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Affective and Cardiovascular Effects of Experimentally-Induced Social Status

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Objective: Observational research suggests subordinate social status is associated with negative mental and physical health outcomes. However, observational studies have limitations, including confounding of social status with other factors, limited ability to infer causality, and difficulty of obtaining detailed affective and physiologic data. This study used experimental methods to test the hypothesis that subordinate social status per se causes psychological distress and cardiovascular arousal. ***Design:*** Forty-four women were randomly assigned to an induced subordinate or dominant status condition. Social status was manipulated using a procedure derived from status construction theory. ***Main Outcome Measures:*** Affective responses were assessed via self-report. Cardiovascular responses were assessed by measures of systolic and diastolic blood pressures obtained with an automated blood pressure machine. ***Results:*** Participants in the subordinate condition perceived themselves as lower in status; the reverse was true for dominant condition participants. Compared with induced dominant status, induced subordinate status produced increased negative affect and systolic blood pressure over the course of the study. ***Conclusion:*** Findings suggest social status can be experimentally manipulated and short-term induction of subordinate status can have adverse effects on affect and stress-related physiological systems. Results have implications for understanding how socioeconomic status "gets under the skin" to influence health.

Keywords: social status, blood pressure

The formation of social hierarchies is a fundamental aspect of human relations, and social status appears to influence multiple aspects of human functioning. Social status broadly defined refers to a general ordering in society. Subordinate social status can be conceptualized as the state of occupying a less advantaged position on a given social hierarchy as a function of some salient characteristic (e.g., gender, race/ethnicity, income). Thus, social status encompasses but also transcends economic, educational, and occupational factors assessed by traditional socioeconomic measures. Theorists have long hypothesized that subordinate social status may have negative effects on mental and physical health. Specifically, lower social status—above and beyond resource access—may engender stress that exerts cumulative negative effects on mental and physical health (Wilkinson, 1997).

Socioeconomic status (SES) is perhaps the most widely studied index of social status. Incremental increases in SES are associated with better mental and physical health for adults and children, even at the upper end of the SES continuum where resource deprivation is rare (e.g., Adler et al., 1994; Chen, Matthews, & Boyce, 2002; Kaplan & Keil, 1993; Lorant et al., 2003; Lynch, 1996). Thus, SES may reflect not only access to resources but also relative position within the social hierarchy. Consistent with that thesis, subjective perceptions of social status have been found to predict health independently of objective SES measures (Adler, Epel, Castellazzo, & Ickovics, 2000; Ostrove, Adler, Kuppermann, & Washington, 2000). Similarly, research by Boyce indicates that preschool children occupying subordinate positions in peer group social interactions are at greater risk for poor health outcomes (Boyce, 2004). Additional work in this area has suggested that the relation between SES and health among preschoolers may be mediated by cardiovascular reactivity and social dominance status (Goldstein, Trancik, Bensadoun, Boyce, & Adler, 1999).

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However, certain shortcomings in research on SES limit its ability to clarify the health effects of social status. First, SES measures of status are often confounded with access to material and other resources, making it difficult to ascertain whether subordinate social position has a deleterious impact *in and of itself*. Second, the vast majority of this research has been observational, limiting conclusions about the causal direction of SES-health relations. Finally, although stress-related physiologic dysfunction is one key pathway by which low social status may influence health (Adler et al., 1994; Brunner, 1997), it is often not feasible to collect detailed affective and physiologic measures in large, community-based samples. Research on subjective perceptions of social status (Adler et al., 2000; Ostrove et al., 2000) and social ordering among children (Boyce, 2004; Goldstein et al., 1999) has also tended to use observational methods, in which the health correlates of naturally occurring hierarchies are examined.

Experimental methods have the potential to augment observational findings via manipulation of social position distinct from confounders, random assignment of participants to permit causal inference, and detailed assessment of affective and physiologic mechanisms. Experimental research with animals lends support to the notion that subordinate social status may have adverse health consequences. For instance, female cynomolgus monkeys assigned to experimentally manipulated subordinate status displayed markers of "behavioral depression," including cortisol hypersecretion, fearful vigilance, and decreased affiliative behavior, as well as increased risk for atherosclerosis (Kaplan et al., 1996; Shively, Laber-Laird, & Anton, 1997). Research with other nonhuman primates also suggests adverse physiological effects of subordinate social status (Abbott et al., 2003; Sapolsky, Alberts, & Almann, 1997). However, the extent to which such findings can be generalized to humans remains unclear.

