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## Stress at Work: Differential Experiences of High versus Low SES Workers

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### Abstract

This paper asks whether workers with greater socioeconomic status (SES) experience different levels of stress at work than workers with lower SES and, if so, what might explain these differences. We collected innovative assessments of immediate objective and subjective measures of stress at multiple time points across consecutive days from 122 employed men and women. We find that in comparison to higher SES individuals, those with lower SES reported greater happiness at work, less self-reported stress, and less perceived stress; cortisol, a biological marker of stress, was unrelated to SES. Worker's momentary perceptions of the workplace were predicted by SES, with higher SES individuals more commonly reporting feeling unable to meet work demands, fewer work resources, and less positive work appraisals. In turn, perceptions of the workplace had a generally consistent and robust effect on positive mood, subjective stress, and cortisol.

### Keywords

United States; Stress; Work; Socioeconomic status; Momentary Workplace Perceptions; Ecological Momentary Assessment; Cortisol

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There is growing consensus that disparities in exposure to stress can be traced to differences in socioeconomic status (SES) (Aneshensel and Mitchell 2014; Pearlin et al. 1981; Turner and Turner 2005). As the workplace is a primary area in which socioeconomic differences play out, the relationship between stress and status at work has long been of interest. Historically, research suggested that higher status employment brought with it a largely unmitigated wealth of positive benefits for one's well-being (Tausig 1999). Yet, more recently, the “stress of higher status” hypothesis has suggested that long hours, the likelihood of job spillover, and the demands of holding job authority may lead to stress at work among elite workers (Blair-Loy 2009; Moen et al. 2013; Schieman and Reid 2009; Schieman et al. 2006; Schieman et al. 2009; Wharton and Blair-Loy 2006). A recent study

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found that those with lower incomes experienced a greater decrease in their stress levels when at work compared to home than did high status individuals (Damaske et al. 2014).

Despite calls for more precise and ecologically valid measurements of stress, there is little quantitative information regarding stress experiences at work. Assessing whether there is a relationship between SES and stress at work necessitates measuring stress levels while individuals of varying SES are actually in the workplace. Otherwise, retrospective recall biases influenced by one's overall level of stress or current mood could influence reports (Smyth and Stone 2003). For example, retrospective reports may conflate perceptions of work stress with perceptions of other stress, such as demands of home life. Moreover, retrospective reports cannot adequately measure the momentary experiences that may lead to increases in one's stress. To our knowledge, no prior study has examined SES differences in stress levels at work as they are occurring, even though studies have shown that daily stressors are related to socioeconomic differences (Almeida et al. 2005). This study uses an ecologically valid data collection approach in which workers report their stress levels and perceptions of their workplace when prompted several times a day, allowing us to repeatedly capture (and better characterize) stress levels and work perceptions on the job in real-time and in daily life.

This paper asks: do high SES workers experience differential levels of stress at work than low SES workers? If so, what explains differential levels of stress between high and low SES workers? We seek to explain this relationship through a number of momentary assessment characteristics to measure people's immediate experiences of work demands, work resources, and positive work appraisals (see Figure 1 for conceptual model). Stress was measured both subjectively (using self-reports) and objectively (using the stress hormone cortisol) six times each day for three days, allowing us to focus on only those moments when participants reported being at work. Our objective measure of stress, salivary cortisol, becomes elevated as part of the biological stress response; thus, higher salivary cortisol levels are an indicative of greater stress at the moment of assessment (Smyth et al. 1998). Finally, in addition to stress, we report on subjective assessments of one's positive affect as these effects may be distinct from stress (cf. Larson, Richards, and Perry-Jenkins 1994).

## Stress at Work

The stress process model argues that inequalities in the social structure—particularly inequalities across class, gender, and race—create inequalities in social stress (Aneshensel and Mitchell 2014; Pearlin et al. 1981). Researchers have long contended that higher status work positions provide better working conditions, such as more job control, more authority, more job stability, more income, and less monotony, which may bring health benefits (Heaney, Israel, and House 1994; Karasek 1979; Marshall and Barnett 1992; Tausig 1999). Although higher status positions may provide resources that can improve health in the long-term, these resources might come at a cost. Those in high status positions face high levels of stress at work (Schieman and Reid 2009; Schieman et al. 2006; Schieman et al. 2009). In particular, research points to the continued conflict between work and home and the increased time pressure for professions as creating a time bind that strains professional workers (Blair-Loy 2009; Moen et al. 2013). Prior research using diary studies (i.e., single

daily assessments, typically at the end of the day) suggest that high SES individuals experience a greater number of daily stressors than do low SES individuals (Almeida et al. 2005). Yet, to our knowledge, these findings have not been tested using data that captures real-time stress at work.

