

Socioeconomic Status, Psychosocial Processes, and Perceived Health: An Interpersonal Perspective

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ABSTRACT

Background: Psychosocial variables, including stress, emotions, and social factors, may contribute to the association between socioeconomic status (SES) and health. Concepts and methods from interpersonal theory (1) could provide a useful framework for research concerning the roles of psychosocial factors in socioeconomic health disparities. **Purpose:** We examined the association between SES and psychosocial processes captured by the interpersonal circumplex and tested the degree to which circumplex ratings explained the association between SES and perceived health. **Methods:** San Diego community residents ($N = 304$; 51% male; 34% Latino; 50% White; 20% Black; 6.8% Asian/Asian American; 2.9% another ethnicity) completed a circumplex-based assessment of several social contexts (home, work, and community), the SF-12 measure of perceived health, and questions concerning demographic characteristics. **Results:** Multilevel models revealed that individuals with lower SES described their social worlds as more hostile and less friendly compared with their higher SES counterparts. Furthermore, lower SES was associated with perceptions of exposure to more dominant or controlling behavior from others, compared with higher SES. Appraisals of hostility versus friendliness, in particular, helped explain the inverse association between SES and some aspects of perceived health. **Conclusions:** Applications of interpersonal theory may be useful in efforts to understand the roles of psychosocial factors in SES-related health disparities.

(Ann Behav Med 2006, 31(2):109–119)

This research was supported by a San Diego State University Foundation Faculty Grant-In-Aid awarded to Linda C. Gallo. Linda Gallo was supported by National Institutes of Health Grant MH66101–01 during preparation of this article. We are grateful to Jennifer Jacobs, Anna Ortega, Simon Puente, Isis Tejada, and Amber Trigueros for assistance with data collection and entry.

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INTRODUCTION

Socioeconomic health disparities are well documented in the United States and other industrialized nations (2). Each upward step in the socioeconomic hierarchy is associated with relative health advantages (3), although disparities are most striking at lower socioeconomic status (SES) levels (4,5). A comprehensive explanation for the gradient remains elusive, despite considerable efforts to identify underlying mechanisms (6). Numerous pathways, such as environmental exposures, physiological processes, and health behaviors, are likely to be involved. In addition, psychosocial variables, including stress, social support, and negative emotions, may contribute to SES-related health disparities (7,8).

Given the range of potentially significant psychosocial risk factors, the literature examining their roles in health disparities could benefit from a unifying research framework. The interpersonal model of personality and social behavior (1) incorporates concepts and methods that might be valuable in this regard. In prior studies, this model has provided an integrative lens through which to conceptualize varied psychosocial risk factors and examine their relationships with health (9–12).

A key tenet of interpersonal theory is that two orthogonal dimensions underlie most aspects of human social behavior (1,13). These dimensions form the axes of the interpersonal circumplex (1,14) (see Figure 1), the primary structural component of the model. The horizontal axis describes the degree of affiliation versus hostility, whereas the vertical axis describes dominance versus submission in social behavior. The circumplex allows description of individuals and the social contexts they inhabit, facilitates comparisons across groups, and provides a framework for validation of constructs and measures (15,16). In addition, thoroughly validated circumplex-based assessments are available on which to rate oneself, others, behaviors, or contexts (1). This structural aspect of the interpersonal model can thus facilitate research that seeks to understand how broad-based social factors can shape interpersonal experiences and situations in diverse social contexts (17).

Prior research suggests that SES may relate to psychosocial factors relevant to both circumplex dimensions. For example, compared with their higher SES counterparts, persons with lower SES report less social network integration and social sup-

