Psychosocial Resources and the SES–Health Relationship

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ABSTRACT: **Psychosocial resources, which include optimism, coping style, a sense of mastery or personal control, and social support, influence the relationship between SES and health. To varying degrees, these resources appear to be differentially distributed by social class and related to health outcomes. Such resources may partially mediate the impact of SES on health. For example, environments that undermine personal control may have an impact on chronic arousal and the corresponding development of disease, such as CHD. Psychosocial resources may also moderate the impact of SES on health. For example, a large number of positive social relationships and a few conflictual ones may buffer individuals against the adverse effects of SES-related stress. These psychosocial resources are moderately intercorrelated, and so a research strategy that explores their coherence as a psychosocial profile that promotes resilience to stress is tenable and merits empirical examination. The erosion of these resources as one moves lower on the SES scale and specific factors that contribute to such erosion are discussed.**

INTRODUCTION

What explains the robust SES gradient with respect to all-cause mortality and health outcomes? How does social class get under the skin so that it adversely affects basic bodily processes and the likelihood of illness? Plausible pathways include the differential practice of health habits, differential availability and use of health services, the cumulative adverse effects of chronic stress, and the inability to meet chronic stress with resources that may help to diffuse its psychological and biological impact.[1] Our analysis focuses on this last pathway, arguing that the availability of psychosocial resources varies by social class, and the effectiveness of those resources for moderating stress may vary by SES as well. We begin by identifying the resources that have been shown to be distributed by SES, to most effectively moderate the effects of stress, to ameliorate the effects of ill health, or all three. Four psychosocial resources meet these criteria: a sense of personal control, optimism, social support, and ways of coping. To varying degrees, these resources seem to be distributed by SES and are associated with health outcomes. As such, they may partially mediate the relation between SES and health; they clearly moderate the SES and health relationship; and, taken together, they present a portrait of the type of person who may best be able to combat the health risks of SES-related chronic stress.

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PERSONAL CONTROL

Personal control, also known as a sense of personal mastery, reflects individuals' beliefs regarding the extent to which they are able to control or influence their outcomes. Many theorists have emphasized the importance of perceptions of personal control or mastery and suggested that this desire is a fundamental need of human beings.[2,3] A variety of instruments assess control-related beliefs,[b] with Pearlin and Schooler's[4] "Personal Mastery Scale," the most widely used measure in health research.

Studies have shown a positive association between SES (e.g., higher income and/or education) and belief in personal control.[5–9] Similar patterns of association are seen for related constructs such as personal mastery[10–12] and self-efficacy,[10] and lower SES has also been associated with greater powerlessness and anomie.[6,13] Social class differences in personal control beliefs may also be importantly influenced by characteristics of the environmental settings that are likely to be inhabited by different social classes. For example, Kohn and Schooler found that work setting characteristics such as environmental complexity and contingency (i.e., control over the process of one's work) can promote the development and persistence of stronger personal agency/control beliefs,[14] and studies of the effects of downward mobility with respect to employment status highlight the negative impact of such experiences on personal control and efficacy beliefs.[10,12]

Evidence linking control beliefs to health is mixed, with evidence for both more positive and more negative health outcomes associated with stronger perceptions of personal control. Some studies show a relation between a higher sense of control and better psychological health,[15] as well as better physical health outcomes, including lower incidence of CHD,[16] better self-rated health and functional status,[17,18] and lower mortality risk.[17,18] However, control beliefs can be associated with poorer health outcomes under certain circumstances,[19,20] especially when expectations for control are high but opportunities to exercise it are constrained.[20–22] Both animal and human studies have found the highest levels of reactivity (that is, increasing cardiovascular or neuroendocrine activity or reduction in immune function) in situations marked by incongruity between expectations for control and situational uncontrollability or difficulty in controlling outcomes.[23–26] The relation between the Type A behavior pattern and increased risk for heart disease may also be an example of such links. Type As have been shown to have a strong need for control,[27] to persist in attempts for control in laboratory situations,[27,28] and to exhibit greater physiologic reactivity in the face of uncontrollable situations.[29] Such persistence, in the face of external realities that limit or prevent actual control over outcomes, along with its accompanying physiological reactivity, may contribute to Type As' increased risk for CHD. Personal control beliefs, however, may also contribute to CHD risk independent of Type A behavior. The presence of stronger personal mastery beliefs, for

[b]These control-related beliefs include: global assessments (e.g., the original Rotter I-E scale and Pearlin's Personal Mastery scale (see Ref. 115 for details); factorial measures that provide separate measures of beliefs regarding "personal control," "powerful others," and "chance" (e.g., Internality, Powerful Others, and Chance Scales or Spheres of Control; see Ref. 115 for review of measures); domain-specific measures (e.g., "Health Locus of Control"[116]; see Ref. 115 for a more complete review of available scales).

example, has been found to be associated with greater coronary atherosclerosis independent of other known risk factors.[19] To the extent that such strong mastery beliefs promote unrealistic expectations for control, they may be associated with patterns of physiological arousal that promote the development of atherosclerosis.

Socioeconomic status may also moderate the association between control beliefs and health outcomes. Using data from three national samples, Lachman and Weaver[11] found significant interactions of control beliefs with both education and income in relation to health and well-being. Specifically, although beliefs in personal control were associated with more positive health outcomes in all SES groups, the differences in health outcomes associated with stronger versus weaker control beliefs were greater at lower levels of education and income. Among those with less education or income, those with strong control beliefs reported health outcomes comparable to those seen in higher SES groups for self-rated health, acute physical symptoms, depressive symptoms, and life satisfaction. Continued focus on the antecedents of control beliefs, their distribution by SES, and their relation to health outcomes, is clearly justified by the current evidence.

