The Role of Psychosocial Processes in Explaining the Gradient Between Socioeconomic Status and Health

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Abstract

The gradient between socioeconomic status (SES) and health is well established: Many measures of health show that health increases as SES increases. However, the mechanisms underlying this association are not well understood. Behavioral, cognitive, and affective tendencies that develop in response to the greater psychosocial stress encountered in low-SES environments may partially mediate the impact of SES on health. Although these tendencies might be helpful for coping in the short term, over time they may contribute to the development of allostatic load, which increases vulnerability to disease. Debate remains regarding the direction of causation between SES and health, the impact of income inequality, the interaction of SES with race-ethnicity and gender, and the effects of SES over the life course.

Keywords

socioeconomic status; health; psychosocial mediators; race-ethnicity; stress

Researchers in many fields are increasingly interested in the relationship between socioeconomic status (SES) and health. In 1993, *The New England Journal of Medicine* published several articles documenting marked differences in death rates among individuals at different income and educational levels. The journal's editor, Marcia Angell, observed that "in study after study, socioeconomic status emerges as one of the most important influences in morbidity and mortality" (Angell, 1993, p. 126). She further commented that SES is a "most mysterious" determinant, acting on health not directly, but rather through indirect mechanisms.

Shortly after this series of articles, Adler et al. (1994) challenged psychologists to help unravel this mystery. They noted that the SES-health relationship was not simply a function of poverty and could not be explained by lack of access to health care. Presenting evidence of a graded relationship between SES and health, which appears even in populations with universal access to care, they argued that psychosocial processes could play a mediational role. In this article, we describe the SES-health gradient, review what has been discovered about psychosocial mediators, and discuss current controversies and questions.

THE RELATIONSHIP BETWEEN SES AND HEALTH

SES is a reflection of social position, and is traditionally measured by income, education, and occupation. Each dimension of SES reflects different resources (e.g., education confers knowledge, credentials, and social networks; income provides access to better housing, nutrition, and health care). Though often used interchangeably, these measures are only moderately intercorrelated. Nevertheless, they show similar relationships to health—a graded association such that across the full range of SES, higher SES is associated with better health. Thus, it is not just that individuals in poverty have higher morbidity and mortality rates than those above the poverty line; the middle-class also has worse health than the wealthy. Similarly, people who have not completed high school have higher mortality rates than do high school graduates, who, in turn, have higher mortality rates than do college graduates. The Whitehall Study of health among British civil servants provides a clear demonstration of this SES-health gradient. The initial study found that 10-year survival increased with occupational grade; the highest-grade civil servants had significantly lower mortality than did the next-highest, "executive grade" civil servants, who had lower mortality than did clerical employees, and so on. These effects remained 25 years later, even after many participants had retired (Marmot & Shipley, 1996).

Although income shows a graded association with mortality, the effect is greatest at the lowest income levels, especially for infant mortality. Thus, the effect of additional income on health is greatest for the poorest groups. At the same time, because SES effects continue along the entire income spectrum, and because most people are in the middle of the distribution, most health disparities associated with SES occur among the middle classes. The SES-health gradient is seen for many diseases, but is strongest for cardiovascular disease, arthritis, diabetes, chronic respiratory diseases,

and cervical cancer, as well as for the psychiatric disorders of schizophrenia, substance abuse, and anxiety.

POSSIBLE MECHANISMS

No single mechanism accounts for the SES-health gradient. Figure 1 presents a simplified model of pathways through which SES may affect health. This model does not include all pathways, nor does it depict feedback loops and interactions among domains.

Each of the boxes between SES and health in Figure 1 represents a different level of analysis. Within each level, as SES declines, demands increase and resources for dealing with these demands decrease. Consequently, across multiple life domains, individuals with lower SES are exposed to more stress than are individuals with higher SES. Moreover, at any given level of stress, they experience a larger psychological response to that stress. Over time, this combination of stress and stress reactivity diminishes individuals' reserve capacity for responding to environmental challenges, and may make them more vulnerable to disease (Gallo & Matthews, 2003).

Environments

SES is associated with the physical and social environments in which individuals work and live (Fig. 1, Box B). Those individuals with fewer socioeconomic resources generally inhabit environments with higher levels of toxins, pathogens, and noise, and have jobs that subject them to more physical risks (Box D). They encounter more social conflict, crowding, and crime, while experiencing less social support. They also have decreased access to means for restoring and maintaining health, including recreation facilities, health care, and healthy foods.