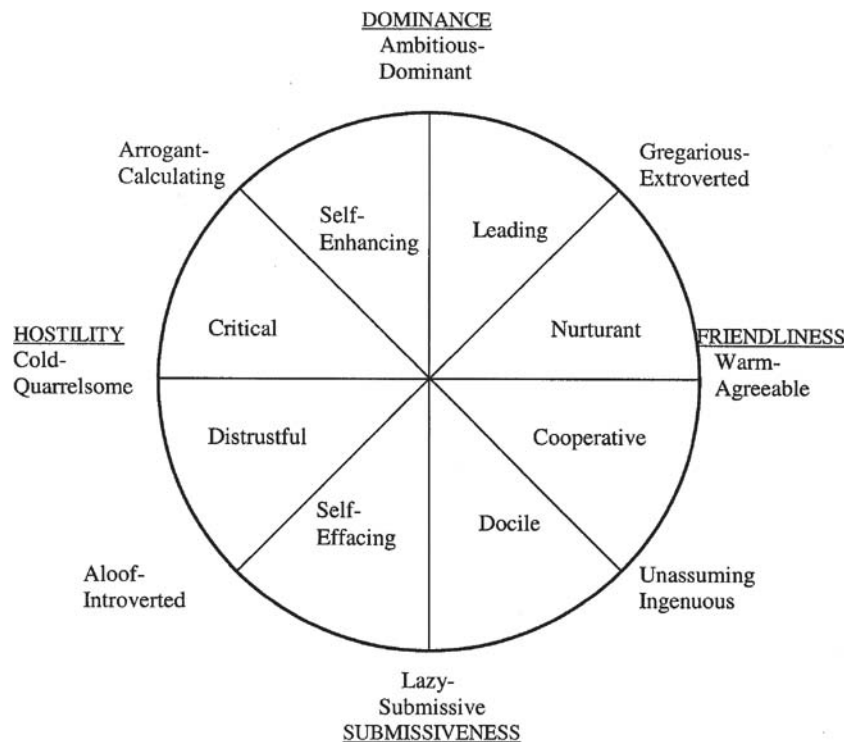


FIGURE 1 The interpersonal circumplex: The horizontal axis is Hostility versus Friendliness; the vertical axis is Dominance versus Submissiveness. The octant scales are identified around the outside, and additional descriptors are noted within the octants. From “A Psychological Taxonomy of Trait-Descriptive Terms: The Interpersonal Domain,” by J. S. Wiggins, 1979, *Journal of Personality and Social Psychology*, 37. Adapted with permission.

port and more social conflict (18–20). Individuals with lower SES also tend to display a more hostile, less affiliative interpersonal style compared with those with higher SES (e.g., 21,22). Hostile traits and social support and conflict relate closely to the horizontal circumplex axis (23). Status-based conceptualizations (24) suggest that individuals with lower SES may occupy a subordinate (i.e., less dominant) social position relative to those with higher SES. Indeed, individuals with low SES often report low levels of status-related personal characteristics, such as perceived control, self-efficacy, and self-esteem (25,26). Thus, individuals with lower SES may view their social worlds as involving greater exposure to interactions in which others exert more dominance, control, or status—experiences that relate closely to the vertical circumplex axis.

In addition to this useful structural framework, interpersonal theory provides a foundation for understanding how social experiences associated with low SES are maintained in ways that could relate to health. Specifically, the interpersonal model views individuals and social milieus as mutually reinforcing and cyclically related (1,27). Low-SES environments could foster harmful recurring interpersonal cycles in multiple contexts across the life span, leading to chronic psychosocial stress. For example, low-SES communities are often characterized by crowding, high crime rates, and poor civic engagement, which could in turn discourage trust, mutual aid, and feelings of control (e.g., 28,29). Discriminatory social experiences also are more common in low-SES contexts and could contribute to feel-

ings of demoralization and cynical mistrust (30). Moreover, individuals with low SES frequently work in jobs characterized by poor control and support and inequitable compensation and benefits (31–33). Low SES could also increase vulnerability to close relationship stressors, such as domestic violence (34), substance abuse (35), and divorce (36). Furthermore, children with low SES report greater exposure to violence, and fewer positive life events, compared with their higher SES counterparts (37).

Thus, across contexts and time, individuals with low SES may experience stressors, negative events, and interpersonal situations characterized by conflict and low support, control, and status. These experiences could promote negative expectations and beliefs about the social world (e.g., mistrust, cynicism, pessimism), which could foster more antagonistic, defensive interpersonal behavior. Indeed, prior research has shown that children and adolescents with lower SES interpret ambiguous social stimuli as more threatening compared with their higher SES counterparts (37,38). Over time, a hostile or mistrustful interpersonal style would likely evoke further conflict and reduced support. It is important to note that, such negative transactional cycles would be facilitated by a low-SES environment consisting of greater exposure to these interpersonal risks and culturally influenced beliefs that such outcomes are to be expected.

THE CURRENT STUDY

By providing an integrative structural framework through which to examine the implications of SES for social experiences

across contexts, and by contributing a conceptual basis for understanding how these associations emerge across the life span, the interpersonal model may facilitate efforts to understand the roles of psychosocial processes in socioeconomic health disparities. This study represents an initial effort to demonstrate the utility of the interpersonal approach for this purpose. The primary goal of the study was to examine whether SES would predict social ratings on a circumplex-based measure. Consistent with research suggesting that the impact of SES on psychosocial risk experiences should manifest across multiple social contexts, we examined experiences at home, at work, and in the community. We predicted an inverse association between SES and appraisals of dominance from social partners and a positive association between SES and perceptions of affiliation.

The second purpose of this research was to examine whether differences in social context ratings contribute to the relationship between SES and self-rated health. Previous research has shown a strong, inverse association between SES and subjective views of health (39,40). Furthermore, self-reported health is an important outcome from both quality of life and objective perspectives, because it relates to future mortality risk independent of other risk factors (41). We hypothesized that SES and perceptions of one's social world as less affiliative and more dominant would predict worse self-appraised mental and physical health and, furthermore, that associations between SES and health perceptions would be partially explained by psychosocial risk processes captured through affiliation and dominance ratings.