Considerable research has attempted to determine the best proxies to use to measure SES for health research (for discussions, see Adler et al. 1994; Braveman et al. 2006; Krieger et al. 1997; Martin et al. 2012). Because occupational status is often unstable and the benefits of an occupation may vary widely by race and gender (Krieger et al 1997; Braveman et al. 2006), a measure of SES that includes both income and education may be most suitable for measuring one's overall economic position and security (Braveman et al. 2006). It is also possible that education and income may reveal slightly different gradients of status, so using both indicators may better encapsulate multiple dimensions of both economic capabilities and personal prestige (Seeman et al. 2008; Krieger et al. 1997). Both income and education have been found to be stable predictors of health outcomes as well as mood (see Martin et al. 2012; Subramanian et al. 2005).

H1. Higher SES workers will experience greater levels of stress (both cortisol and self-reported) at work than will lower SES workers.

**Momentary Perceptions of the workplace:** Researchers have examined processes at the workplace to gain a better understanding of whether workplace experiences moderate the relationship between work and stress. A key aspect of stress at work may be the relationship between working conditions and how those working conditions are experienced by the individual worker (Dewa et al. 2010). Work engagement has been shown to replenish one's mood, increasing one's positive affect at work (Sonnetag et al. 2012). Increased resources at work has been shown to increase worker engagement (Wayne, Shore, and Liden 1997), and may decrease one's experience of stress and strain on the job as resources may increase the ability to cope with the stress of work. Yet existing research tells us little about how to expect these experiences may vary by SES.

High status jobs typically come with greater job demands, including more responsibility, more time demands, greater interpersonal conflict, and greater conflict over use of authority than low status jobs (Pudrovska and Karraker 2014; Schieman et al. 2006; Schieman et al. 2009). But low SES workers experience low job control and little schedule control (Karracker 1979), which may leave them feeling without resources. Finding a job demanding or difficult can raise one's stress at work, particularly when workers feel unable to cope with the job demands or feel unsupported by their work environment to meet the demands (Frone, Russel, and Cooper 1992; Sonnetag et al. 2012). Thus feeling *unable to meet job demands* may increase one's stress at work. Thus, we ask:

R1: Does feeling unable to meet job demands increase stress at work? Does this vary by SES?

The job resources model posits that jobs bring with them not only demands, but also resources with which people can manage such demands, suggesting that resources are a key

component to experiences at work (Bakker and Demerouti 2007). Although high SES jobs are often thought to bring greater resources (Karakar 1979; Bakker and Demerouti 2007), recent research found that many of the work conditions often considered “resources” actually contribute to greater work-life boundary strain and create higher stress for high status workers (Schieman et al. 2009). To our knowledge, there have been no studies that investigate SES variation in whether workers perceive themselves as having enough resources to meet the demands of their jobs. Recent work calls for more detailed examination of if, and how, resources may relate to stress at work (Aneshensel and Mitchell 2014).

R2: Is having enough resources to complete a task associated with stress? Does this vary by SES?

*Positive work appraisals*, a measure that assesses how much people like their workplace or feel like it is a place they can thrive, may decrease one's levels of stress and strain experienced on the job. Overall, job satisfaction is expected to be associated with higher status but prior research has found mixed results as high SES workers may also have higher expectations about their jobs (Ma and MacMillan, 1998; Ross and Reskin 1992). Moreover, job satisfaction is a measure of overall experiences of employment, rather than a momentary capture of whether a worker is at the moment feeling positively towards their workplace. There is, in fact, scant research on status and positive work appraisals. Thus, extending this work, one's SES may influence more generally how positive the workplace is perceived.

R3: Are positive work appraisals associated with lower stress at work? Does this vary by SES?

**Demographic Contributors:** In addition to the above, demographic characteristics have also been shown to contribute to stress levels. The quality and strain of jobs often differs by gender and race (Marshall and Barnett 1992; Pudrovska and Karaker 2014). Experience of work-life conflict, the importance of work, and the impact of work on one's health may also vary by age (Schieman et al. 2009). When women marry, they experience longer unpaid work hours in the home (Sarkisian and Gerstel 2006), which may contribute to additional stress at work. In general, parents appear to face greater levels of work-life conflict than do non-parents, although recent research suggests that parents may find greater stress-release at work than do non-parents (Damaske et al. 2014).