Experimental manipulation of social status among humans is a more challenging endeavor, as human status hierarchies are subtle, diverse, and complex. Manipulations among humans have generally involved rigged competitions or performance evaluation scenarios. Only a few such studies have examined *health-related effects* of induced status. For example, Josephs, Sellers, Newman, and Mehta (2006) induced social status via rigged competitions described as tests of intelligence, which the participant either lost (low status) or won (high status). Individuals with high baseline testosterone (which the authors interpreted as high baseline status) in the low-status condition displayed distress and cardiovascular arousal. In social comparison research, Mendes, Blascovich, Major, and Seery (2001) found that participants induced to perceive themselves as less competent than their partners experienced negative affect and adverse cardiovascular responses. Real-world status hierarchies may in fact often be generated by performance-based scenarios. However, when used to elucidate effects of social status, these types of manipulations may be susceptible to confounding by phenomena such as performance or evaluation anxiety, achievement motivation, or locus of control.

Sociological research on the formation of status hierarchy beliefs by Ridgeway and colleagues may offer a promising alternative model for status induction (e.g., Ridgeway, Boyle, Kuipers, & Robinson, 1998; Ridgeway & Erickson, 2000). Ridgeway's status construction theory proposes that the processes sufficient to create status beliefs are (1) a nominal distinction between individuals in the population, paired with (2) a perceived inequality between those individuals (Ridgeway et al., 1998). Ridgeway has developed an experimental procedure for creating those conditions, which has successfully generated status beliefs in multiple trials (Ridgeway et al., 1998; Ridgeway & Erickson, 2000). This procedure offers three potential benefits. First, the nominal distinction and associated status beliefs are *created* in the laboratory, avoiding the complex reactions and potential confounders that can occur when using existing status characteristics (e.g., SES). Second, the status induction does not reference intelligence or other attributes that may confound the assessment of social status. As a result, the manipulation targets social status in a "pure" fashion. Finally, use of a nominal distinction generates beliefs not only about one's own status but also about the relative status of the hypothetical *groups* to which each individual belongs. This is analogous to real-world status distinctions, which often operate most powerfully in relation to social groupings (e.g., race, class, gender).

To our knowledge, Ridgeway's status-induction paradigm has never been employed to assess how status may impact affective and cardiovascular responses and ultimately, "get under the skin" (Taylor, Repetti, & Seeman, 1997). This study is a preliminary investigation aimed at adapting Ridgeway's paradigm to examine effects of induced dominant versus subordinate status on affect and cardiovascular functioning. Because exaggerated cardiovascular reactivity to stressful experiences has been linked to adverse health outcomes, such as cardiovascular disease (e.g., Everson, Kaplan, Goldberg, & Salonen, 1996; Kamarck et al., 1997; Light, Dolan, Davis, & Sherwood, 1992), recurrent cardiovascular arousal has been posited as a stress-related pathway by which social factors may increase risk for disease (Brunner et al., 2002; Schneiderman, 1987). The present study represents preliminary work designed to evaluate the feasibility of a procedure to induce social status (subordinate vs. dominant) in the short-term. We examined whether subordinate social status would produce elevations in psychological distress (i.e., increased negative affect and decreased positive affect) and cardiovascular arousal (i.e., increased systolic and diastolic blood pressure), as compared with dominant status. In addition, we explored whether these effects might be maintained or even enhanced in the context of other types of stressful conditions.

Method

Participants

Our protocol requires same-sex matching of participants and confederates because gender is a characteristic with status meaning that could potentially confound dyadic interactions in the status-induction protocol (Ridgeway & Smith-Lovin, 1999). In the present study, a female undergraduate research assistant served as the confederate and was paired with female participants. Participants were recruited from the Boston community using study descriptions posted on an online bulletin board. Exclusion criteria included: (1) age less than 18 or greater than 25; (2) use of medications that affect cardiovascular or emotional functioning (e.g., antihypertensive medications; antidepressants) (3) severe medical or psychiatric conditions (e.g., cardiovascular disease; bipolar disorder); and (4) current smoking. Testing lasted approximately 2.5 hours. Participants were compensated $50 for their time and up to $10 for transportation.