OPTIMISM/PESSIMISM

Optimism refers to outcome expectancies that good things, rather than bad things, will happen. Interest in optimism was fueled initially by a model of behavioral self-regulation derived by Carver and Scheier[30] which assumes that goal-directed behavior is guided by a hierarchy of closed-loop negative feedback systems. Optimism is judged to be a general and stable dispositional resource that influences whether an individual will stay focused on reducing discrepancies between present behavior and a goal or standard selected for pursuit. Both generalized outcome expectancies (dispositional optimism) and specific situational expectancies (situational optimism) are believed to maintain focus and effort.

Dispositional optimism is most commonly measured by the LOT-R,[31] a 10-item scale assessing respondents' agreement with such statements as, "In uncertain times, I usually expect the best." Another approach to assessing dispositional optimism derives from Seligman's[32] theoretical position on learned helplessness. It maintains that, to the extent that generalized expectancies are negative, internal, and global, bad health and mental health consequences will follow. Pessimistic explanatory style, as this response style is called, is measured by content analysis of interview protocols for attributions of negative events to stable, internal, and/or global factors. A third conceptualization of optimism, situational optimism, examines positive outcome expectancies for specific situations. Because specific expectancies are more proximal to specific events than dispositional beliefs, they may be important predictors of psychological and biological responses to specific stressors.[33]

The research literature has not previously addressed the relation of optimistic expectations to SES. To do so, we analyzed four existing datasets with reasonable variability in SES, and an intriguing pattern emerged.[c] In all four data sets, a modest relationship between dispositional optimism and SES was fully explained by pessimism. That is, when the scale items assessing pessimism (negatively worded items) were examined separately from those measuring optimism (the positively worded

items), optimism was unrelated to SES, but pessimism was significantly and consistently related at moderately high levels. Thus, SES appears to be related to the development of negative expectations for one's outcomes, though not necessarily positive ones.

A modest amount of evidence has related dispositional optimism/pessimism to health-related outcomes. Schulz *et al.*[2] found that the pessimism items of the LOT were a significant predictor of early mortality among young patients with recurrent cancer, after controlling for site and symptoms. Conceptually related findings are also reported by Antoni and Goodkin,[34] who found that, among women with atypical neoplastic cervical growth, those who were pessimistic (as assessed by the Millon Inventory) were more likely to have severe disease. In a study of CABG patients, Scheier *et al.*[35] found that those scoring low in optimism (total LOT score) were significantly more likely to have developed new Q-waves on their electrocardiograms as a result of the surgery and were significantly more likely to have a clinically significant release of the enzyme aspartate aminotransferase. Both are markers for MI, suggesting that the pessimists were significantly more likely than the optimists to have had an infarct during surgery. These relations persisted after controlling for number of grafts, severity of CHD, and a composite index of coronary risk factors. Optimism also significantly predicted rate of recovery, such that optimists were faster to achieve behavioral milestones, such as sitting up in bed and walking, than were pessimists, and were rated by staff members as showing a better physical recovery. At six-month follow-up, optimists continued to have a recovery advantage, reporting that they were more likely to have resumed vigorous physical exercise, to have returned to work, and to have resumed normal activities (see also Ref. 36). In a five-year follow-up, optimists were more likely to be working and, among those experiencing angina, reported less severe chest pain. Optimists were also less likely to be rehospitalized for complications arising from the surgery. Two studies of college students conducted during the last weeks of the academic semester found that optimists reported developing fewer physical symptoms than pessimists over time, taking baseline symptoms into account.[37,38] In addition to its association with disease directly, dispositional optimism has been related to other routes to biological endpoints, including the use of more active and problem-focused coping strategies,[39,40] greater psychological well-being, and better health habits (e.g., Ref. 41; see Ref. 42 for a review). Not all studies show a protective relationship of optimism or a negative effect of pessimism on health. Chesterman *et al.*[43] found that optimism predicted birth complications in older women, and Cohen *et al.*[44] found evidence suggesting decreased immunocompetence in optimists in response to stress; however, in another study,[45] pessimism was associated with decreased immunocompetence in response to stress.

Some research has also related situational optimism to health-related outcomes. For example, in the context of HIV infection, negative HIV-specific expectancies

[a]The data sets were a study of Florida residents' recovery from Hurricane Andrew (Gail Ironson, P.I.); the Women and Family Project investigation of women at risk for HIV (Gail Wyatt, P.I.); the MACS Cohort Study, an investigation of the natural history of AIDS in gay men (Roger Detels, P.I.); and an investigation of recovery patterns of 234 coronary artery bypass graft patients (Michael Scheier, P.I.). The authors wish to thank Michael Scheier and Charles Carver for reanalyzing their datasets to reveal these patterns.

predicted immune decline,[46] symptom onset,[47] and survival time for AIDS.[48] In a study on coping with law school,[49] situational optimists had higher NKCC after controlling for the effects of mood. Leedham, Meyerowitz, Muirhead, and Frist[50] found that situationally optimistic expectations were associated with faster recovery following heart transplant.

Studies that have used pessimistic explanatory style as a measure of pessimism have also uncovered relations to health. Pessimistic explanatory style was associated with lower levels of two measures of cell-mediated immunity in a sample of elderly men and women.[51] A study of Harvard University graduates assessing pessimistic explanatory style at age 25 found that these men had significantly poorer health or were more likely to have died when they were assessed 20 to 35 years later.[52]

In conclusion, pessimism appears to be related to SES, and it has shown relationships to important health outcomes. The intriguing asymmetry of positive and negative expectations and their relation to SES merits continued exploration. In particular, research should focus on how these negative expectations develop and whether they partially account for the SES–health relationship.