Psychological Tendencies

Physical and social environments shape cognitive and affective tendencies (Fig. 1, Box C). In this section, we present evidence regarding those tendencies that are associated with both SES and health outcomes. Where possible, we discuss studies that have shown specifically that cognitive and affective tendencies play a role in the relationship between SES and health. However, because SES, psychological tendencies, and biological or health outcomes have seldom all been examined within any one sample, such evidence is limited.

Extensive data attest to the centrality of perceived personal control and mastery in the SES-health gradient. Because lower-SES contexts afford fewer opportunities for control, it is not surprising that individuals at lower levels of SES report less mastery and control than do higher-SES individuals. Perceived control is also related to health outcomes, and may influ-
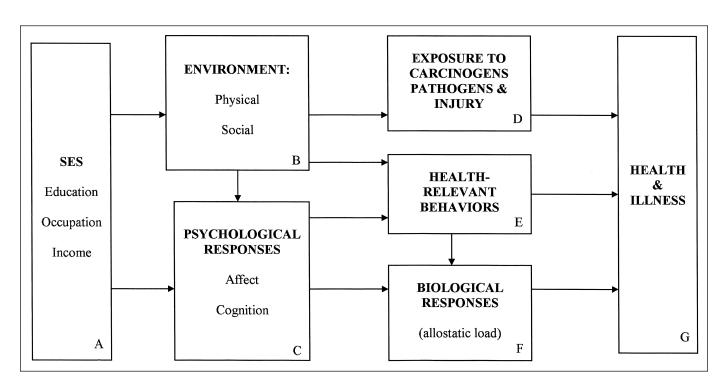

Fig. 1. Simplified model of pathways from socioeconomic status (SES) to health. Modified from Adler and Ostrove (1999).

ence the relationship between SES and health. For example, Lachman and Weaver (1998) found that low-SES individuals with high levels of perceived control have health outcomes similar to those of high-SES individuals. Control in the work environment appears to be particularly important to health. In the Whitehall sample of civil servants, for example, perceived control at work accounted for more than half of the association between SES and health (Marmot, Bosma, Hemingway, Brunner, & Stansfeld, 1997).

Lower-SES environments may also diminish optimism and foster hopelessness and hostility, which are closely linked to the affective states of depression and anger. Negative cognitions and affective states increase as SES decreases (see Gallo & Matthews, 2003). Hopelessness and depression predict a myriad of health outcomes, including heart attacks and cardiac death, and account for some of the relationship between SES and health (Fiscella & Franks, 1997). Hostility and anger are likewise potent predictors of mortality and morbidity, and among some groups they mediate the relationship between SES and cardiovascular functioning (Gump, Matthews, & Räikkönen, l999). Finally, optimism-pessimism predicts such health outcomes as recovery from coronary bypass surgery and onset of AIDS in HIV-positive men.

A specific cognition related to SES is subjective social standing. People are often keenly aware of their own SES standing vis-à-vis others' SES, and of negative stereotypes about their group. Recent studies suggest that individuals' evaluations of where they stand on a "social ladder"—anchored at the top by those having the most income and education and the best jobs, and at the bottom by those having the least resources and worst jobs—are strongly associated with a variety of health indicators, including self-rated health, waist-to-hip ratio, and heart rate (e.g., Adler, Epel, Castellazzo, & Ickovics, 2000). Scores on measures of subjective social standing are correlated with indicators of psychological distress, such as depression and negative affect, but show independent associations with health outcomes. Current research is uncovering what determines individuals' subjective status.

Behavior

Those health-relevant behaviors that contribute the most to morbidity and mortality—smoking, sedentary lifestyle, high-fat diet—also increase as SES decreases (Fig. 1, Box E). Similarly, adherence to prescribed treatments for medical conditions varies by SES. Thus, for example, although diabetics' control over their blood sugar is better the more educated they are, this association disappears in analyses that statistically control for adherence to the treatment regimen (Goldman & Smith, 2002). Differences in health-relevant behaviors across SES levels may reflect the extent to which environments differentially constrain or encourage those behaviors. Environmental constraints operate in conjunction with SES-related cognitive and affective tendencies, such as hostility and depression, to affect people's health-relevant behavior. Although behavior contributes substantially to morbidity and premature mortality, it does not wholly explain the SES-health gradient. Health-related behaviors account for less than half of the association between SES and health (Lantz et al., 2001).