Forty-five women were scheduled for research visits. One participant's data were excluded due to an external interruption of the testing protocol, leaving 44 participants in the sample, of whom 22 were randomized to the induced subordinate condition and 22 to the induced dominant condition. One participant in the induced subordinate condition had invalid blood pressure readings. As a result, she was excluded from all analyses with blood pressure. Participants had an average of 15.5 years of education (SD = 1.76, range = 12–20). The average age was 21.86 (SD = 2.03; range = 18–25). Twenty-eight participants (62.2%) self-identified as European American, 6 participants (13.3%) as African American, 5 participants (11.1%) as Asian/Pacific Islander, 3 participants (6.7%) as Hispanic, and 1 participant (2.2%) as "other." Two participants did not provide data on race/ethnicity. Forty-three participants (97.7%) were unmarried, and 1 participant (0.02%) did not provide data on marital status.

Measures

Demographic and anthropometric information was obtained via a brief questionnaire that included items regarding age, race, education, marital status, height, and weight. Body mass index (BMI) was calculated as weight (kg)/height (m)^2.

Status belief measures (Ridgeway et al., 1998) asked the participant to rate (1) how *most people* and, (2) how she *personally* would rate her own group and her partner's group (i.e., Personal Response Style group derived from a false personality measure, as described below) with respect to status and power using seven-point scales. Each participant also rated herself and her partner on perceived influence and relative skill using nine-point scales.

Affect. The Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988) is a well-validated 20-item self-report measure containing positive and negative affect scales. Affect is rated using a scale of 1 ("*very slightly or not at all*") to 5 ("*extremely*"). Scores were standardized in this study because some identical items were completed as part of a separate questionnaire on a 4-point scale. Cronbach alphas were acceptable for all four PANAS administrations, with the average α = .78 for Negative Affect and 0.84 for Positive Affect.

Blood pressure. Systolic (SBP) and diastolic (DBP) blood pressures were assessed via an automated blood pressure machine (Dynamap Procare 100, asculcatory model). The cuff was attached to the nondominant arm to enable participants to use a computer and phone during study tasks. To obtain baseline blood pressure, three blood pressure readings were obtained at 1-min intervals following a 5-min rest period, and the second two readings were averaged. Readings for each subsequent assessment period were averaged.

Procedure

Participants were randomly assigned to either the *induced subordinate* or *induced dominant* status condition. Research visits were scheduled during the first 7 days of the menstrual cycle (early follicular phase). Participants were instructed to abstain from coffee after 9am on the day of the testing session. Participants were tested individually. On arriving in the lab, the participant sat in a waiting area where the confederate—ostensibly a second participant—was also seated, at a distance great enough to prevent verbal interaction. The experimenter greeted the confederate and led her away into a testing room, then escorted the participant to a separate testing room. The participant was told that the study concerned decision-making performance in groups of similar and different individuals, with the goal of improving organizations' ability to solve complex and ambiguous problems, and that she would be interacting with the other participant on a series of tasks over the telephone. The participant completed the PANAS. Following a 5-min "vanilla baseline" resting period in which the participant watched a Power Point sequence of shifting colors (Jennings, Kamarck, Stewart, Eddy, & Johnson, 1992), baseline blood pressure readings were obtained.

(1) Creating nominal distinction. Using a procedure adapted from "mere difference" social psychological studies (Tajfel, Billig, Bundy, & Flament, 1971), the participant was asked to select her preference between two works of art and was informed that this was a "Personal Response Style" test that distinguished between two stable personality types (S2 or Q2). No feedback regarding the nature of these personality types was provided. The participant was asked to copy basic information about herself and her partner on a card to be kept near her. In so doing, she was able to see that she and her partner each had a different Personal Response Style. This false personality measure functions to prime ingroup/outgroup comparisons. Previous research with this paradigm has indicated that whatever characteristic of the partner becomes salient in the course of the study protocol is attributed to her "group" (Ridgeway et al., 1998; Ridgeway & Erickson, 2000).

(2) Generating interaction and influence hierarchies. Next, the participant was instructed to engage in a decision-making task (the "Meaning Insight Task") with her partner, which involved matching English words with words from a supposedly ancient language using "meaning insight." Participants and confederates each performed the task on separate computers and interacted via telephone, to reduce potentially confounding effects of visual cues related to social status (e.g., attractiveness). The task consisted of two separate rounds, each containing 10 items. The participant was told she had been randomly selected to state her responses first, after which the confederate would state her responses. The pair was instructed to reach an agreement on each item within 90 seconds and record their answers privately. Answers were to be scored as correct only if both members agreed on the same answer, and the team with the most correct answers would win a prize ($10 for Round 1, $50 for Round 2).