SOCIAL SUPPORT

Social support refers to the types of help that people receive from others, and it is generally classified into two (sometimes three) major categories: emotional and instrumental (and sometimes informational) support. Emotional support refers to the things that people do that make a person feel loved and cared for and that bolster a sense of self-worth (e.g., talking over a problem, providing encouragement/positive feedback); such support frequently takes the form of nontangible types of assistance. By contrast, instrumental support refers to the various types of tangible help that others may provide (e.g., help with child care/housekeeping, provision of transportation or money). Informational support (sometimes included within the instrumental support category) refers to the help that others may offer through the provision of information.

Investigators have chiefly explored three types of measures of social support. The first is network measures, namely whether people are involved in relationships and groups, and if so, which ones and how many. That is, are people married; do they have children; do they have friends; and are they members of formal and informal community, religious, and interest groups? The second approach assesses social support, that is, people's perceptions that there are others available to them who might provide emotional or instrumental support. The third approach investigates how satisfied people are with the support that they receive from others.

Social support has been found to vary positively with socioeconomic status in studies in the United States,[53–55] England,[8] and Sweden.[56] This pattern is true for both emotional and instrumental support and for both men and women (though the differences appear to be somewhat greater for men.[8] Notably, however, the actual size of the observed variations is relatively small.[8]

The strongest associations between social support (particularly emotional support) and health outcomes are seen in relation to psychological well-being. A large literature documents lower risk for depression and for psychological distress more

generally for those who enjoy greater social support (for review see Ref. 57). Relationships to physical health outcomes have also been documented. Much of this research has used measures of social integration, such as network size, rather than social support, and found consistent relations to all-cause mortality and extant disease (e.g., Refs. 58 and 59, for reviews). There is also evidence linking both emotional and instrumental support to less extensive development of coronary atherosclerosis[60,61] and to better survival post-myocardial infarction,[62,63] and post-stroke.[64] More generally, evidence suggests that emotional support is protective with respect to physical function.[65] The effects of instrumental support, however, appear to be more mixed with higher levels of such support associated with greater disability in some cases[66] (for review, see Ref. 67).

Studies also show that emotional support in particular affects both psychological and physical health outcomes in children. Children exposed to deficient nurturing are at increased risk for depression[68,69] and suicidal ideation.[70] Children born to mothers who lacked family support are at increased risk for low birth weight[71] and childhood exposure to less responsive parenting has been related to increased risk for childhood illness[72] and substance abuse among adolescents.[73,74]

A growing body of evidence links social support to physiological regulatory processes. Among children, presence of a supportive caregiver has been shown to lower HPA responses to maternal separation (as indexed by salivary cortisol levels).[75] For adults, social support has likewise been found to predict lower levels of HPA (hypothalamic–pituitary–adrenal) and SNS (sympathetic nervous system) activity in laboratory-based challenge paradigms as well as community settings.[76] Evidence also links social support to lower risk of decline in CD4 T cell counts among HIV-infected men.[77]

To date, social conflict has been a relatively neglected aspect of social relationships in research on SES, social relationships, and health. Social conflict refers to the various types of negative social interaction that may occur within social relationships (e.g., arguments, criticism, hostility, unwanted demands) and may include physical violence. Available data suggest that lower SES is associated with higher levels of social conflict for adults,[78] and evidence also suggests that lower SES is associated with more troubled peer relations among adolescents.[79] Research also suggests that certain social stressors may be more prevalent in lower SES environments (e.g., residential crowding, fear of crime, financial strain); these stressors are associated with lower perceived support[80–83] and may contribute to reductions in reported levels of social support because they foster a distrust of others.[84] However, high levels of support have been found within certain ethnic enclaves (e.g., see Refs. 85–87).

A modest research literature indicates that greater social conflict is associated with greater psychological distress[78,88] (for review, see Ref. 67). Significantly, the impact of social conflict on psychological distress levels is greater among those living in more crowded homes,[83] an effect that appears to be partially mediated by reductions in perceptions of control.[89]

Relationships between social conflict and physical health outcomes have received little research attention to date. However, in both children and adults exposed to social conflict, patterns of heightened physiological reactivity are found, suggesting possible links to poorer health outcomes. Preschoolers exposed to videotapes of an-

gry adult interactions exhibit increases in heart rate and blood pressure.[90] Research also demonstrates relationships between childhood exposure to conflict and/or physical violence and increased risks for depression,[91,92] headaches and stomachaches,[93] and increased risk of mortality.[94] Increased levels of reported stressors in both day-care and family environments (some reflecting social stressors) have also been related to increased incidence of respiratory illness (though specific measures of family conflict were not related to illness).[95] Studies of adults report relationships between social conflict and greater physiologic arousal both with respect to blood pressure[96,97] and neuroendocrine activity.[98]

Unlike control and optimism, for which there are generally preferred measures of the concepts, social support enjoys no preferred measure, and so the lack of a gold standard for assessing social support has impeded progress. Nonetheless, social support, social conflict, and the balance between them may be important moderators of the SES and health relationship.

COPING STRATEGIES

Coping strategies refer to the specific efforts, both behavioral and psychological, that people employ to master, tolerate, reduce, or minimize stressful events. Two general coping strategies have been distinguished: *problem-solving strategies* are efforts to do something active to alleviate stressful circumstances, whereas *emotion-focused strategies* involve efforts to regulate the emotional consequences of stressful or potentially stressful events. Research indicates that people use both types of strategies to combat most stressful events.[99] The predominance of one type of strategy over another is determined, in part, by personal style (e.g., some people cope more actively than others) and also by the type of stressful event. For example, people typically employ problem-focused coping to deal with potentially controllable problems such as work-related problems and family-related problems, whereas stressors perceived as less controllable, such as certain kinds of physical health problems, prompt more emotion-focused coping.