METHOD

Participants and Procedure

Between February and June 2003, participants were recruited from community settings in five city of San Diego zip code areas with populations of at least 20,000 (to ensure adequate numbers of eligible participants), median incomes of \$50,000 or less (to ensure a range of SES) and at least 30% non-Latino White residents (because of the requirement of speaking English). Ten city zip codes met these criteria according to the 2000 U.S. census, and 5 (50%) were selected randomly. Research assistants who were trained psychology students of Latino or White ethnicity visited a variety of public places (e.g., shopping centers, plazas, public transportation stops, community centers) in the selected areas and asked adults if they were interested in completing a survey concerning health and social experiences in exchange for \$10. To avoid bias in recruitment, assistants approached participants according to a table of random numbers. Participation was limited to residents aged 25 and older, to limit inclusion of full-time students. In addition, participants were required to live in one of the selected zip code areas and to speak and write in English (Spanish translations were unavailable). Following screening, verbal informed consent was obtained, and participants completed the survey individually. They were then paid \$10 in cash and thanked for their participation. The San Diego State University's Institutional Review Board approved all procedures and materials.

In total, 407 individuals were approached for possible participation. Forty-eight (12%) declined screening, and an addi-

tional 49 (11%) were ineligible because of age ($n = 24$) or zip code of residence ($n = 20$). Finally, 5 individuals (1%) declined participation after hearing more about the study. Thus, 309 (76%) of the individuals originally approached completed the survey. Approximately equal numbers of participants were recruited from each zip code area (18.7%–22.3% of participants per area). Four participants were excluded from the current analyses because of missing data, and 1 was excluded because his answers were considered suspect (e.g., he specified his profession as "pimp"), for a final sample of 304.

Survey

Demographic characteristics. Respondents were asked to report their age, sex, and all applicable ethnicities, according to the following choices: Latino/Hispanic/Chicano, White/Caucasian/European, Black/African American, Asian/Asian American, Native Hawaiian or Other Pacific Islander, and American Indian or Alaskan Native. In addition, participants indicated whether they were born in the United States.

SES. Educational attainment was used to represent SES.¹ Respondents specified the highest grade or year of school completed, according to the following categories: None or kindergarten only; Grades 1 through 8 (elementary); Grades 9 through 11 (some high school); Grade 12 or GED (high school graduate); 1 to 3 years college (some college, technical school, associate degree); 4 years of college or more (college graduate); Master's degree (e.g., MSW, MBA); Advanced or professional graduate degree (e.g., PhD, MD, JD). For the purposes of analysis, these categories were collapsed to represent low education (high school or GED, $n = 69$; or less education, $n = 14$), medium education (some college, $n = 95$), and high education (college degree, $n = 96$; or greater, $n = 30$). Education has a number of advantages over alternative individual measures of SES (42). Specifically, because education is typically completed by early adulthood, it both precedes and influences occupation and income and is less vulnerable to "reverse causation" (i.e., effects of poor health on SES). Moreover, measures of income are prone to missing data, and occupation and income may be poorly suited to capturing the SES of individuals who are not working because of retirement, caregiving, or illness.

Interpersonal experiences. The Impact Message Inventory, Circumplex Version (IMI-C) (43) was used to assess participants' social-contextual experiences according to interpersonal affiliation and dominance. The IMI-C describes an individual's covert responses or "impact messages" evoked during social experiences. A subscale score was derived for each

¹Data regarding family income were collected but were missing in 6 participants. Furthermore, income groups differed in the number of contexts rated, $F(3, 293) = 5.10, p < .01$; the lowest income group rated fewer contexts than higher income groups. As a result, the reliability of the estimates of interpersonal appraisals for this group could be compromised. For these reasons, and for the sake of clarity and brevity, we did not include income-related analyses.

octant of the circumplex (see Figure 1), describing social contexts according to all possible intersections of affiliation and dominance. Sample items for each octant scale are shown in Table 1. Standard procedures were used to create factor scores for Affiliation versus Hostility and Dominance versus Submission, based on weighted combinations of octant scales (43). The weighting formulas are based on principles of circumplexity, which posit a predictable pattern of correlations among octant scores. As such, octants closer to the axis poles are weighted more heavily than are more distant octants (44). Factor scores were used in the primary analyses, rather than the octant scales, to minimize Type I error risk. Validation research has indicated that the IMI-C octant and factor scales have good circumplex structure and adequate internal consistencies (45).

In this study, participants completed the measure four times to describe social experiences at home, at work with supervisors, at work with coworkers, and when “interacting with people in [their] neighborhood.” Participants were instructed to describe their experiences within contexts, rather than with particular individuals. For example, the instructions for rating the home environment were as follows:

Think about the people you live with. [Participants were then asked to specify the number of adults and children living with them.] Now, imagine you are spending time at home, with the friends, family, or roommates who live with you. Please read each item and circle the number for the response that best describes how you would feel if you were talking or spending time with the people at home. Although your relationships may differ across the individuals you live with, please think IN GENERAL how spending time at home makes you feel.