The confederate disagreed with a prespecified number of participant responses. The confederate's behavior was scripted so as to be deferential (i.e., hesitant speech, lack of certainty and confidence, questioning tone) in interactions with participants assigned to the *induced dominant status condition* and assertive (i.e., a confident and nondomineering manner; Carli, LaFleur, & Loeber, 1995; Ridgeway, Berger, & Smith, 1985) in interactions with participants assigned to the *induced subordinate condition*. The participant's experimental condition (subordinate or dominant) remained constant across both rounds of the Meaning Insight Task, and confederate behavior was also consistent across both task rounds. This manipulation has been demonstrated to reliably induce perceptions of dominant or subordinate status in research participants (Ridgeway et al., 1998; Ridgeway & Erickson, 2000). Presumably, the participant comes to imbue the previously content-free nominal distinction (i.e., the Personal Response Style distinction between participant and partner) with status meaning, the content of which depends upon the assertive or submissive behavior of the confederate. The participant completed the status belief measures and PANAS following each round of the Meaning Insight task. Blood pressure was monitored at 1-min intervals throughout each round of the task.

(3) Stressor. To explore whether effects of induced social status might be more pronounced effects under conditions of stress, we adapted the widely used Trier Social Stress Test (Kirschbaum, Pirke, & Hellhammer, 1993). Following completion of the status induction, the participant was instructed to engage in a 5-min backward counting task with her partner, in which *individual* performance would be judged based on speed and accuracy, with a prize ($50.00) for the best performance. The participant and her partner were instructed to take turns counting backward from 6,233 by increments of 27 and were told that this task measures aspects of intelligence. The participant then completed the PANAS. Blood pressure was monitored at 1-min intervals during the task.

The participant remained in the testing room for a 20-min recovery period, during which blood pressure was recorded at 5-min intervals, and the participant was debriefed.

Statistical Analysis

Using *t*-tests and χ^2 analyses, participants in the two status conditions were compared with respect to demographic and other characteristics at baseline (e.g., age, race/ethnicity, education, BMI) to ensure success of randomization. Success of the social status manipulation was evaluated using *t*-tests to compare the status beliefs of two groups, as well as the percentage of times each participant changed her Meaning Insight Task responses to conform to the confederate. We expected individuals in the subordinate group to change their scores more often than individuals in the dominant group. *t*-test effect sizes are reported as Cohen's *d* statistic, calculated as the difference between the two group means divided by the pooled standard deviation (i.e., the root mean square of the two standard deviations). Small, medium, and large effects sizes for *d* are estimated as .20, .50, and .80, respectively (Cohen, 1992).

Primary hypotheses were evaluated using repeated measures multivariate analysis of covariance (RM ANCOVA) with group by time interactions. Separate models were estimated to assess cardiovascular and affective outcomes. Group was a two-level variable (subordinate vs. dominant status). Covariates included age and race/ethnicity for all outcomes, and additionally BMI for cardiovascular outcomes. Given the small numbers of minority group participants, race/ethnicity was coded as *non-Latino White* or *minority*. Effect sizes are reported for RM ANCOVA analyses using Partial Eta Squared (η_p^2), which ranges in value from 0 to 1, with 0 indicating no effect of social status on the dependent variable, and 1 indicating the strongest possible relation (Green, Salkind, & Akey, 2000).

For affect analyses, separate models were estimated for negative and positive affect. These models included four time points: baseline, post-Meaning Insight task (rounds 1 and 2), and poststressor task. For cardiovascular outcomes, separate models were estimated for SBP and DBP. These models included five time points: baseline, Meaning Insight task (rounds 1 and 2), stressor task, and recovery. Two participants exceeded the 17-min time limit for a given round of the Meaning Insight Task; blood pressure ratings obtained following 17 minutes were not included in analyses. If a significant group by time interaction was observed in an RM ANCOVA model, *t*-tests were conducted to evaluate whether the groups differed in the rate or direction of change with respect to the relevant outcome from baseline through each assessment time point.

Results

Participants in the two conditions did not differ significantly with respect to baseline demographic, affective, or physiological variables. Mean BMI for the sample was 23.66 ($SD = 4.39$). Mean baseline SBP was 104.06 ($SD = 10.02$), and mean baseline DBP was 63.15 (8.18).