An additional distinction that is often made in the coping literature is between active and avoidant coping strategies. Active coping strategies are either behavioral or psychological responses designed to change the nature of the stressor itself or how one thinks about it, whereas avoidant coping strategies lead people into activities (such as alcohol use) or mental states (such as withdrawal) that keep them from directly addressing stressful events. Generally speaking, active coping strategies, whether behavioral or emotional, are thought to be better ways to deal with stressful events, and avoidant coping strategies appear to be psychological risk factors or markers for adverse responses to stressful life events.[100]

Broad distinctions, such as problem-solving versus emotion-focused, or active versus avoidant, have only limited utility for understanding coping, and so research on coping and its measurement has evolved to address a variety of more specific coping strategies. A variety of idiosyncratic coping measures exist, but in recent years, researchers have typically used one of two instruments: the Ways of Coping measure[99] or the COPE.[39]

In terms of the SES–health relation, coping style may be a psychosocial resource that is farther downstream than those thus far reviewed. That is, coping methods may be, in part, the result of expectations of control, an optimistic or pessimistic way of thinking, and the degree to which one has social support available. This is not to say that coping strategy is unimportant or epiphenomenal in the SES–health relation, but rather that it may be somewhat farther along on the psychosocial chain as a mediator. Consequently, and not surprisingly, the evidence for the relation of coping strategies to SES is rather meager. Only preliminary evidence has found avoidant coping to be higher as SES decreases.[101]

Both the COPE and the Ways of Coping scales have been reliably tied to psychological distress, such that active coping strategies appear reliably to produce better emotional adjustment to chronically stressful events than do avoidant coping strategies. In terms of physical health outcomes, an active versus avoidant coping strategy has been associated with better immune status in HIV-seropositive men,[102,103] in individuals infected with herpes simplex virus,[104] and in men with immunologically-mediated infertility.[105] Use of denial following serostatus notification was associated with more rapid disease progression in HIV-seropositive gay men.[106] Active coping with disease was associated with fewer recurrences and longer survival from melanoma.[107] Avoidance coping was associated with lower numbers of T cells and reduced NK cytotoxity among law school students.[49]

In summary, it appears as if coping strategies may be part of a mediational chain from SES to health risk, but exactly the ways in which they are affected by or reflect SES, and the point at which they affect health, requires further exploration.

OTHER PSYCHOSOCIAL RESOURCES

We reviewed several other psychosocial resources as candidate mediators or moderators of the SES–health gradient. One resource that does not appear to contribute to the SES–health relation is self-esteem. There is little evidence that self-esteem varies by SES or that it is associated reliably with health outcomes.[108] There does seem to be some role for high self-esteem in successful coping with stressful events and in recovery from illnesses (see Ref. 109), but these beneficial outcomes do not appear to be SES-distributed.

Also deserving of consideration are psychosocial resources that may facilitate longevity and good health at the upper ends of the SES–health gradient, which include vitality and vigor and purpose in life. Relative to the resources already discussed, fewer studies have explored the potentially protective effects of these resources, but preliminary research is promising. For example, vitality may be modestly correlated with SES[110 d] and, on the health side, vitality is associated with fewer chronic physical health conditions,[111] fewer symptoms among people with HIV infection,[112] and fewer symptoms for those with chronic fatigue syndrome.[113] However, measures of vitality do not distinguish between physical and psychological forms, and, therefore, endorsement of exhaustion may represent feelings of physical

[d]We are grateful to Brooks Gump for reanalyzing the Scheier *et al.*[110] data set to reveal these findings.

exertion in the context of poor health or psychological demands in the context of poor coping.[114] Despite these reservations, the potential protective functions of positive states merits additional consideration.

REACTIVE RESPONDING

To further explore the measurement of psychosocial states that may contribute to the SES and health relationship, the MacArthur SES and Health Psychosocial Working Group has used insights from our understanding of SES and how it might affect health to develop measures to try to get closer to understanding how SES gets under the skin. We began by trying to characterize the attributes of environments that may change as one moves lower on the SES scale and identify what the physiological concomitants of those states might be. The result is a concept, termed "reactive responding," and a set of measures that assesses it.

Reactive responding refers to the self-regulatory patterns believed to develop as a result of exposure to chronically stressful environments that may increase as one is lower on the SES ladder. Development of the concept was guided by the observation that, by virtue of being born into a particular social class, an individual is exposed to a set of environments that differ from those that constitute the experience of individuals in other social classes; these regularities are assumed to produce reliable differences across social classes in the evolution of self-regulatory strategies and skills for dealing with characteristics of SES-related environments. The lower one's social class, the more likely one's environments (that is, family, school, work, neighborhood) may be characterized by a dearth of resources, including time and money, as well as an abundance of chronically stressful conditions, such as crowding, noise, crime, and other risks. In contrast, to the extent that one is higher in social class, one's environments may be more rich in resources, such as money, and lower in chronic stressors, providing opportunities for the development of self-regulatory skills devoted to setting future goals, planning, developing a future temporal orientation, and the like. Regularities across environments within level of social class may produce fairly stable class differences in prevailing modes of responding, such that, through chronic use, such self-regulatory mechanisms become instilled as habits or dispositions, and thus may be employed in new environments where they may not always be maximally useful.

Reactive responding is thought to be characterized by the following:

Chronic vigilance/load: A high level of environmental demands, coupled with danger or urgency, may lead to a state of chronic vigilance, such that individuals chronically monitor the environment for threatening cues.

On-line responding/on-line planning: When individual action is driven by environmental demands rather than an individual's self-generated agenda, there may be little opportunity for anticipatory planning; rather, what planning occurs may be online in response to environmental demands.

Emotional action: Responding in demanding environments may be emotionally charged, first due to interruptions from the environment; second, to the extent that risks may be present in the situation; and third, by virtue of an absence of personal control.

Constrained options: When responding occurs as a result of environmental demands rather than self-generated planning, environmental options may be few, and the opportunity for a person to develop alternatives may be low.

