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Healthy, wealthy, wise? Psychosocial factors influencing the socioeconomic status–health gradient

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Abstract

The present research investigated psychosocial factors: control beliefs; social relations moderating the SES–health gradient. Participants included 3775 respondents from a national probability sample, Midlife in United States (t^1: Age, M = 46.40, SD = 13.00, t^2: Age, M = 55.47, SD = 12.43), who provided reports on control beliefs, social relations, and health at two assessment occasions (1994/1995 and 2002/2003). Hierarchical regression demonstrated that control beliefs, social support, and strain uniquely moderated relationships between SES and longitudinal health. The present study highlights the importance of psychosocial factors as protective mechanisms of socioeconomic disadvantages and associated long-term deleterious health outcomes.

Keywords

control beliefs, health disparities, health gradient, social relations, socioeconomic status

The influence of socioeconomic status (SES) on physical and psychological health has been widely documented. Individuals with lower status are more likely to have higher mortality rates (Adler and Newman, 2002; Berkman and Syme, 1979; Jemal et al., 2008), suffer from stress-related illnesses (Cohen, 2008; Sapolsky, 1998), and have greater physical and cognitive impairments (e.g. Preston and Taubman, 1994). Other disparities include unequal access to healthcare, higher exposure to environmental risks, and psychological distress associated with subordinate status, (i.e., little control, unsafe environments, low pay; Marmot and Smith, 1997); although these factors do not explain all of the inequalities in health and mortality (Adler and Newman, 2002; Marmot and Smith, 1997).

Current research strongly supports the concept of a gradient of influence, that is, at every increment of SES, any upward movement in the hierarchy has health benefits (Adler et al., 1994; Marmot et al., 1997). The explanations of superior health for low SES individuals are unlikely to be the same processes for those with high

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status. For example, for an individual with low income, a small influx of income may provide a brief reprieve, with an acute subsequent improvement in health; however, this same influx may not be meaningful for a wealthier individual (Mayer, 1997). The gradient of SES to health is still a broad area of inquiry.

The Whitehall studies (Marmot et al., 1997) provided critical evidence that inequalities in health and mortality may be influenced by other inequalities than material resources or healthcare access. By examining longitudinal health outcomes in civil service employees, who were provided with the same universal health care, Marmot et al. repeatedly demonstrated that those with lower status and less control at work resulted in higher mortality, and poorer health. Thus, there is compelling evidence that psychosocial variables may be critical protective factors (e.g. Adler et al., 1994; Adler and Newman, 2002; Ickovics et al., 2006; Marmot et al., 1997; Mayer, 1997); although little work has investigated the long-term potential of psychosocial factors on physical and psychological health. Therefore, an examination of psychosocial factors on long-term health status is warranted.

The present investigation examined two likely psychosocial factors that have been strongly linked to both SES and health outcomes: perceived control and social relations (support and strain). Conceptually, moderation, rather than mediation analyses, was selected primarily to examine the interactions between SES and psychosocial factors. Second, moderation was used to identify changes in the strength of the relationship between status and health, varying by level of control or support (Baron and Kenny, 1986). In addition, the present study used education as SES as it has been posited as generally stable in adulthood (e.g. Winkleby et al., 1992), and once attained, cannot fluctuate, as other SES measures might (i.e. one can lose/change occupation, increase or decrease income; e.g. Krieger et al., 1997). Thus, education was one measure of SES that could be captured by most participants.

Perceived control and health

A wealth of research suggests that perceived control influences multiple domains of health, including psychological well-being and physiological reactivity (e.g. Lachman and Weaver, 1998b; Marmot, 2000; Seeman, 1998; Taylor and Seeman, 1999). In addition, related investigations have shown that individuals with high-perceived control have less severity of symptoms, shorter healing times, and longevity (e.g. Langer and Rodin, 2004; Taylor et al., 2000). Perceived control has also been posited as a moderator of SES on health. Lachman and Weaver (1998a) investigated two aspects of conceptualizing control: 'mastery' and 'constraints' with a longitudinal and nationally representative sample. The researchers found that perceived control moderated the relationships between SES–health; those in the lowest income group coupled with a high sense of control had comparable health outcomes to those with high income. Lachman et al. also reported significant relationships between education (as SES) and health outcomes.