Social Status Induction

Table 1 displays findings from group comparisons on the status belief measures. As predicted, participants in the subordinate condition perceived their own Personal Response Style group to be lower in status/power than their partner's Personal Response Style group, and also believed other people would perceive the groups in this way. The reverse was true for participants in the dominant condition. Subordinate participants also perceived themselves as having less influence and skill relative to their partners, whereas the reverse was true for dominant participants. A further measure of status is how many times each participant changed her answers during the Meaning Insight Task to conform to her partner. Participants in the subordinate condition conformed to the confederate more often than participants in the dominant condition both in the first round of the task, 75.57% of the time vs. 49.42%; $t(1, 42) = 5.3$, $p < .001$, $d = 1.60$) and in the second task round (subordinates conformed 80.27% of the time vs. 66.23% for dominants; $t(1, 41) = 2.54$, $p < .05$, $d = 0.77$. In addition, subjects randomized to the subordinate group took longer to complete the meaning insight task (55.71 minutes; $SD = 11.01$) than did subjects randomized to the dominant group (47.68; $SD = 7.00$), $t(41) = 2.87$, $p < .01$.

Effects of Social Status on Affective Responses

Our hypotheses about the effects of status on affect were partially supported (see Figures 1a and 1b). A significant group × time interaction was observed for negative affect, Wilks's $\lambda = 0.79$, $F(3, 37) = 3.28$, $p < .05$, partial $\eta_p^2 = 0.21$, such that the subordinate group showed significantly greater increase in negative affect relative to the dominant group from baseline through the first round of the Meaning Insight task, $t(1, 42) = 3.41$, $p < .01$, $d = 1.03$ and from baseline through the stressor task, $t(1, 42) = 3.05$, $p < .01$, $d = 0.92$, as well as a trend toward greater increase from baseline through the second round of the Meaning Insight task, $t(1, 42) = 2.00$, $p = .05$, $d = 0.62$. By contrast, the group x time interaction was not significant for positive affect.

Effects of Social Status on Cardiovascular Responses

Our hypotheses about the effects of status on cardiovascular arousal were also partially supported (see Figures 2a and 2b). A significant group × time interaction was observed for SBP,

Table 1
Participant Ratings of Status Indices for Self Versus Partner

	Subordinate (n = 22) M (SD)	Dominant (n = 21) M (SD)	t	d
Status/power: external perceptions				
Own group	16.68 (4.50)	20.24 (4.16)	−2.69**	0.82
Partner's Group	20.64 (4.80)	16.71 (2.95)	3.21**	0.99
Difference	−3.95 (5.52)	3.52 (5.22)	−4.56***	1.39
Status/power: subjective perceptions				
Own group	17.73 (6.02)	20.52 (3.59)	−1.86	0.56
Partner's group	19.45 (3.49)	16.43 (3.25)	2.94**	0.90
Difference	−1.73 (7.07)	4.10 (5.18)	−3.07**	0.94
Perceived influence				
Round 1				
Self	4.23 (2.02)	6.00 (2.14)	−2.83**	0.85
Partner	7.86 (0.99)	4.32 (1.81)	8.06***	2.43
Difference	−3.64 (2.34)	1.68 (1.96)	−8.17***	2.46
Round 2				
Self	4.68 (2.30)	5.59 (2.06)	−1.38	0.42
Partner	6.82 (1.44)	4.45 (1.92)	4.62***	1.40
Difference	−2.14 (2.96)	1.14 (2.05)	−4.26***	1.29
Relative skill				
Round 1				
Self	13.77 (4.33)	13.36 (5.83)	0.26	0.08
Partner	19.27 (5.30)	11.73 (5.27)	4.74***	1.43
Difference	−5.50 (5.04)	1.64 (4.26)	−5.07***	1.53
Round 2				
Self	14.55 (6.11)	13.00 (5.90)	0.85	0.26
Partner	17.64 (5.18)	12.45 (5.01)	3.37**	1.02
Difference	−3.09 (6.87)	0.55 (2.76)	−2.30*	0.70

Note. Status/power: External perceptions. Participants were asked to rate how "most people" would evaluate the status/power of their own and their partner's Personal Response Style groups. Status/power: Subjective perceptions. Participants were asked to rate how "you personally" would evaluate the status/power of their own and their partner's Personal Response Style groups.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Wilks's λ = 0.70, $F(4, 34) = 3.71$, $p < .05$, partial $\eta_p^2 = .30$, indicating greater systolic increases in the subordinate as compared with the dominant group from baseline through both Meaning Insight rounds (Round 1, $t(1, 41) = 2.23$, $p < .05$, $d = 0.68$; Round 2, $t(1, 36) = 2.18$, $p < .05$, $d = 0.66$) and from baseline through recovery, $t(1, 41) = 2.37$, $p < .05$, $d = 0.72$. The groups did not differ with respect to SBP increases from baseline through the stressor task. Interestingly, there appeared to be more variability in SBP during the stressor than at other assessment points. The standard deviation for SBP during the stressor was 16.04, as compared with 10.02 for baseline, 12.92 for Round 1, 11.77 for Round 2, and 10.82 for recovery. Participants in the subordinate and dominant groups had similar levels of SBP variability during the stressor (15.33 for the subordinate group and 16.10 for the dominant group). The group × time interaction was not significant for DBP, although the pattern of findings was consistent with those for SBP and in the predicted direction.