## Method

**Participants**—A total of 122 participants were recruited from the greater metropolitan area of a midsized city in the Northeast as part of a larger study examining work parameters and health. Seven participants tested at baseline were unable to complete relevant portions of the study leaving a final sample of 115. Eligibility criteria were being over the age of 18, currently employed Monday through Friday with regular working hours between 6:00am and 7:00pm, not employed on weekends, able to come into the research laboratory on a Wednesday evening and the following Monday, fluent in English, free of psychiatric therapy or drug treatment changes in the past three months, and not pregnant.

**Procedure**—Participants were recruited via random calls from a local telephone directory and from public listings on a university email news alert. Participants were screened for eligibility and then scheduled a laboratory visit on an upcoming Wednesday evening. At the initial visit, participants gave informed consent and completed the baseline materials. Ecological momentary assessment [EMA] was used to assess momentary levels of mood, stress, and perceptions of the workplace (Smyth & Heron 2013). EMA data was collected via handheld computers (PalmPilot Z22; Palm Inc., Sunnyvale, CA) programmed using a free, open-source software package called the Experience Sampling Program (<http://www.experience-sampling.org/>; Barrett and Barrett 2001). Participants were provided the EMA devices and extensively trained by research staff on how to complete the entire set of questions in the EMA assessment protocol. Participants were told to report on their judgments of the workplace for that moment, not in general. Also, participants were provided salivettes and trained on how to collect and store their saliva samples. For the following three days (Thursday through Saturday) participants completed up to six EMAs daily. Auditory alarms signaled participants to complete the surveys at semi-random intervals during waking hours. The day was stratified into six roughly equal intervals; within each interval, excluding the first and last 15 minutes of the interval, an assessment randomly occurred. Only those assessments participants completed while at work were used for the present analyses. Finally, participants returned all materials on the ensuing Monday and the EMA data was checked for completion. Participants were paid \$100 for completing the study protocol, and an additional \$20 if they completed at least 17/18 surveys.

## Materials

**Baseline assessments:** Upon coming to the lab, participants indicated their income and education among several additional measures not relevant for the present analyses. For personal income, participants selected one of the following response options: less than \$10,000; \$10,000-19,999; \$20,000-29,999; \$30,000-39,999; \$40,000-49,999; \$50,000-74,999; \$75,000-99,999; \$100,000-150,000; or greater than \$150,000. The income response options were then recoded by entering the middle value of the range of dollar amounts for each response (e.g., \$20,000-29,999 was recoded as 25,000; for <\$10,000, 5,000 was entered and for >\$150,000, \$175,000 was entered). For education, participants indicated their highest level of schooling, which was then recoded into the following four categories: high school or less, some college (i.e., vocational certificate, associate degree, or some college response), graduated college, and graduate school. The recoded income and education variables were standardized and averaged together, which was then used for the primary analyses as the measure of SES. A similar pattern of results is found if only the income or education variable are used (supplemental analyses available upon request).

In addition, participants reported their age, race, sex, marital status, and number of children and whether those children were under the age of 18 and living at home. We reduced the number of levels for each demographic variable, excepting age, to simplify analyses. Race was recoded as 1 = White, 0 = non-White. Sex was recoded as 1 = female, 0 = male. Marital status was recoded as 1 = married, 0 = not married. Finally, children was recoded as 1 = have children under the age of 18 living at home, 0 = no children under the age of 18 living at home.

### Ambulatory assessments

**Mood and stress:** To measure mood, participants indicated how happy they were feeling at the time of the prompt on a 0 (*Not at All*) to 6 (*Very Much*) scale. Stress was assessed in two ways. Using the same scale, participants reported how stressed they were at the time of the prompt (referred to below as “stressed”). Participants also completed a modified 4-item Perceived Stress Scale (PSS; Cohen, Kamarck, and Mermelstein 1983) using a 0 (*Not at All*) to 4 (*Very Much*) scale (referred to below as “PSS”). Items were modified to assess if participants were currently feeling stressed (e.g., “At the time of the prompt, did you feel difficulties piling up so that you cannot overcome them?”). These measures are similar to those that have been used in prior studies examining momentary health and daily life (King, Oka, and Young, 1994; Smyth, Zawadzki, Santuzzi, and Filipkowski, 2014).