Participants responded to each item on a 4-point scale (i.e., *not at all*, *somewhat*, *moderately so*, *very much so*), and items were averaged to form octant scales. Participants evaluated only social contexts relevant to them (e.g., unemployed participants did not complete work ratings).

TABLE 1
Sample Items From the IMI-C for Each Octant Scale

<i>Octant Scale</i>	<i>IMI-C Item</i>
	When I am with: the people I live with; my supervisors/bosses at work; my coworkers at work; the people in my neighborhood, I feel:
Dominant	Bossed around.
Hostile-Dominant	I should tell them they are often inconsiderate.
Hostile	That they don't want to get involved with me.
Hostile-Submissive	That they are nervous around me.
Submissive	In charge.
Friendly-Submissive	I could ask them to do anything.
Friendly	Welcomed by them.
Friendly-Dominant	That I can relax and they will take charge.

Note. IMI-C = Impact Message Inventory, Circumplex Version.

We used an abbreviated version of the IMI-C, with two rather than seven items per octant, to reduce participant burden. Items were chosen on the basis of internal consistencies observed in prior studies (46) and in an effort to represent, as possible, the breadth of the constructs. Given that only two items were used to represent each subscale, estimates of internal consistency were modest and fell below .60 for some octant scale/context combinations. However, the analyses used the more psychometrically stable Affiliation and Dominance factor scales and, given that theoretically consistent associations were observed, we do not believe that statistical power was compromised. (Note that internal consistency was not assessed for the factor scores, because they represent amalgamates of octant subscales with varied intercorrelations.)

Perceived health. The SF-12-V2 was used to evaluate perceived health and health-related quality of life (47). This measure is an abbreviated version of the widely used SF-36 and has been shown to reproduce more than 90% of the variance in the original measure (47). The SF-12 provides assessments of Physical Functioning, role limitations due to physical health (Role-Physical), Bodily Pain, General Health perceptions, Vitality, Social Functioning, role limitations due to emotional problems (Role-Emotional), and Mental Health. Scales are normed to have a mean of 50 and standard deviation of 10 in the general population (48). The scales demonstrate adequate test-retest reliability and predictive validity (47).

Analytic Procedures

To accommodate the nested structure of the social-context data, the primary hypotheses were tested in multilevel modeling analyses (49) performed in hierarchical linear modeling (HLM 5.04) (50). The analyses entailed three levels, with context ratings (Level 1), nested within individuals (Level 2), nested within zip code areas (Level 3). Age, ethnicity, and gender were included as covariates. Gender was dummy coded (male = 0), and ethnicity was represented by three codes that compared Latino to non-Latino ethnicity (coded 0) and White/Caucasian ethnicity (referent group; coded 0) to Black/African American and to “Other” ethnicity.² Covariates were centered around the mean to adjust for sample demographics and were treated as fixed factors to reduce model complexity.

Fully unconditional random intercepts models were conducted (i.e., no predictors) to estimate the amount of variance attributable to each level. These analyses showed that most vari-

²Participants who indicated Latino ethnicity but did not specify another race were categorized as White. Participants who selected White as well as another race were categorized according to the minority ethnicity. Two participants who endorsed Black/African American as well as Asian and Native American ethnicities, respectively, were categorized as Black. We felt that this would best capture the social implications of ethnicity, because skin color has been related to the occurrence of discrimination (65). We are aware of the potential error associated with these somewhat arbitrary decisions; however, because these codes are included for covariate purposes, we do not feel that results are affected substantively.

ability was due to rating context (i.e., Level 1; approximately 80% and 91% for Affiliation and Dominance, respectively). In addition, a significant amount of variance was attributable to interindividual differences (i.e., Level 2) for Dominance (8%) and Affiliation (20%; both $p < .001$). Variance due to area clustering (i.e., Level 3) was less than 1% for both outcomes, however, we maintained the three-level structure to maximize statistical power.

Three-level, random intercepts and slopes models were then conducted. At Level 1, these analyses calculated average Affiliation and Dominance scores (i.e., intercepts) as well as slopes indicating variation by context, for each participant. Context was effect coded, with three codes that compared home, supervisor, and coworker ratings to mean ratings. Effect codes were centered, to adjust for the proportion of participants who rated each context. Initial analyses indicated that the contrast comparing coworker ratings to other ratings should be treated as nonrandom, given very low between-subjects variability for this target effect. This model parameter was therefore treated as fixed. At Level 2, SES was entered as a predictor of the intercepts and slopes calculated at Level 1. Education was represented by two dummy codes, with high school or less coded as the referent group (coded 0) and compared with individuals with some college, and college degree or more education. We used a model-building approach, so that context codes and between-subjects covariates were entered first, followed by main effects of SES and, finally, the SES \times Context interaction effects.