Narrow learning and skill development: To the extent that environmental demands drive a person's responses, there may be few opportunities for broad learning. Rather, within the context of constrained options, learning and consequent skills may be quite narrow.

Present orientation: High levels of environmental demands and the need to respond reactively to an environment may foster a present orientation that keeps a person focused on the short-term future.

Simple, short-term goal orientation: A focus on the present, a relative absence of resources, and a relative dearth of opportunities for individual control may lead to the development of relatively simple and short-term goals, as opposed to the creation of long-term goals and opportunities.

We developed a multiscale measure of reactive responding, which attempts to assess these self-regulatory patterns that are believed to develop as a result of exposure to the chronically stressful environments that may increase as one decreases on the SES ladder. In early investigations, three scales have been found to relate to both to SES and to health outcomes: *vigilance*, characterized as the need to chronically monitor the environment for threatening cues (an example of an item is, "I'm on my guard in most situations"); *emotional action*, which measures the extent to which responding in demanding environments is emotionally charged (an example is the reverse-coded item, "I let my emotions cool before I act"); and *goal orientation*, assessing the extent to which people plan where they are going in life and have long-term goals (an example of such an item is, "I have many long-term goals that I work to achieve"). High vigilance, high emotional action, and low goal orientation have been modestly associated with low SES in the samples we have studied thus far, and these same scales appear to be implicated in a variety of health symptoms in several samples. We currently have in place large-scale projects to see if these scales continue to be associated with SES and health in larger and more heterogeneous samples with respect to major health outcomes. What distinguishes our reactive responding scales from the more usual explorations of psychosocial resources and the SES–health relation is, first, the effort to get people to self-rate their behavior in specific and potentially SES-related environments marked by chronic stress and, second, the possible proximity of these experiences to the physiological level, especially vigilance and emotional arousal. Such measures may be helpful in identifying how SES gets under the skin.

CONCLUSIONS

The psychosocial resources reviewed here, although unlikely to be a sufficient explanation for the SES–health relationship, are nonetheless potentially important mediators of SES disparities in health and longevity. Specifically, these are the resources that people bring to stressful encounters that enable them to cope more or less badly with those stressful encounters, both acute and chronic. When we pose the question, "How does SES get under the skin to affect health?" one way in which it

may do so is through the psychological mediation or moderation provided by or facilitated by resources such as psychological control, social support, coping style, optimism, and reactive responding.

What remains to be achieved is an integration of psychosocial resources with an understanding of the biobehavioral pathways by which SES affects health. Psychosocial resources influence the perception of events and the degree to which they are experienced as stressful as well as their aftermath and thus, they initiate, exacerbate, or ameliorate the behavioral, physiological, and neuroendocrine responses to stress in ways that ultimately lead to the startling, robust SES gradients in health outcomes that are so commonly observed. Preliminary efforts to develop such models are already under way (see Baum[117]; McEwen and Seeman[118]).

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REFERENCES

1. TAYLOR, S.E. *et al.* 1997. Health psychology: what is an unhealthy environment and how does it get under the skin? Ann. Rev. Psychol. **48:** 411–447.
2. SCHULZ, R. *et al.* 1994. Pessimism and mortality in young and old recurrent cancer patients. Presented at the Annual Meeting of the American Psychosomatic Society. June. Boston, MA.
3. WHITE, R.W. 1959. Motivation reconsidered: the concept of competence. Psychol. Rev. **66:** 297–335.
4. PEARLIN, L.I. & C. SCHOOLER. 1978. The structure of coping. J. Health Soc. Behav. **19:** 2–21.
5. COHEN, S. *et al.* 1999. The role of psychological characteristics in the relation between socioeconomic status and perceived health. J. App. Soc. Psychol. **29:** 445–467.
6. MIROWSKY J. & C. ROSS. 1986. Social patterns of distress. Annu. Rev. Sociol. **12:** 23–45.
7. LEVINSON, H. 1981. Differentiating among internality, powerful others, and chance. *In* Research with the Locus of Control Construct, Vol. 1. H.M. Lefcourt, Ed.: 15–63. Academic Press, New York.
8. MARMOT, M.G. *et al.* 1997. Contribution of job control and other risk factors to social variations in coronary heart disease incidence. Lancet **350:** 235–239.
9. PINCUS, T. & L.F. CALLAHAN. 1995. What explains the association between socioeconomic status and health: primarily access to medical care or mind-body variables? Advances: J. Mind–Body Health **11:** 4–36.
10. GECAS, V. 1989. The social psychology of self-efficacy. Annu. Rev. Sociol. **15:** 291–316.
11. LACHMAN, M.E. & S.L. WEAVER. 1999. The sense of control as a moderator of social class differences in health and well-being. J. Pers. Soc. Psychol. In press.
12. PEARLIN, L.I. *et al.* 1981. The stress process. J. Health Soc. Behav. **22:** 337–356.

