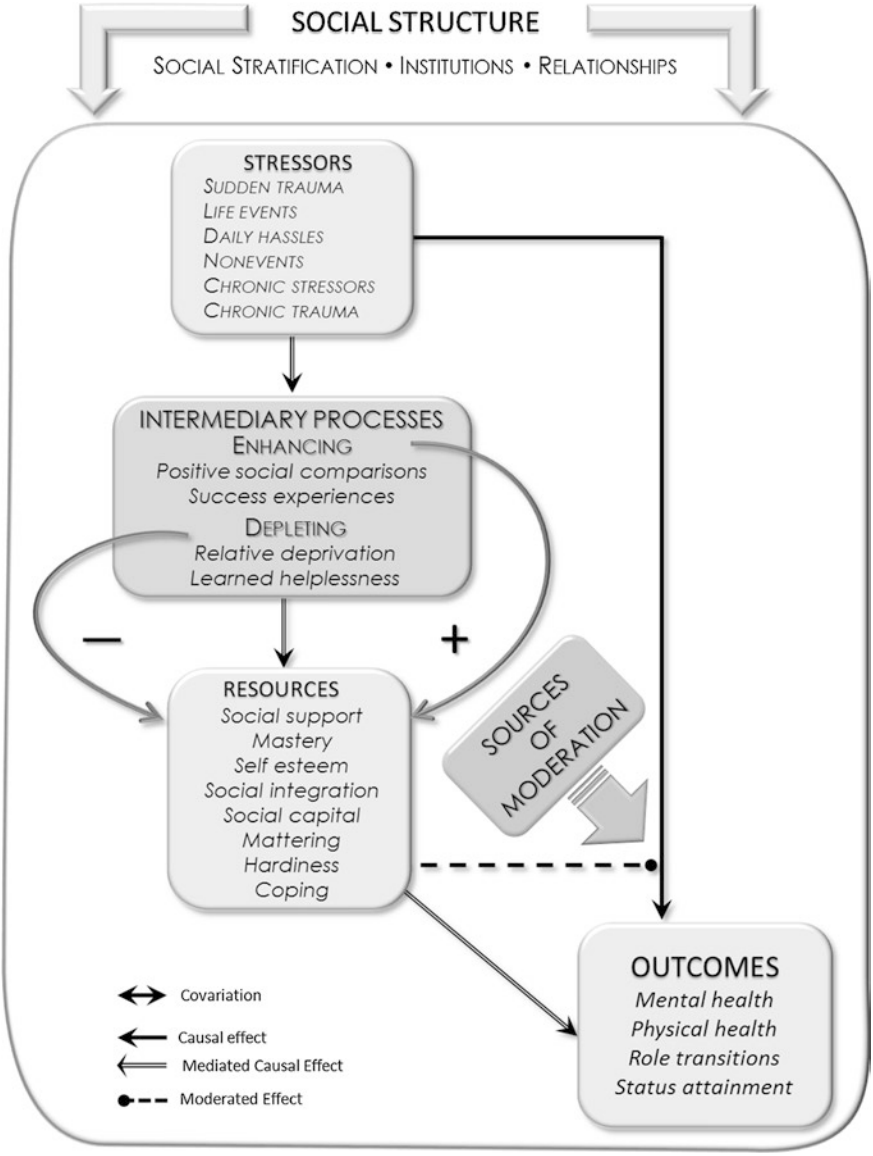

Fig. 3.3 An elaboration of the stress process. Not all paths shown for simplicity

The distinction between mediators and moderators is complicated by the fact that the same resource may serve both functions.

A recent study by Prelow et al. (2006) illustrates these distinctions by testing three models of social support as a mediator and/or moderator of the effect of racial discrimination on depressive symptoms among a sample of African American

college students: (1) conditional stress-buffering (moderation), (2) discrimination-induced mobilization of support (mediation as additive buffering); and, (3) the opposite—deterioration of support (mediation opposite to buffering). Findings are consistent with only the support-deterioration model: Discrimination is negatively associated with social support, which, in turn, is positively associated with symptoms so that persons exposed to discrimination have more frequent symptoms than they otherwise would have if their sense of support had not been diminished by exposure to discrimination.

As with mediation, we recommend that the Stress Process Model be expanded to include a theoretical explanation for why moderation occurs and that research test these explanations. This elaboration of the Stress Process Model would entail identifying the factors and processes that account for the effect moderation produced by the resource, as shown in Fig. 3.3. In statistical terms, this typically would mean adding variables to the model that reduce or eliminate the product interaction term that operationalizes moderation. In addition, more attention needs to be paid to the theoretical implications of failing to find hypothesized moderation.

3.4 Conclusions

Earlier we asserted that the publication of *The Stress Process* has been as influential as it has been in large part because it posited a *system* of relationships among stressors, social and personal resources, and mental health outcomes. The constructs that comprise this system have been elaborated considerably over time, especially with regard to the nature of stressors and outcomes. Current applications continue to emphasize several key relationships among these constructs: (1) the extent to which differential exposure to stressors accounts for social status differences in the risk of having a mental health disorder, (2) whether these status differences are due to differential vulnerability, and (3) the mediating and moderating roles of resources in accounting for the effects of exposure on mental health outcomes. The constructs and relationships set forth in the original specification of the stress process have proven to be a solid foundation for subsequent work on the mental health effects of social stress.

Whereas the past thirty years has seen considerable elaboration of the constructs comprising the Stress Process Model, especially stressors, it is our contention that the relationships among these constructs warrants equal attention, specifically the explanation of mediation and the explanation of moderation. This endeavor should flow from the application of mid-range theory about the social origins of self-esteem (see Thoits 2013) and mastery (see Ross and Mirowsky 2013), and the factors that influence the perception of being supported by others (see Turner and Turner 2013). In this regard, we echo Thoits' (2011) recent call for explaining *how* social support exerts its beneficial effects on mental health rather than continuing to demonstrate that it has these effects (although this recommendation pertains to a different juncture in the stress process). Thus, it is our belief

that the future of research on the Stress Process Model lies in explicating more fully how this system operates.

The system of relationships set forth in *The Stress Process* (Pearlin et al. 1981) set in motion a program of research carried out by numerous researchers that has elaborated the model's basic constructs and relationships. These developments have illuminated the conceptual overlap with other research areas, especially the life course, social stratification, emotions, and social psychology. In this manner, the Stress Process Model has helped make the sociology of mental health a mainstream area of sociological inquiry.

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