Given minimal area effects, secondary hypotheses (i.e., that interpersonal appraisals would explain SES-related perceived health disparities) were evaluated using traditional path regression models performed in SPSS. Residual files from HLM analyses were imported into SPSS and used to create empirical Bayes estimates of average Affiliation and Dominance ratings for each individual. Defined procedures for testing mediation were then applied (51). First, we examined whether interpersonal appraisals and SES predicted the health outcomes. When these initial criteria were satisfied, the health outcome was regressed simultaneously on SES and the Affiliation and Dominance factor scores. Degree of mediation was evaluated by comparing the unstandardized regression coefficients in the analysis that included only the SES indicators to those from the analysis that included interpersonal factors and SES, and examining percentage of attenuation. All analyses accounted for age, sex, and ethnicity.

RESULTS

Participant Characteristics

On the average, participants were 37.84 years old ($SD = 12.12$), and 51% were male. Thirty-four percent of the sample reported Latino ethnicity; 50% White, 20% African American/Black, 6.8% Asian/Asian American, 1.3% Pacific Islander/Native Hawaiian, and 1.6% Native American. Most participants, 84%, were born in the United States. The sample was relatively well educated; 4.7% reported less than high school; 22.8% a high school degree or GED, 30.9% some college, 31.9% a college degree, and 9.7% a graduate degree. Compared with census statistics for the selected zip code areas, participants

were of similar age (mean age was 35 years according to census data) but were more likely to report Latino ethnicity (19% Latino according to the census) and were better educated (34% with college degree or more according to the census).

SES and Interpersonal Experiences

Context ratings. One-way analyses of variance revealed significant context-related differences in affiliation and dominance ratings (both $ps < .001$). The home context was rated as most friendly and least dominant, followed by the coworkers context; the supervisors and neighborhood contexts were perceived as more hostile and dominant. The pattern of context ratings was similar within each level of education. These expected differences suggest that our version of the IMI-C was a sensitive measure of perceived variations in social contexts. All participants appraised their neighborhood, and 86%, 77%, and 75% of participants rated their home, supervisor(s), and coworker(s), respectively. The education groups did not differ in the number of contexts rated ($p > .10$).

Effects of SES. After accounting for context and covariates, education significantly predicted affiliation ratings, $\chi^2(2) = 8.58, p < .05$. The effect size was small, with 6% of variance explained. Compared with individuals with high school or less education, $\gamma_{\text{intercept}} = 11.25 (SE = 1.43)$, participants with some college rated their social environments as more friendly (i.e., less hostile), $\gamma = 3.56 (SE = 1.83), t(296) = 1.94, p = .05$, as did those with college or more education, $\gamma = 5.47 (SE = 1.75), t(296) = 3.13, p < .01$. Thus, the average affiliation rating for the lowest education group was 11.25, compared with 14.81 and 16.72 for the middle and high education groups, respectively. Addition of the Education \times Context interaction effects did not contribute significantly to model fit, $\chi^2(6) = 9.29, p > .10$; thus, education did not substantially influence the context-related pattern of ratings. The education contrasts accounted for 11% of variance in overall ratings of experienced dominance, $\chi^2(6) = 10.81, p < .01$. People with some college, $\gamma = -2.08 (SE = 0.93), t(296) = -2.24, p < .01$; and college or more education, $\gamma = -2.85 (SE = 0.87), t(296) = -3.30, p < .01$; perceived their social environments as less dominant or controlling than those with high school or less education, $\gamma_{\text{intercept}} = -0.92 (SE = 0.69)$. Thus, all groups perceived their social worlds as involving more submissive than dominant behavior (as reflected by the negative scores), and the average ratings across contexts were $-0.92, -3.00, \text{ and } -3.77$, for the low, medium, and high education groups, respectively. Education did not contribute to explaining the pattern of ratings across targets, $\chi^2(6) = 6.94, p > .10$.³

³Exploratory HLM analyses were also performed using octant scales as outcomes, to determine more specific differences among groups. These analyses showed that the low education group described their social worlds as significantly more Hostile, Dominant, Hostile-Dominant ($p = .05$), and Hostile-Submissive, and less Friendly and Friendly-Submissive, compared with the high education group. The low education group appraised their social environments as significantly more Hostile and Dominant than the medium education group.

SES, Interpersonal Experiences, and Subjective Health Outcomes

Interpersonal experiences and subjective health. Table 2 shows the results of analyses that regressed the SF-12 scales onto perceptions of affiliation and dominance. The interpersonal variables explained between 4% and 16% of the variance in health ratings. Affiliation was a more consistent predictor of perceived health than was Dominance; however, the effect of Dominance was significant for some outcomes.

SES and subjective health. Table 3 shows the results of analyses that regressed the SF-12 perceived health outcomes onto SES. The education variables predicted a small but significant amount of the variance in most outcomes (i.e., except Social Functioning and Vitality). Consistent with substantial prior research, individuals with more education reported better health than their less educated counterparts.