13. BLAUNER, R. 1964. Alienation and Freedom: The Factory Worker and His Industry. University of Chicago Press, Chicago.
14. KOHN, M.L. & C. SCHOOLER. 1983. Work and Personality: An Inquiry into the Impact of Social Stratification. Ablex Publishing Corp. Stamford, CT.
15. RODIN, J. *et al.* 1985. The construct of control: biological and psychosocial correlates. Ann. Rev. Gerontol. Geriatr. **5:** 3–55.
16. KARASEK, R.A. *et al.* 1982. Job, psychological factors and coronary heart disease: Swedish prospective findings and U.S. prevalence findings using a new occupational inference method. Adv. Cardiol. **29:** 62–67.
17. RODIN, J. & E.J. LANGER. 1977. Long-term effects of a control-relevant intervention with the institutionalized aged. J. Pers. Soc. Psychol. **35:** 897–902.
18. SEEMAN, M. & S. LEWIS. 1995. Powerlessness, health and mortality: a longitudinal study of older men and mature women. Soc. Sci. Med. **41:** 517–525.
19. SEEMAN, M. 1991. Alienation and anomie. *In* Measures of Personality and Social Psychological Attitudes, Vol. 1. J.R. Robinson, *et al.* Eds.: 291–372. Academic Press, San Diego.
20. THOMPSON, S.C. *et al.* 1988. The other side of perceived control: disadvantages and negative effects. *In* The Social Psychology of Health. S. Spacapan & S. Oshkamp, Eds.: 69–93. Sage, Beverly Hills.
21. EVANS, G.W. *et al.* 1993. Specifying dysfunctional mismatches between different control dimensions. Br. J. Psychol. **84:** 255–273.
22. ROTHBAUM, R. *et al.* 1982. Changing the world and changing the self: a two-process model of perceived control. J. Pers. Soc. Psych. **42:** 5–37.
23. DEGOOD, D.E. 1975. Cognitive control factors in vascular stress responses. Psychophysiology **12:** 399–401.
24. HOUSTON, B.K. 1972. Control over stress, locus of control, and response to stress. J. Pers. Soc. Psychol. **21:** 249–255.
25. MANUCK, S.B. *et al.* 1978. Effects of coping on blood pressure responses to threat of aversive stimulation. Psychophysiology **15:** 544–549.
26. SIEBER, W.J. *et al.* 1992. Modulation of human natural killer cell activity by exposure to uncontrollable stress. Brain Behav. Immunol. **6:** 141–156.
27. MILLER, S.M. *et al.* 1985. Preference for control and the coronary-prone behavior pattern: "I'd rather do it myself." J. Pers. Soc. Psychol. **49:** 492–499.
28. STRUBE, M.J. & C. WERNER. 1985. Relinquishment of control and the type A behavior pattern. J. Pers. Soc. Psychol. **48:** 688–701.
29. KRANTZ, D.S. *et al.* 1974. Helplessness, stress level, and the coronary-prone behavior pattern. J. Exp. Soc. Psychol. **10:** 284–300.
30. CARVER, C.S. & M.F. SCHEIER. 1981. Attention and Self-Regulation: A Control-Theory Approach to Human Behavior. Springer, New York.
31. SCHEIER, M.F. *et al.* 1994. Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): a reevaluation of the Life Orientation Test. J. Pers. Soc. Psychol. **67:** 1063–1078.
32. SELIGMAN, M.E.P. 1975. Helplessness: On Depression, Development and Death. Freeman, San Francisco.
33. ARMOR, D.A. & S.E. TAYLOR. 1998. Situated optimism: specific outcome expectancies and self-regulation. *In* Advances in Experimental Social Psychology, Vol. 30. M.P. Zanna, Ed.: 309–379. Academic Press, New York.
34. ANTONI, M.H. & K. GOODKIN. 1988. Host moderator variables in the promotion of cervical neoplasia. I: Personality facets. J. Psychosom. Res. **32:** 327–338.
35. SCHEIER, M.F. *et al.* 1989. Dispositional optimism and recovery from coronary artery bypass surgery: the beneficial effects on physical and psychological well-being. J. Pers. Soc. Psychol. **57:** 1024–1040.
36. FITZGERALD, T.E. *et al.* 1993. The relative importance of dispositional optimism and control appraisals in quality of life after coronary bypass surgery, J. Behav. Med. **16:** 25–43.
37. SCHEIER, M.F. & C.S. CARVER. 1991. Dispositional optimism and adjustment to college. Unpublished raw data.

38. TAYLOR, S.E. & L.G. ASPINWALL. 1990. Psychological aspects of chronic illness. *In* Psychological Aspects of Serious Illness. G.R. VandenBos & P.T. Costa, Jr., Eds.: 3–60. American Psychological Association, Washington, DC.
39. CARVER, C.S. *et al.* 1989. Assessing coping strategies: a theoretically based approach. J. Pers. Soc. Psychol. **56:** 267–283.
40. TAYLOR, S.E. *et al.* 1992. Optimism, coping, psychological distress, and high-risk sexual behaviors among men at risk for AIDS. J. Pers. Soc. Psychol. **63:** 460–473.
41. PARK, C.L. *et al.* 1997. The roles of constructive thinking and optimism in psychological and behavioral adjustment during pregnancy. J. Pers. Soc. Psychol. **73:** 584–592.
42. SCHEIER, M.F. & C.S. CARVER. 1992. Effects of optimism on psychological and physical well-being: theoretical overview and empirical update. Cog. Ther. Res. **16:** 201–228.
43. CHESTERMAN, E. *et al.* 1990. Trait optimism as a predictor of pregnancy outcomes. Poster presented at the First International Congress on Behavioral Medicine, Uppsala, Sweden.
44. COHEN, F. *et al.* 1999. Differential immune system changes with acute and persistent stress for optimists vs. pessimists. Brain Behav. Immun. **13:** 155–174.
45. BACHEN, E. *et al.* 1991. Effects of dispositional optimism on immunologic responses to laboratory stress. Unpublished data.
46. TAYLOR, S.E. *et al.* 1999. Psychological resources, positive illusions, and health. Am. Psychol. In press.
47. REED, G.M. *et al.* 1999. Negative HIV-specific expectancies and AIDS-related bereavement as predictors of symptom onset in asymptomatic HIV-positive gay men. Health Psychol. **18:** 1–10.
48. REED, G.M. *et al.* 1994. Realistic acceptance as a predictor of decreased survival time in gay men with AIDS. Health Psychol. **13:** 299–307.
49. SEGERSTROM, S.C. *et al.* 1998. Effects of optimism and coping on stressor-related mood and immune changes. J. Pers. Soc. Psychol. **74:** 1646–1655.
50. LEEDHAM, B. *et al.* 1995. Positive expectations predict health after heart transplantation. Health Psychol. **14:** 74–79.
51. KAMEN-SIEGEL, L. *et al.* 1991. Explanatory style and cell-mediated immunity in elderly men and women. Health Psychol. **10:** 229–235.
52. PETERSON, C. *et al.* 1988. Pessimistic explanatory style is a risk factor for physical illness: a thirty-five-year longitudinal study. J. Pers. Soc. Psychol. **55:** 23–27.
53. MATTHEWS, K.A. *et al.* 1989. Educational attainment and behavioral and biological risk factors for coronary heart disease in middle-aged women. Am. J. Epidemiol. **129:** 132–144.
54. HUANG, G. & M. TAUSIG. 1990. Network range in personal networks. Soc. Networks **12:** 261–268.
55. CAMPBELL, K.E. *et al.* 1986. Social resources and socioeconomic status. Soc. Networks **8:** 97–117.
56. OSTERGREN, P.-O. 1991. Psychosocial Resources and Health. Department of Community Health Sciences, Lund University. Malmo, Sweden.
57. GEORGE, L.K. 1989. Stress, social support, and depression over the life-course. *In* Aging, Stress, Social Support, and Health. K. Markides & C. Cooper, Eds.: 241–267. Wiley, London.
58. HOUSE J.S. *et al.* 1988. Social relationships and health. Science **241:** 540–45.
59. SEEMAN, T.E. 1996. Social ties and health: The benefits of social integration. AEP **6:** 442–451.
60. SEEMAN, T.E. & S.L. SYME. 1987. Social networks and coronary artery disease: a comparative analysis of network structural and support characteristics. Psychosom. Med. **49:** 341–354.
61. BLUMENTHAL, J.A. et al. 1987. Social support, type A behavior, and coronary artery disease. Psychosom. Med. **49:** 331–340.
62. BERKMAN, L.F. *et al.* 1992. Emotional support and survival after myocardial infarction: a prospective, population-based study of the elderly. Psychosom. Med. **58:** 459–471.