Discussion

In the present study, social status was experimentally manipulated to test the hypothesis that subordinate social status causes adverse emotional and cardiovascular responses. Findings indicated the manipulation was feasible to implement and successful at generating social status beliefs in participants in both the subordinate and dominant status conditions. As predicted, subordinate status was associated with certain adverse affective and cardiovascular outcomes compared to dominant status. Induced subordinate status predicted higher negative affect and SBP. Effect sizes for group differences were generally moderate to large.

With respect to affective responses, negative affect increased among subordinate participants in response to the status manipulation, whereas negative affect decreased among dominant participants. This pattern suggests that induced subordinate status is subjectively distressing, in contrast to dominant status. These findings are consistent with other studies assessing status-related phenomena (Josephs et al., 2006; Mendes et al., 2001). Although this study involved short-term induction of a relatively subtle status differential, findings are consistent with research indicating higher rates of depression or depressive symptoms occurring with chronically subordinate status (Lorant et al., 2003; Shively et al., 1997).

By contrast, consistent group differences in positive affect were not observed. Positive and negative affect are often conceptualized as orthogonal constructs and are largely uncorrelated in the PANAS (Watson et al., 1988). Because negative affect tends to be more responsive to mild situational stressors (Larsen, Hemenover, & Norris, 2003), it is perhaps not surprising that our short-term experimental manipulation had a stronger effect on negative than positive affect. In addition, Josephs et al. (2006) have noted that the positive affect subscale of the PANAS reflects not only hap-