Tests of mediation. The results of these analyses suggested the potential role of interpersonal context appraisals in mediating associations between SES and all SF-12 scales except Social Functioning and Vitality. Therefore, in the final analyses, each of these health outcomes was regressed onto the SES variables, after controlling for Affiliation and Dominance. As shown in Table 4, there was little evidence that interpersonal context appraisals contributed to associations between SES and Physical Functioning or Role-Physical. In fact, the coefficients representing the influence of interpersonal appraisals on these outcomes—particularly the coefficients for dominance—were attenuated when the education variables were included. However, the effects of SES on Mental Health, Role-Emotional, General Health, and Bodily Pain were all attenuated by at least moderate amounts after accounting for interpersonal factors. Thus, at least in part, interpersonal experiences, and the broader psychosocial factors tapped by the circumplex dimensions, contributed to the association between SES and these health outcomes.

TABLE 2

Results of the Analyses Regressing the SF-12 Perceived Health Scales on Social Context Ratings of Affiliation and Dominance

<i>SF-12 Scale</i>	<i>Unstandardized Coefficient (SE)</i>	<i>Standardized Coefficient</i>	<i>t Test</i>
Physical Functioning, $\Delta R^2 = .04$, $F(2, 293) = 7.36$, $p < .01$			
Intercept	50.13 (0.47)		
Affiliation	0.11 (0.07)	.10	1.71*
Dominance	-0.45 (0.19)	-.14	-2.32**
Physical-Role, $\Delta R^2 = .06$, $F(2, 293) = 10.93$, $p < .01$			
Intercept	49.62 (0.50)		
Affiliation	0.21 (0.07)	.18	2.92***
Dominance	-0.40 (0.20)	-.13	-1.98**
Bodily Pain, $\Delta R^2 = .09$, $F(2, 293) = 17.55$, $p < .01$			
Intercept	48.64 (0.52)		
Affiliation	0.33 (0.07)	.26	4.46***
Dominance	-0.32 (0.21)	-.09	-1.52
General Health, $\Delta R^2 = .04$, $F(2, 293) = 6.84$, $p < .01$			
Intercept	47.36 (0.61)		
Affiliation	0.18 (0.09)	.12	2.08**
Dominance	-0.45 (0.25)	-.11	-1.82*
Vitality, $\Delta R^2 = .06$, $F(2, 291) = 9.94$, $p < .01$			
Intercept	51.97 (0.58)		
Affiliation	0.33 (0.08)	.25	3.97***
Dominance	-0.02 (0.24)	.00	-0.07
Social Functioning, $\Delta R^2 = .06$, $F(2, 293) = 9.97$, $p < .01$			
Intercept	47.64 (0.53)		
Affiliation	0.22 (0.07)	0.18	2.94***
Dominance	-0.37 (0.22)	-0.11	-1.72*
Role-Emotional, $\Delta R^2 = .06$, $F(2, 292) = 9.34$, $p < .01$			
Intercept	46.05 (0.58)		
Affiliation	0.20 (0.08)	.16	2.48**
Dominance	-0.49 (0.24)	-.14	-2.07**
Mental Health, $\Delta R^2 = .16$, $F(2, 293) = 28.79$, $p < .01$			
Intercept	47.58 (0.51)		
Affiliation	0.46 (0.07)	.37	6.31***
Dominance	-0.21 (0.21)	-.06	-0.99

Note. All analyses control for age, sex, and ethnicity. Covariates and affiliation and dominance were centered about the sample mean prior to entry, so that the intercept represents the average health outcome for the sample.

* $p < .10$. ** $p < .05$. *** $p < .01$.

TABLE 3
Results of the Analyses Regressing the SF-12 Perceived Health Scales on the SES (i.e., Educational Attainment) Contrasts

Predictors	Unstandardized Coefficient (SE)	Standardized Coefficient	t Test
Physical Functioning, $\Delta R^2 = .05$, $F(2, 293) = 10.62$, $p < .01$			
Intercept (high school or less)	46.63 (0.91)		
Some college	3.95 (1.25)	0.20	3.15***
College or beyond	5.37 (1.17)	0.28	4.57***
Physical-Role, $\Delta R^2 = .05$, $F(2, 293) = 7.76$, $p < .01$			
Intercept (high school or less)	46.46 (0.98)		
Some college	3.44 (1.35)	0.17	2.56**
College or beyond	4.95 (1.26)	0.27	3.93***
Bodily Pain, $\Delta R^2 = .02$, $F(2, 293) = 3.23$, $p < .05$			
Intercept (high school or less)	46.69 (1.07)		
Some college	1.59 (1.46)	0.07	1.09
College or beyond	3.42 (1.37)	0.17	2.50**
General Health, $\Delta R^2 = .02$, $F(2, 293) = 3.52$, $p < .01$			
Intercept (high school or less)	44.75 (1.20)		
Some college	2.85 (1.65)	0.12	1.73*
College or beyond	4.08 (1.54)	0.18	2.65**
Vitality, $\Delta R^2 = .00$, $F(2, 291) = 0.37$, $p > .10$			
Intercept (high school or less)	51.15 (1.18)		
Some college	0.94 (1.61)	0.04	0.58
College or beyond	1.28 (1.51)	0.06	0.85
Social Functioning, $\Delta R^2 = .01$, $F(2, 293) = 2.02$, $p > .10$			
Intercept (high school or less)	46.73 (1.06)		
Some college	-0.08 (1.46)	-0.00	-0.05
College or beyond	2.18 (1.36)	0.11	1.60
Role-Emotional, $\Delta R^2 = .02$, $F(2, 292) = 3.42$, $p < .05$			
Intercept (high school or less)	43.53 (1.17)		
Some college	2.77 (1.60)	0.12	1.73*
College or beyond	3.89 (1.50)	0.19	2.60**
Mental Health, $\Delta R^2 = .03$, $F(2, 293) = 4.10$, $p < .05$			
Intercept (high school or less)	45.02 (1.08)		
Some college	2.82 (1.48)	0.14	1.90*
College or beyond	3.95 (1.39)	0.20	2.85***