63. WILLIAMS, R.B. *et al.* 1992. Prognostic importance of social and economic resources among medically treated patients with angiographically documented coronary artery disease. JAMA **267:** 520–524.
64. GLASS, T. & G.L. MADDOX. 1992. The quality and quantity of social support: stroke recovery as psycho-social transition. Soc. Sci. Med. **34:** 1249–1261.
65. SEEMAN, T.E. *et al.* 1995. Behavioral and psychosocial predictors of physical performance: MacArthur studies of successful aging. J. Gerontol. **50A:** M177–M183.
66. SEEMAN, T.E. *et al.* 1996. Social network characteristics and onset of ADL disability: MacArthur studies of successful aging. J. Gerontol. **51B:** 5191–5200.
67. BURG, M.M. & T.E. SEEMAN. 1994. Families and health: the negative side of social ties. Ann. Behav. Med. **16:** 109–115.
68. KASLOW, N.J. *et al.* 1994. Depressed children and their families. Clin. Psychol. Rev. **14:** 39–59.
69. LEWINSOHN, P.M. *et al.* 1994. Adolescent psychopathology. II. Psychosocial risk factors for depression. J. Abnorm. Psychol. **103:** 302–315.
70. ADAMS, D.M. *et al.* 1994. Perceived family functioning and adolescent suicidal behavior. J. Am. Acad. Child Adoles. Psychiatry. **33:** 498–507.
71. COLLINS, N.L. *et al.* 1993. Social support in pregnancy: psychosocial correlates of birth outcomes and postpartum depression. J. Pers. Soc. Psychol. **65:** 1243–1258.
72. GOTTMAN, J.M. & L.F. KATZ. 1989. Effects of marital discord on young children's peer interaction and health. Dev. Psychol. **25:** 373–381.
73. SHEDLER, J. & J. BLOCK. 1990. Adolescent drug use and psychological health: a longitudinal inquiry. Am. Psychol. **45:** 612–630.
74. BAUMRIND, D. 1991. The influence of parenting style on adolescent competence and substance use. J. Early Adoles. **11:** 56–95.
75. GUNNAR M.R. *et al.* 1992. The stressfulness of separation among nine-month-old infants: effects of social context variables and infant temperament. Child Dev. **63:** 290–303.
76. SEEMAN, T.E. & B.S. MCEWEN. 1996. Impact of social environment characteristics on neuroendocrine regulation. Psychosom. Med. **58:** 459–471.
77. THEORELL, T. et al. 1995. Social support and the development of immune function in human immunodeficiency virus infection. Psychosom. Med. **57:** 32–36.
78. SCHUSTER, T.L. *et al.* 1990. Supportive interactions, negative interactions and depressed mood. Am. J. Commun. Psychol. **18:** 423–438.
79. BOLGER, K.E. *et al.* 1995. Psychosocial adjustment among children experiencing persistent and intermittent family economic hardship. Child Dev. **66:** 1107–1129.
80. EVANS G.W. *et al.* 1989. Residential density and psychological health: the mediating effects of social support. J. Pers. Soc. Psychol. **57:** 994–999.
81. LEPORE, S.J. *et al.* 1991. Dynamic role of social support in the link between chronic stress and psychological distress. J. Pers. Soc. Psychol. **61:** 899–909.
82. LEPORE, S.J. *et al.* 1991. Daily hassles and chronic strains: a hierarchy of stressors? Soc. Sci. Med. **33:** 1029–1036.
83. LEPORE, S.J. *et al.* 1991c. Social hassles and psychological health in the context of chronic crowding. J. Health Soc. Behav. **32:** 357–367.
84. KRAUSE, N. 1992. Stress and isolation form close ties in later life. J. Gerontol: Soc. Sci. **46:** S183–S194.
85. GANS, H. 1962. The Urban Villagers: Group and Class in the Life of Italian-Americans. Free Press, New York.
86. STACK, C. 1975. All Our Kin: Strategies for Survival in a Black Community. Harper and Row, New York.
87. MACLEOD, J. 1995. Ain't No Making It. Westview Press, Boulder.
88. ROOK, K.S. 1990. Parallels in the study of social support and social strain. J. Soc. Clin. Psychol. **9:** 118–132.
89. LEPORE, S.J. *et al.* 1992. Role of control and social support in explaining the stress of hassles and crowding. Environ. Behav. **24:** 795–811.
90. EL-SHEIKH, M. *et al.* 1989. Coping with adults' angry behavior: behavioral, physiological, and self-report responding in preschoolers. Dev. Psychol. **325:** 490–498.