Causal relationships, however, have not yet been elucidated. Higher education (as SES) may be associated with greater overall exposure and awareness of healthy behavioral strategies, illness prevention, subsequently facilitating better health. Moreover, a dynamic pattern may subsist with this psychosocial factor; a sense of control can facilitate action for achievements; success may enhance one's environments with more opportunities to strengthen a higher sense of control.

Social relations and health

Social relationships have also been associated with acute and chronic health (e.g. Berkman and Glass, 2000; Kornblith et al., 2001). If qualitatively positive, social support has been posited as protective against negative health (e.g. Berkman and Syme, 1979; Cohen and Wills, 1985); while

social strain can have deleterious impacts on health (e.g. Rook, 1998). Related work has investigated social support on physiological reactivity (i.e. the ability to react and cope with stress efficiently; e.g. Uchino, 2006), and has informed clinical interventions (e.g. Spiegel et al., 1989). To illustrate, Spiegel et al. (1989) investigated support group interventions for women with breast cancer. Those within the support group survived significantly longer (M = 36.6 months) compared with those in the control group (M =18.9 months). In summary, the quality of our social world can enhance or harm our health.

Education and social relations

The relationships between education (as SES) and social relations are complex; both academic and employment environments based on higher education can be potentially health adverse (e.g. performance demands, difficult co-workers, etc.) or health enhancing (e.g. mentorships in higher education, collaborative networks). It has been suggested that higher education confers greater opportunities for occupations with social prestige; individuals may be viewed as valuable contributors (Fujishiro et al., 2010). Moreover, in higher education, one may have more opportunities to collaborate with many new people, via conferences and classroom settings, adding to a sense of belonging and inclusion (e.g. Baumeister and Leary 1995). Alternatively, low education has been associated with greater social isolation (Turner and Marino, 1994).

Method

Participants were from a national probability sample, Midlife in the United States (MIDUS I; Brim et al., 1995–1996, MIDUS II; Ryff et al., 2004–2006) and were selected via random digit dialing and interviewed for 20–30 minutes. Self-administered questionnaires were mailed and returned with an 87% response rate (t^1) and 81% (t^2; decedent adjusted). All paired variables from MIDUS I and II data were included.

Participants

The t^1 sample included 6181 adults, aged 24 to 75 (M = 46.40, SD = 13.00), 52% female, 79% White, 52.9% had some college education. Self-rated health (10 is highest) in t^1: M = 7.8, SD = 1.5 and well-being (10 is highest) in t^1: M = 6.9, SD = 1.2.

The t^2 sample included 3775 adults, aged 32 to 84 (M = 55.47, SD = 12.43), 53% female, 86% White, and 51.8 % had some college education. Self-rated health in t^2: M = 7.4, SD = 1.6 and well-being in t^2: M = 6.4, SD = 1.6.

Measures

Health composites for the present investigation were included to capture two domains of physical health: chronic illnesses (as serious health issues) and functional limitations (i.e. that limit mobility). A depressive symptoms scale was included to assess psychological health.

Health measures

Chronic health. This 28-item composite included serious health issues such as arthritis, lupus, diabetes, cancer and so on. A total score was computed based on the number of chronic health problems respondents endorsed (α = 0.82). Higher values indicated greater frequency of chronic illnesses (possible range 0–28; adapted from Ryff et al. (2004).

Functional limitations. Adopted from the SF-36 Health Survey (Ware and Ganek, 1994), this measure included nine questions about physical limitations, including lifting, bending, and exercise. Items were recoded on a four-point scale (0 = 'not at all', 3 = 'a lot') and summed (α = 0.83).

Higher scores indicated a greater number of physical limitations (possible range 0–27).