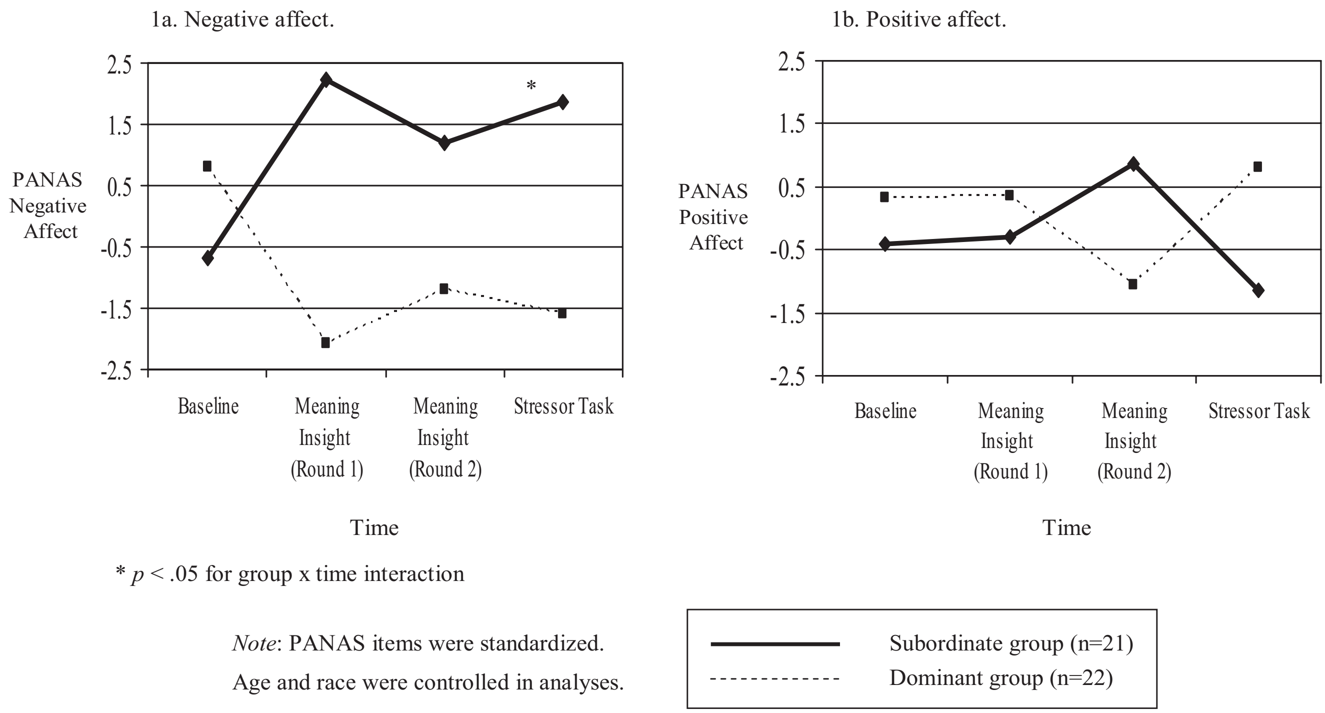

Figure 1. a and b. Negative and positive affect as a function of status group.

piness but also high levels of concentration and engagement (Watson et al., 1988). Thus, our positive affect findings may indicate that both status groups show comparable levels of engagement with the study tasks.

As predicted, participants assigned to subordinate status showed greater increases in SBP relative to those assigned to dominant status. These group differences in SBP were evident throughout both rounds of the Meaning Insight Task, as well as recovery. Notably, cardiovascular reactivity to laboratory stressors has been linked to adverse cardiovascular outcomes (Schneiderman, 1987; Treiber et al., 2003). Group differences in DBP were not statistically significant, although results were in the predicted direction. These findings are consistent with other literature that has found greater responsivity of SBP rather than DBP to laboratory stressors (e.g., Cesana et al., 2003), particularly tasks involving active coping (Sherwood & Turner, 1995).

We included the backward-counting stressor task in order to explore whether effects of induced social status would be maintained or even enhanced under stressful conditions. Group differences were observed in negative affect but not cardiovascular reactivity during the stressor task. Subordinate participants reported increased negative affect, whereas dominant participants reported reduced negative affect. By contrast, both groups displayed pronounced cardiovascular arousal of a magnitude greater than that observed during the meaning insight task, suggesting that the cardiovascular effects of this stressor may have overwhelmed status induction effects. It is also notable that both groups displayed greater variability in blood pressure data during the stressor task than during the other assessment points. Thus, individual differences in response to the stressor may have attenuated our ability to detect group differences as a function of induced status.

Previous research has shown SES to be related to cardiovascular reactivity during a stressor (e.g., Chen & Matthews, 2001; Kapuku, Trieber, & Davis, 2002). Differences between our findings and this work are likely due in large part to the fact that the present investigation concerned experimentally-induced social status, whereas previous work assessed effects of chronic, preexisting SES. SES, even in children, can be associated with preexisting subclinical changes in vasculature (Chen, Martin, & Matthews, 2006; Yan et al., 2006). Thus, experimentally-induced social status is almost certain to have weaker effects than the adverse multiple material and social conditions associated with low SES that have accumulated over a lifetime.

We purposely selected a relatively homogeneous sample with respect to gender, age, and education, in order to reduce interindividual variability in preexisting status characteristics that may impact response to induced status. As a result, findings are not generalizable to males or to individuals of different demographic groups. Further research is needed to assess a more diverse spectrum of individuals and to evaluate the impact of preexisting status and personality factors on responses to induced social status. Moreover, this study was a preliminary investigation that included a limited set of outcome measures. Future research should consider the effects of laboratory-induced status on autonomic nervous system, HPA axis, inflammatory, or other cardiovascular indices known to be responsive to stress. Careful consideration should be given to power and effect size issues in this work. We note that examination of other outcomes, such as indicators of HPA activation (e.g., cortisol), will likely require larger sample sizes than were included in this initial study, as well as attention to appropriate timing of assessments, particularly given the longer time taken by participants in the subordinate condition to complete the