91. DOWNEY, G. & E. WALKER. 1992. Distinguishing family-level and child-level influences on the development of depression and aggression in children at risk. Dev. Psychopathol. **4:** 81–95.
92. KOVEROLA, C. *et al.* 1993. Relationship of child sexual abuse to depression. Child Abuse Neglect. **17:** 393–400.
93. MECHANIC, D. & S. HANSELL. 1989. Divorce, family conflict, and adolescents' well-being. J. Health Soc. Behav. **3:** 105–116.
94. SORENSON, S.B. & J.G. PETERSON. 1994. Traumatic child death and documented maltreatment history, Los Angeles. Am. J. Pub. Health **84:** 623–627.
95. BOYCE, W.T. *et al.* 1995. Psychobiological reactivity to stress and childhood respiratory illnesses: results to two prospective studies. Psychosom. Med. **57:** 411–422.
96. EWART, C.K. *et al.* 1991. High blood pressure and marital discord: not being nasty matters more than being nice. Health Psychol. **10:** 155–163.
97. GERIN, W. *et al.* 1992. Social support in social interaction: a moderator of cardiovascular reactivity. Psychosom. Med. **54:** 324–336.
98. KIECOLT-GLASER, J.K. *et al.* 1994. Stressful personal relationships: immune and endocrine function. *In* Handbook of Human Stress and Immunity. R. Glaser & J. Kiecolt-Glaser, Eds.: 321–329. Academic Press, San Diego.
99. FOLKMAN, S. & R.S. LAZARUS. 1980. An analysis of coping in a middle-aged community sample. J. Health Soc. Behav. **21:** 219–239.
100. HOLAHAN, C.J. & R.H. MOOS. 1987. Risk, resistance, and psychological distress: a longitudinal analysis with adults and children. J. Abnorm. Psychol. **96:** 3–13.
101. CARVER, C.S. 1999. Personal communication.
102. GOODKIN, K., N.T. BLANEY, *et al.* 1992. Active coping style is associated with natural killer cell cytotoxicity in asymptomatic HIV-1 seropositive homosexual men. J. Psychosom. Res. **36:** 635–650.
103. GOODKIN, K., I. FUCHS, *et al.* 1992. Life stressors and coping style are associated with immune measures in HIV-1 infection—a preliminary report. Int. J. Psychiatry Med. **22:** 155–172.
104. KEMENY, M.E. 1991. Psychological factors, immune processes, and the course of herpes simplex and human immunodeficiency virus infection. *In* Stress and Immunity. N. Plotnikoff *et al.*, Eds.: 199–210. CRC Press, Boca Raton.
105. KEDEM, P. *et al.* 1992. Psychoneuroimmunology and male infertility: a possible link between stress, coping, and male immunological infertility. Psychol. Health. **6:** 159–173.
106. IRONSON, G. *et al.* 1994. Distress, denial, and low adherence to behavioral intentions predict faster disease progression in gay men infected with human immunodeficiency virus. Int. J. Behav. Med. **1:** 90–105.
107. FAWZY, F.I. *et al.* 1993. Malignant melanoma: effects of an early structured psychiatric intervention, coping, and affective state on recurrence and survival six years later. Arch. Gen. Psychiatry **50:** 681–689.
108. ADLER, N.E. 1998. Self-esteem. *In* Psychosocial Notebook of the MacArthur SES and Health Network. MacArthur Foundation, San Francisco.
109. TAYLOR, S.E. 1999. Health Psychology, 4th edit. McGraw-Hill, New York.
110. SCHEIER, M.F. *et al.* 1999. Optimism and rehospitalization following coronary artery bypass graft surgery. Arch. Int. Med. **159:** 829–835.
111. LERNER, D. *et al.* 1994. Job strain and health-related inequality of life in a national sample. Am. J. Pub. Health **84:** 1580–1585.
112. WU, A.W. *et al.* 1991. A health status questionnaire using 30 items from the Medical Outcomes Study: preliminary validation in persons with early HIV infection. Med. Care **29:** 786–798.
113. BUCHWALD, D. *et al.* 1996. Functional status in patients with chronic fatigue syndrome, other fatiguing illnesses, and healthy individuals. Am. J. Med. **101:** 364–370.
114. GUMP, B. 1998. Vitality and vigor. *In* Psychosocial Notebook of the MacArthur SES and Health Network. MacArthur Foundation, San Francisco.
115. LEFCOURT, H.M. 1991. Locus of control. In Measures of Personality and Social Psychological Attitudes, Vol. 1. J.P. Robinson *et al.*, Eds.: 413–499. Academic Press, San Diego.

116. WALLSTON, K.A. *et al.* 1978. Development of the multidimensional Health Locus of Control Scales. Health Educ. Monogr. **6:** 161–170.
117. BAUM, A. *et al.* 199. Socioeconomic status and chronic stress: does stress account for SES effects on health? Ann. N.Y. Acad. Sci. **896:** this volume.
118. MCEWEN, B.S. & T. SEEMAN. 1999. Protective and damaging effects of mediators of stress: elaborating and testing the concepts of allostasis and allostatic load. Ann. N.Y. Acad. Sci. **896:** this volume.