Psychological well-being

Depressive symptoms. Respondents answered six items on a five-point scale (1 = 'all of the time', 5 = 'none of the time'). Examples included, 'How often in the past 30 days did you feel nervous, hopeless, worthless?' Negative items were reverse scored, and the mean was computed for valid responses on > 3 items (α = 0.87). Higher values indicated greater depressive symptoms (possible range 6–30; adapted from Mroczek and Kolarz, 1998).

Control beliefs

Scales developed by Lachman and Weaver (1998a) and Pearlin and Schooler (1978) were used to operationalize a general sense of control. The concept of 'control' was based on two components, the *personal mastery*: perceptions of effectiveness in reaching goals, and *personal constraints*: perceived obstacles and constraints that inhibit reaching goals. *Personal mastery* and *perceived constraints* were summed to create a general control scale (α = 0.72).

Personal mastery. This measure included four items with a seven-point scale (1 = 'agree/yes strongly', 7 = 'disagree/no strongly'). Items were reverse scored such that higher scores reflect greater sense of personal mastery. The mean was computed for valid items at 50% of the items on the mastery scale (possible range 4–28; α = 0.70). An example was, 'I can do just about anything I really set my mind to.'

Perceived constraints. This measure included eight items with a seven-point scale (1 = 'agree/yes strongly', 7 = 'agree/yes strongly'). Items were reverse scored; higher scores reflect greater sense of perceived constraints (possible range 8–56; α = 0.72). An example was, 'What happens in my life is often beyond my control.'

Social relations

Friend, family, and spouse questions were averaged to develop a summary score of support or strain (adapted from Schuster et al., 1990).

Social support. Participants were asked to rate four items such as, 'How much do members of your family (friends, spouse) care about you?' They answered with a four-point range (1 = 'A lot', 4 = 'Not at all'). Items were recoded; higher scores represent greater support (possible range 4–16; α = 0.85).

Social strain. Similarly, participants were asked to rate four items such as, 'Family (friend, spouse) members criticize you.' Anchors were similar to above. Items were recoded; higher scores represent greater strain (possible range 4–16; α = 0.82).

Socioeconomic status

SES was measured as a continuous variable: years of education.

Data analyses

In order to examine moderation effects of control and social relations, hierarchical multiple regression analyses were used (Baron and Kenny, 1986), with SPSS 18 software. Variables were entered block wise into the regression equation. Incremental F tests of the difference in R^2 between blocks of variables and any significant changes in the total R^2 after each new set of predictors were examined.

SES and moderators were centered to reduce multicollinearity (Baron and Kenny, 1986). The order of entry was as follows: Step 1, Time 1 health; Step 2, age and gender; Step 3, education; and in Step 4, the moderator was entered (i.e. control, support, or strain). Finally, at Step 5, the centered interaction terms of SES x moderator were added. Initially, the models statistically controlled for antidepressant medications.

Table 1. Summary regression table showing chronic problems moderated by SES x control beliefs[a], and SES x social strain[b].

Variable	B	SeB	β	Total R2	Variable	B	SeB	β	Total R2
Step 1				0.36	Step 1				0.36
ChronPbs T1[a]	0.45	0.01	0.43***		ChronPbs T1[b]	0.545	0.01	0.43***	
Step 2				0.30	Step 2				0.24
Age	0.04	0.00	0.21***		Age	0.04	0.00	0.21***	
Gender*	0.16	0.06	0.04**		Gender*	0.16	0.06	0.04**	
Step 3				0.30	Step 3				0.29
Education	–0.03	0.01	–0.03**		Education	–0.03	0.01	–0.03**	
Step 4				0.30	Step 4				0.30
Control	–0.14	0.03	–0.06***		SocStrain	0.27	0.07	.051***	
Step 5				0.30	Step 5				0.30
Ed*Contrl	0.03	0.01	0.03*		Ed*Strn	–0.06	0.03	–0.03*	

Note: For Chronic problems[a], Step 1; ΔR2 = .249, Step 2; ΔR2 = .044, Step 3; ΔR2 =.001, Step 4; ΔR2 = .003, Step 5; ΔR2 = .001. Chronic problems[b], Step 1; ΔR2 = .242, Step 2; ΔR2 = .042, Step 3, 4; ΔR2 =.002, Step 5; ΔR2 = .001. * Sex 1 = male, 2 = female, * $p < .05$ ** $p < .01$ *** $p < .001$. For the final models, $CI_{.95}$: $.01 \leq B \geq .05$, Education by Control; $CI_{.95}$:$-.12 \leq B \geq -.01$, Education by Strain.