Note. All analyses control for age, sex, and ethnicity (centered about the sample mean). Education is represented with two dummy codes, with high school or less coded as the referent group. Thus, the intercept value represents the average health outcome for the high school or less group, whereas the some college and college or beyond parameters and associated statistical tests represent the degree to which those groups differ from the high school or less group.

* $p < .10$. ** $p < .05$. *** $p < .01$.

DISCUSSION

Previous work suggests that concepts and measures from interpersonal theory (1) can provide a well-validated, theoretically grounded context for understanding psychological and social characteristics relevant to health (17,46). In this study, we examined the utility of the interpersonal framework for conceptualizing the roles of psychosocial factors in the association between SES and physical and mental health outcomes.

As hypothesized, individuals with lower SES described their social environments as lower in affiliation (i.e., higher in hostility) and higher in interpersonal dominance (i.e., lower in submission) compared with their higher SES counterparts. Thus, low SES was associated with interpersonal interactions in which social partners were generally less friendly and more dominant. Experiences of low affiliation may reflect stressful aspects of low-SES communities (52), low support at work or in

general (20,53), episodes of social conflict experienced in daily life (31,54), and exposure to ethnic or SES-related discrimination (55). In other words, the affiliation circumplex ratings may capture the repeated cycles of qualitatively hostile interactions that are promoted by higher order socioeconomic contexts.

A slightly different interpretation of the association between SES and dominance ratings may be appropriate, particularly considering analyses showing that these variables exerted overlapping effects on perceived health. Social class based definitions of SES (24) imply a hierarchy of status or control, suggesting that occupying a subordinate position relative to others may be an inherent aspect of having low SES. For example, low-status occupations are typically associated with low control and inequitable benefits and compensation (32). Thus, in everyday life, individuals with lower SES may receive repeated cues that reinforce their subordinate status in the social hierarchy. It

TABLE 4
Results of the Analyses Regressing SF-12 Health Outcomes on Educational Attainment, After Controlling
for Affiliation and Dominance

Outcome	B (SE)	t Test	% Attenuation
Physical Functioning, $\Delta R^2 = .03$, $F(2, 291) = 5.58$, $p < .01$			
Affiliation	0.10 (0.07)	1.51	
Dominance	-0.19 (0.21)	-0.91	
Some college vs. HS or less	3.25 (1.30)	2.49**	17.72
College or beyond vs. HS or less	4.31 (0.10)	3.30***	19.74
Role-Physical, $\Delta R^2 = .02$, $F(2, 291) = 3.04$, $p < .05$			
Affiliation	0.19 (0.07)	2.78***	
Dominance	-0.20 (0.22)	-0.90	
Some college vs. HS or less	2.41 (1.38)	1.74	29.94
College or beyond vs. HS or less	3.41 (1.39)	2.46***	31.11
Bodily Pain, $\Delta R^2 = .00$, $F(2, 291) = 0.42$, $p > .10$			
Affiliation	0.33 (0.07)	4.41***	
Dominance	-0.26 (0.23)	-1.14	
Some college vs. HS or less	-0.02 (1.46)	-0.01	101.26
College or beyond vs. HS or less	1.02 (1.47)	0.70	70.18
General Health, $\Delta R^2 = .01$, $F(2, 291) = 0.91$, $p > .10$			
Affiliation	0.17 (0.09)	1.99**	
Dominance	-0.31 (0.27)	-1.16	
Some college vs. HS or less	1.66 (1.70)	0.97	41.75
College or beyond vs. HS or less	2.29 (1.71)	1.34	43.87
Role-Emotional, $\Delta R^2 = .00$, $F(2, 290) = 0.56$, $p > .10$			
Affiliation	0.20 (0.08)	2.41**	
Dominance	-0.39 (0.26)	-1.49	
Some College vs. HS or less	1.32 (1.64)	0.80	52.35
College or beyond vs. HS or less	1.72 (1.65)	1.04	55.78
Mental Health, $\Delta R^2 = .00$, $F(2, 291) = 0.46$, $p > .10$			
Affiliation	0.45 (0.07)	6.22***	
Dominance	-0.13 (0.23)	-0.55	
Some college vs. HS or less	1.05 (1.44)	0.73	62.77
College or beyond vs. HS or less	1.35 (1.35)	0.94	65.82