Biological Responses

Exposure to acute and chronic stressors, including those associated with lower SES, elicits a cascade of cognitive, affective, and biological responses. These responses are often functional in the short run, but over time may damage systems that regulate the body's stress response. A useful concept for understanding how these responses cause disease is allostatic load (McEwen, 1998), which is the cumulative wear and tear caused by repeated adaptations. Even relatively small changes in the direction of dysregulation or poorer functioning can increase disease risk if they occur across multiple systems. A person's allostatic load is measured by summing the number of indicators on which he or she is in the highest-risk quartile. These indicators include systolic and diastolic blood pressure, waist-to-hip ratio, HDL and LDL cholesterol, blood glycosylated hemoglobin (the percentage of hemoglobin that is chemically bound to glucose, an indicator of glucose levels over the past 2–3 months), and the hormones cortisol, DHEA (dehydroepiandrosterone), epinephrine, and norepinephrine. Allostatic load may serve as a common biological pathway leading from SES to multiple health outcomes (Fig. 1, Box F). In a sample of healthy elderly adults, for example, allostatic load scores at the start of the study were higher as SES level decreased, and these scores predicted physical and cognitive decline, cardiac events, and mortality up to 7 years later (Karlamangla, Singer, McEwen, Rowe, & Seeman, 2002).

CONTROVERSIES AND QUESTIONS

As psychologists, we have focused on stress as a key mechanism underlying the SES-health gradient, emphasizing individual psychosocial and physiological processes. Researchers from other disciplines, such as sociology, economics, and social epidemiology,

place relatively more emphasis on the direct effects of material, historical, and ecological factors on health. Research on income inequality highlights the diverse approaches of these disciplines. Income inequality, a measure of the distribution of income in a given area, is related to mortality rates even in analyses controlling for income. Thus, in two geographic areas with the same mean income, the one in which income is more unequally distributed will likely have a higher mortality rate. Psychologically inclined researchers attribute this association to psychosocial features, such as heightened social anxiety and diminished social trust in communities where income is more unequally distributed. However, other scholars attribute the phenomenon to material features of the environments, arguing that high income inequality results in underinvestment in infrastructure. Still others question whether the finding is due to methodological artifacts, such as the confounding of income inequality with racial composition. Despite ongoing disagreements, the issue of income inequality's effects on mortality has become a crossroads for fruitful interdisciplinary dialogue, underscoring the importance of considering both contextual and individual factors.

At the level of individual SES, there are also questions about the confounding of race-ethnicity with SES. In the United States, because of patterns of discrimination and social disadvantage, many ethnic minorities are overrepresented at lower SES levels. For some diseases and disorders, racial-ethnic differences in prevalence disappear in analyses controlling for SES. However, for others, significant differences remain. These findings suggest that although a substantial portion of the racial-ethnic differences in health is due to social disadvantages associated with low SES,

unique effects specific to race-ethnicity also exist, reflecting experiences of discrimination, residential segregation, negative stereotypes, and other circumstances. As a result, measures of SES may have different meanings and implications within different populations and groups. Further work on the joint and independent contributions of SES and race-ethnicity to health is needed.

The meaning of traditional SES measures may also differ by gender. Women's social class has often been determined by their husbands' status, and some studies have found that the husband's occupational status is a better predictor of a woman's health than her own occupational status. These findings illustrate the importance of considering such issues as gender discrimination and relative power in relationships, and the intersection of gender with other demographic variables.

Another growing area of research concerns SES effects across the life span. The SES-health gradient is strongest at birth (i.e., infant mortality) and in mid to late adulthood. Most research on SES and health has focused on adults' current SES. Yet several studies suggest that childhood SES and the length of time spent living in low-SES conditions are also important predictors of adult health outcomes. An unresolved issue is the extent to which childhood SES has an impact primarily as a contributor to adult SES or sets psychological and physiological tendencies that independently affect adult health.

A related issue is the extent to which health affects SES. There is some evidence for the hypothesis that individuals in poorer health "drift" down the SES hierarchy. However, the reverse impact, of SES on health, appears to be greater. This is especially true for educational attainment, which pre-

dicts health many years after education is completed. Innovative studies capitalizing on random events that affect SES and studies showing that individuals' health is affected by their spouses' SES provide evidence of causality running from SES to health. Nonetheless, mapping the dynamic relationship between SES and health remains a research challenge.

CONCLUSIONS

Over the past decade, research on the socioeconomic determinants of health has increased exponentially, and researchers are now examining more closely the mechanisms by which SES "gets into the body." Research on psychosocial pathways points to the importance of differential exposure to stress. As SES decreases, individuals are exposed to more demands and have fewer resources with which to address them. Responses to such stress—at the psychological, behavioral, and biological levels—may be adaptive in the short run, but can damage health over time. For example, at the psychological level, threatening environments may foster a degree of distrust that may be functional in protecting individuals against victimization. Such distrust may generalize, however, and individuals may respond to ambiguous events in a distrustful way, heightening physiological arousal and further undermining social trust (Chen & Matthews, 2001). Thus, increased biological risk may derive not just from greater environmental exposure to stressors, but also from greater psychological reactivity to the environment. Similarly, biological responses to stress are functional in that they mobilize energy for a "fight or flight" response, but the cumulative effects of repeated adaptations

may increase vulnerability to disease.