These were not significant, thus were removed from the models.

Results

Descriptive statistics

There was no differential or significant attrition based on age, education, control, or social relations. As predicted, high control and social support were both associated with higher SES ($r = .18$, $p < .01$; $r = .05$, $p < .01$) and fewer negative health outcomes (all ps $< .01$). In addition, social strain was negatively related to education and control ($r = -.28$, $p < .01$; $r = -.28$, $p < .01$), and positively correlated with physical and psychological health problems (all ps $< .01$). Summary regression tables are presented for chronic problems (Table 1), depressive symptoms and functional limitations (Table 2).

Chronic health

The first regression produced a significant interaction of SES x social strain ($p < .05$, Fig. 1, top panel) on chronic illness over time. As predicted, those with low SES/high strain had the greatest increases in chronic illnesses, whereas low SES/low strain group appeared similar to the high SES group. For this group, less social strain potentially prevented increases in chronic illnesses over time. SES x control also moderated chronic health issues ($p < .05$). With high control, there were no significant increases in chronic illness, at all levels of education (Fig. 1; bottom panel). Critically, for the low SES group, the associated negative health outcomes may have been deflected by high control. Alternatively, low SES/low control groups had the greatest increases in chronic health issues.

Depressive symptoms

The next analyses produced a significant interaction of SES and social support to moderate changes in depressive symptoms ($p < .001$). Those with high SES/high support resulted in the least changes in depressive symptoms. For those in the low SES group, however, social support did not buffer the deleterious psychological health

Table 2. Summary regression table showing depressive symptoms moderated by SES x social support, functional limitations moderated by SES x social strain.

Variable	B	SeB	β	Total R2	Variable	B	SeB	β	Total R2
Step 1				0.25	Step 1				0.35
DeprsSympT1	0.50	0.01	0.47***		Limit T1	0.65	0.02	0.51***	
Step 2				0.26	Step 2				0.40
Age	0.00	0.00	–0.05**		Age	0.13	0.01	0.22***	
Gender*	0.50	0.02	0.04**		Gender*	0.60	0.17	0.04***	
Step 3				0.27	Step 3				0.41
Education	–0.02	0.00	–0.09***		Education	–0.31	0.04	–0.11***	
Step 4				0.27	Step 4				0.42
SocSupport	–0.07	0.02	0.06***		SocStrain	1.26	0.22	0.07***	
Step 5				0.27	Step 5				0.42
Ed*Sup	–0.02	0.01	–0.04***		Ed*Strn	–0.18	0.09	–0.03*	

Note: For Depressive symptoms, Step 1; ΔR2 = 254, Step 2; ΔR2 = .004, Step 3; ΔR2 =.009, Step 4; ΔR2 = .003, Step 5; ΔR2 = .001.For Functional Limits: Step 1; AR2 = .354, Step 2; AR2 = .045, Step 3; ΔR2 =.011, Step 4; ΔR2 = .005, Step 5, ΔR2 < .001. * Sex 1 = male, 2 = female, * $p < .05$ ** $p < .01$ *** $p < .001$. For the final models, CI_{95}: $-.03 \leq B \geq -.01$, Education by Support; CI_{95}:$-.34 \leq B \geq -.03$, Education by Strain.

effects of low SES (Fig. 2; top panel). Thus, in these data, higher social support appeared to be protective for those with higher SES.

Functional limitations

The next regression model produced a significant interaction of SES x social strain on changes in functional limitations ($p < .05$). As hypothesized, higher social strain was related to greater functional limitations, particularly for those with low SES. In low SES/low strain group, fewer functional limits increased compared to those low SES/high strain (Fig. 2; bottom panel). This suggests that less social strain may have been a protective factor against potential increases in this particular health domain.