Note. All analyses control for age, sex, and ethnicity (centered about the sample mean). R^2 shows the percentage of variance in the outcome accounted for by addition of the education contrasts, after accounting for covariates and interpersonal factors, and the F tests examine whether this change was significant. The far right column depicts the percentage reduction in the unstandardized regression coefficients, compared to the analyses that did not control for social context ratings. Affiliation and dominance are centered about the sample mean prior to entry. Information for the high school or less group (i.e., the referent group) is not displayed. HS = high school.

* $p < .10$. ** $p < .05$. *** $p < .01$.

is also possible that in lower SES environments, social status, dominance, and/or control are chronically threatened or challenged in everyday interactions in which individuals assert their own status by putting others “down.”

This study also showed that ratings of the social environment, especially affiliation (or hostility), helped explain the inverse association between SES and perceived health. In particular, social context ratings contributed to the association between SES and general health, pain, mental health, and the influence of health on social functioning. Affiliation and Dominance ratings were less relevant to explaining associations between SES and overall physical health, or the impact of physical health on daily living. Social factors captured by the horizontal (i.e., Affiliation) circumplex axis contributed most to the SES and perceived health association. These findings are consistent with a large body of research showing that low support, and high social con-

flict, hostility, anger, and aggression may be relevant to health outcomes, including depression, all-cause mortality, and cardiovascular disease (56,57). Furthermore, the results are consonant with prior research that has shown a mediating role for psychosocial factors such as hostility, social support, and conflict in the association between SES and health (19,58–60). It is important to note that at least some research indicates that psychosocial factors may be most relevant to health disparities at low SES levels (19,58) rather than at higher steps in the SES gradient. This study did not identify a similar trend, although the range of SES we examined was limited. Inasmuch as psychosocial experiences or traits captured by the circumplex do contribute to health disparities, these associations are likely to proceed through a combination of behavioral and physiological pathways. Describing these pathways is beyond the scope of this study, but extensive discussions can be found in prior reviews

(61,62). Overall, these findings support the continued focus on psychosocial factors in efforts to elucidate and eliminate SES health disparities, and they suggest that the interpersonal framework may provide a helpful methodological and theoretical context for these efforts.

It is notable that effect sizes reflecting the associations between SES and social context ratings were small in this study, and prior research has documented similar trends (see 53 for discussion). Additional research has shown that the relationship between SES and social functioning varies according to the specific measures of SES and social constructs, as well as the ethnicity and urban versus rural origin of the respondents (20,63). Thus, like other factors, social context experiences—and associated psychosocial risk patterns—appear to form only a small piece of the health disparities puzzle.

These findings should be interpreted in light of several limitations. First, census data indicate that our sample was relatively well educated and more likely to be Latino relative to area demographics. Furthermore, the small sample size did not permit examination of interaction effects between education and other demographic characteristics (e.g., age, sex, ethnicity) in predicting interpersonal experiences or their influence on health. Exploring whether SES has similar implications for interpersonal processes across diverse population groups, and examining whether the health implications of interpersonal variables are consistent across levels of SES and other demographic factors, are important future research directions. Another limitation is the exclusion of non-English-speaking individuals from the study, which, especially in San Diego's multicultural environment, could have created a sampling bias. The study also relied exclusively on self-reports, and common method variance may therefore have contributed to observed associations (64). Although self-reported health has been shown to be an important predictor of objective endpoints, including mortality (41), it does contain a subjective component. Thus, ratings of health and social experiences could have been influenced by unmeasured variables, such as neuroticism. We also used an abbreviated version of the IMI-C, and reliability and validity of the measure may have been compromised. Given the cross-sectional design, the directionality of associations is unclear, particularly in relation to the association between social ratings and health outcomes (because either could precede the other, or they could be mutually reinforcing). Furthermore, because we focused on general social contexts instead of specific relationships or experiences, we were unable to examine the effects of SES on nuanced aspects of social functioning. Given these limitations, the findings should be viewed as providing preliminary support for the hypothesized associations and for the utility of the interpersonal model for this type of research. Further research, using larger samples and more diverse methods, including process-focused approaches that would permit analysis of more refined distinctions in social experiences among SES groups, is recommended.

This study provides initial evidence for the utility of concepts and methods from interpersonal theory (1) in efforts to understand the roles of psychosocial factors in the association be-

tween SES and health. Low-SES contexts may bring exposure to hostility and contested dominance or social status, and more hostile or less supportive aspects of low-SES environments, in particular, might contribute to health disparities. Further research on the contribution of psychosocial factors in the SES and health gradient is warranted, and interpersonal theory provides a well-validated, conceptually meaningful context for this research.

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