A number of controversies and questions about the association between SES and health remain. On the scientific side, these involve establishing the direction of causal influences between SES and health, the relative roles of material and psychosocial conditions, how SES operates in conjunction with race-ethnicity and gender, and whether biological responses to stress constitute a common pathway for a range of diseases. On the policy side, there is debate about the utility of addressing the mediating pathways at the individual level, as opposed to trying to modify SES itself. Although it may be possible to buffer the effects of lower status by helping individuals develop better ways of coping with the stresses that low SES generates, policies that improve education, employment, and income could have broader effects.

Recommended Reading

Adler, N.E., Boyce, W.T., Chesney, M., Cohen, S., Folkman, S., Kahn, R., & Syme, S.L. (1994). (See References)

Adler, N.E., Marmot, M., McEwen, B., & Stewart, J. (Eds.). (1999). *Socioeconomic status and health in industrialized nations: Social, psychological, and biological pathways.* New York: New York Academy of Sciences.

Gallo, L.C., & Matthews, K.A. (2003). (See References)

McEwen, B. (2002). *The end of stress as we know it.* Washington, DC: Joseph Henry Press.

Note

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References

Adler, N.E., Boyce, W.T., Chesney, M., Cohen, S., Folkman, S., Kahn, R., & Syme, S.L. (1994). Socioeconomic status and health: The challenge of the gradient. *American Psychologist, 49,* 15–24.

Adler, N.E., Epel, E.S., Castellazzo, G., & Ickovics, J.R. (2000). Relationship of subjective and objective social status with psychological and physiological functioning: Preliminary data in healthy white women. *Health Psychology, 19,* 586–592.

Adler, N.E., & Ostrove, J.M. (1999). SES and health: What we know and what we don't. In N.E. Adler, M. Marmot, B. McEwen, & J. Stewart (Eds.), *Socioeconomic status and health in industrialized nations: Social, psychological, and biological pathways* (pp. 3–15). New York: New York Academy of Sciences.

Angell, M. (1993). Privilege and health: What is the connection? *New England Journal of Medicine, 329,* 126–127.

Chen, E., & Matthews, K.A. (2001). Cognitive appraisal biases: An approach to understanding the relation between socioeconomic status and cardiovascular reactivity in children. *Annals of Behavioral Medicine, 23,* 101–111.

Fiscella, K., & Franks, P. (1997). Does psychological distress contribute to racial and socioeconomic disparities in mortality? *Social Science and Medicine, 45,* 1805–1809.

Gallo, L.C., & Matthews, K.A. (2003). Understanding the association between socioeconomic status and physical health: Do negative emotions play a role? *Psychological Bulletin, 129,* 10–51.

Goldman, D.P., & Smith, J.P. (2002). Can patient self-management help explain the SES health gradient? *Proceedings of the National Academy of Sciences, USA, 99,* 10929–10934.

Gump, B.B., Matthews, K.A., & Räikkönen, K. (1999). Modeling relationships among socioeconomic status, hostility, cardiovascular reactivity, and left ventricular mass in African American and White children. *Health Psychology, 18,* 140–150.

Karlamangla, A.S., Singer, B.H., McEwen, B.S., Rowe, J.W., & Seeman, T.E. (2002). Allostatic load as a predictor of functional decline: MacArthur studies of successful aging. *Journal of Clinical Epidemiology, 55,* 696–710.

Lachman, M.E., & Weaver, S.L. (1998). The sense of control as a moderator of social class differences in health and well-being. *Journal of Personality and Social Psychology, 74,* 763–773.

Lantz, P.M., Lynch, J.W., House, J.S., Lepkowski, J.M., Mero, R.P., Musick, M.A., & Williams, D.R. (2001). Socioeconomic disparities in health change in a longitudinal study of US adults: The role of health-risk behaviors. *Social Science and Medicine, 53,* 29–40.

Marmot, M.G., Bosma, H., Hemingway, H., Brunner, E., & Stansfeld, S. (1997). Contribution of job control and other risk factors to social variations in coronary heart disease incidence. *Lancet, 350,* 235–239.

Marmot, M.G., & Shipley, M.J. (1996). Do socioeconomic differences in mortality persist after retirement? 25-year follow up of civil servants from the first Whitehall study. *British Medical Journal, 313,* 1177–1180.

McEwen, B.S. (1998). Protective and damaging effects of stress mediators. *New England Journal of Medicine, 338,* 171–179.