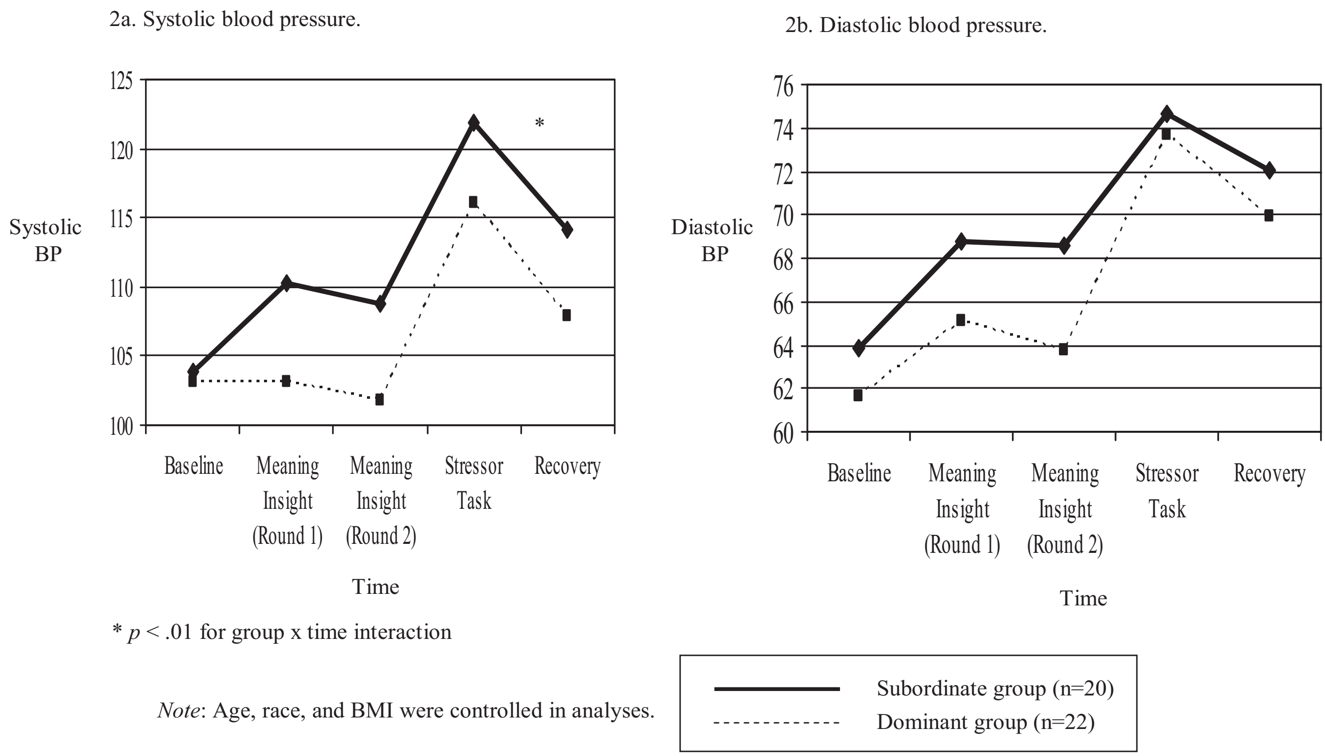

Figure 2. a and b. Systolic and diastolic blood pressure as a function of status group.

Meaning Insight Task compared to participants in the dominant condition. We should also note that blood pressure readings have been obtained more frequently than once every five minutes during recovery in many, but not all (e.g., Kapuku et al., 2002), other studies. In addition, the fact that blood pressure did not return to baseline levels during recovery may reflect the fact that participants were not at rest throughout the entire recovery period but also engaged in some activities that may have served to maintain a degree of arousal (e.g., filling out a demographic form and other measures; providing feedback about the study).

This study demonstrates the feasibility of adapting Ridgeway's social status induction protocol (Ridgeway et al., 1998; Ridgeway & Erickson, 2000) for assessing affective and cardiovascular responses to induced status among an urban-dwelling community sample. In addition, our findings generally support the prediction that induced subordinate status has affective and cardiovascular effects. If our findings can be extrapolated to status-related encounters outside the laboratory, they suggest the potential for significant health effects of induced subordinate status, particularly if experienced repeatedly over a life span, as with many status-related processes (Lynch, 2000). Indeed, our findings are consistent with research on negative health effects of low SES (e.g., Adler et al., 1994; Kaplan & Keil, 1993; Lorant et al., 2003; Lynch, 1996), as well as research on effects of other stressors that may be associated with low social status, including discrimination (e.g., chronic exposure to discrimination was found to predict cardiovascular disease in African American women; Lewis et al., 2006). Given the dramatic mental and physical health disparities that are evident within populations according to social status, more nuanced understanding of their origins is critical. Observational findings are valuable in this respect, but conclusions that can be drawn from such research have significant limitations. Experimental status induction research has the capacity to augment our understanding of the causal relations and mechanisms of action that underlie the well-documented SES gradients in health, as well as other status-related health disparities.

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