Discussion

Consistent with prior work, the present study found that the perception of high control was related to better health, and may be a critical protective factor for low SES individuals over time. The moderation of SES–health gradient by social relations, however, was more complex. SES interacted with both social support and strain to predict long-term health. Nonetheless, while low SES and low support were associated with declines in health, high social support did not always shield low SES individuals. There may be a threshold where increased social support cannot buffer psychological suffering, as suggested by the results on depressive symptoms (Fig. 2). Anhedonia may be related to psychological distress (e.g. Surtees et al., 2008) such that we would intuitively expect that greater social support would alleviate some of this distress. However, this may not always be the case. More precisely, these findings may be reflecting that individuals with low education are reporting the most need of support, thus the higher endorsements.

As hypothesized, the present data found that SES interacted significantly with psychosocial variables to predict long-term health outcomes. It may be that higher education brings with it greater knowledge of illness prevention and opportunities for healthy lifestyle (e.g. most universities now provide stress management and fitness centers). With exposure to current medical information and an environment that

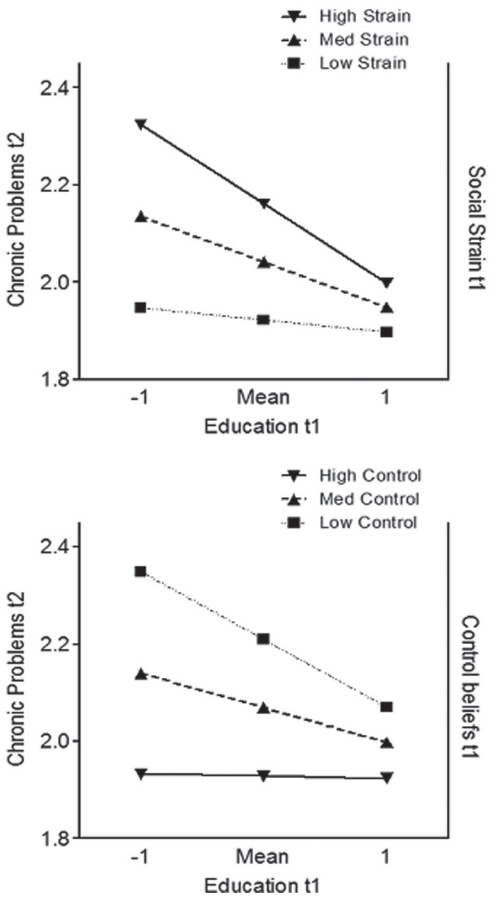

Figure 1. The top panel illustrates the interaction of SES x social strain on the changes in chronic problems (t2 controlling t1). **Note:* Test of simple slopes: SES at +/-1 SD above the mean on strain, $t(3250) = 7.50$, $P < .001$; $t(3250) = 7.89$, $P < .001$ respectively. The bottom panel illustrates the interaction of SES x control beliefs on the change in chronic problems (t2 controlling t1). *Test of simple slopes: SES at +/-1 SD above the mean on control, $t(3255) = 3.60$, $P < .001$; $t(3255) = 6.91$, $P < .001$ respectively.

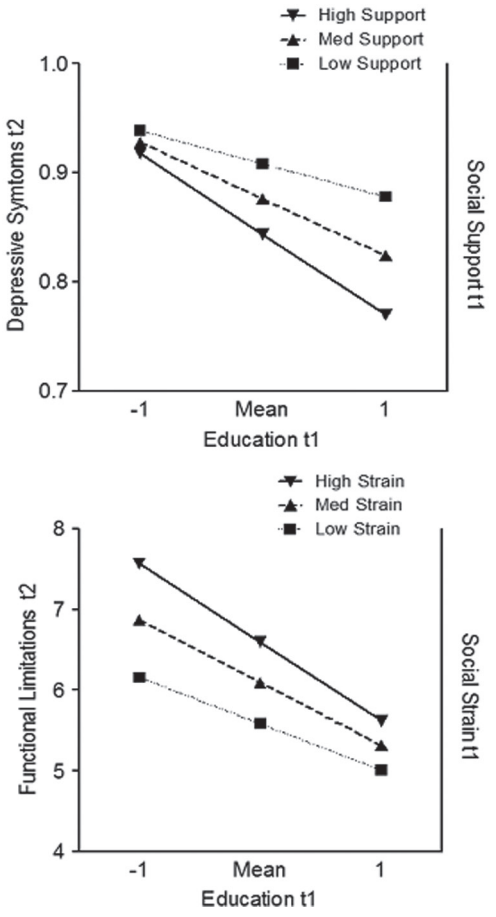

Figure 2. The top panel illustrates the interaction of SES x social support on the change in depressive symptoms (t2 controlling t1). *Test of simple slopes: SES at +/-1 SD above the mean of support, $t(3225) = 4.05$, $P < .001$; $t(3225) = 5.58$, $P < .001$ respectively. The bottom panel illustrates the interaction of SES x social strain t^2 on the changes in functional limitations. *Test of simple slopes: SES at +/-1 SD above the mean of strain, $t(3238) = 13.52$, $P < .001$; $t(3238) = 11.14$, $P < .001$ respectively.

promotes wellness, individuals can make informed health-related choices. Subsequently, making choices may give one a higher sense of efficacy across numerous health domains. Additionally, higher education may bring greater opportunities to enhance a sense of self, and present a wider array of good options from which to choose, which may not always exists at lower levels of social status. For these reasons, education as SES may confer a sense of control over multiple domains that may not exist otherwise.

Furthermore, in this investigation, scales were constructed to measure socioemotional

relations rather than other types of support (instrumental, network, or financial measures). Perhaps reported levels of socioemotional support alone do not give the full meaning and influence of these psychosocial variables. For example, if those with low SES had higher levels of instrumental and/or financial support, this may have buffered the increases in depressive symptoms.

Limitations

Several limitations in the present study warrant discussion. Primarily, education level as the measure of SES in the present study may not capture all components of SES constructs that the current literature on SES–health gradient attempts to delineate.

It can be argued that each measure of status (i.e. occupation, income) captures differing underlying resources, in terms of both actual physical resources and psychosocial pathways. For example, Marmot et al. (1997) found that education was a better predictor for ill health when reviewing three samples cross-culturally. The authors posited that this might reflect an underlying reality; higher education may be directly related to attaining better employment and opportunities for advancement. Interestingly, education and occupation better predicted self-rated health and psychological well-being respectively. Therefore, different aspects of health may be influenced uniquely by different aspects of social class. The investigators also speculated that educational attainment and related achievements could engage coping strategies and influence health behaviors, which may lead to health outcomes (Marmot et al., 1997: 907). In addition, Ross and Van Willigen (1997) suggested that certain occupations confer a sense of social value and prestige, and that acquiring such employment requires higher education, thus highlighting one potential pathway between education and social support.

Moreover, the current study examined two assessment occasions. As future data are collected, more distinct patterns between SES and long-term health can be further delineated.

Future research could compare multiple measures of SES, such as those suggested above, and perhaps use multilevel modeling in an attempt to capture the numerous and complex psychosocial influences between SES and the health gradient.

Finally, the present study used only self-reported items, which are subject to impression management and self-representation biases. Future analyses could include objective physiological and biomarker measures to capture changes in health status (e.g. immune parameters, chronically high levels of glucocorticoids, etc.).

Conclusion

In summary, the complexity of the present results partly reflects the difficulty in disambiguating precisely how psychosocial factors such as sense of control and social relations moderate the processes between SES and specific health changes. The present work, with the benefit of longitudinal data, extends this investigation beyond cross-sectional analyses. This research adds to the ongoing discovery of such mechanisms that can ameliorate life-long health issues or suffering. Psychosocial factors, as potentially modifiable and thus accessible to all, may be particularly indispensable for individuals with low socioeconomic status.

Competing Interests

None declared.

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