**Momentary perceptions of the workplace:** At each measurement occasion, participants responded to 10 items assessing their momentary perceptions of their workplace (see Table 1 for items) using 1 (*Strongly Disagree*) to 5 (*Strongly Agree*) scales. These items represent an adaptation of the Gallup Organization's Q12 employee engagement survey (Harter, Schmidt, Killham, and Agrawal 2009) tapping the domains of overall satisfaction (“positivity”), materials and equipment (“resource”), and expectations (“meeting job demands”). Original items assessed general perceptions of the workplace over the past six months, and were adapted for this study to assess in-the-moment perceptions. To identify workplace perception domains, we subjected these 10 items across all measurement occasions to a principal axis factor analysis with a varimax rotation. A three-factor solution emerged as (determined by eigenvalues > 1) explaining 53.9% of the total variance (see Table 1). Factor 1 consisted of five items measuring “meeting job demands” in the workplace (Cronbach's  $\alpha = .81$  across all measurement occasions); factor 2 consisted of two items measuring “resources” available ( $\alpha = .80$ ); and factor 3 consisted of three items measuring “positive work appraisals” ( $\alpha = .65$ ). Scores were calculated by taking the scale means of the items within each factor.

**Cortisol:** Participants provided saliva samples using salivettes (Sarstedt AG & Co., Nümbrecht, Germany) to assess cortisol. Salivettes are small plastic tubes containing synthetic material that participants place in their mouths for approximately 90 seconds (until saturated with saliva) and then replace in the tube. Upon completion of each EMA, participants were reminded to provide a saliva sample and then labeled the salivette with the date and time. The saliva samples were sent to a technical lab (Dresden, Germany) to assay cortisol using standard methods. Given the non-normal distribution normally observed in cortisol, cortisol values were log-transformed prior to analysis.

### Analytic Plan

These data consists of repeated observations nested within individuals. Participants provided data six times a day for three consecutive days; we restricted our analyses to when participants were at work (thus work days and work hours only; approximately 30% of all observations). Compliance was high; participants completed 561 of 565 prompts within working hours. Due to the semi-random sampling design for the EMAs and differing working schedules, participants had comparable (but not equal) numbers of measurements across days and differing levels of missing data. We used multilevel analytic approaches

(SAS version 9.3 PROC MIXED) that are robust to this kind of missing data and are recommended more generally for analyzing EMA data (Schwartz and Stone 1998). Modeling decisions were generally informed by Snijders and Bosker (1999). Across all models, we used a spatial power covariance structure that assumes that observations closer in time have a higher covariance than those further apart. Random intercepts were specified to allow individuals to vary on their mean levels of momentary reports. In preliminary analyses, we also allowed for a random slope. To model time for this slope, time of day was recoded into six three-hour blocks, ranging from one to six, coinciding with the window of time each EMA prompt took place. The random slope was non-significant for all but one outcome, and thus was dropped from further analyses.

For each set of analyses, we first tested a basic model consisting of the intercept, time of day (as the recoded time variable ranging from one to six), and the predictor(s) of interest. We then tested a model that included as controls age, sex, race, marital status, and having children under the age of 18 living at home. To compare the relative goodness-of-fit across the models we provide the Akaike Information Criterion (AIC) and the Bayesian Information Criterion (BIC), in which lower numbers indicate better fit (Schwarz 1978). As an estimate of effect size, we provide a pseudo  $r^2$  that calculates the amount of variance explained in the outcome by the model.

Finally, we tested whether the momentary workplace perceptions could account for the relationship between SES and momentary mood, stress, and cortisol. Using a series of models as recommended for multilevel data (Krull and MacKinnon, 2001; Zhang, Zyphur, and Preacher, 2009) we tested whether one's momentary workplace perceptions statistically mediated the relationship between SES and momentary mood, stress, and cortisol. First, we examined the impact of SES on mood, stress, and cortisol. Next, we tested whether SES predicted the mediators (i.e., the momentary workplace perceptions). Third, we tested whether the momentary workplace perceptions predicted mood, stress, and cortisol. Finally, we concurrently examined the impact of SES and the momentary workplace perceptions on mood, stress, and cortisol. Statistical mediation would be indicated by significant relationship between SES and the momentary workplace perceptions (model 2), a significant relationship between the momentary workplace perceptions and mood, stress, and cortisol (model 3), and a reduction in the significance of the original effect of SES on mood, stress, and cortisol when the momentary workplace perceptions are included in the model (comparing models 1 and 4). Two additional points are important to mention regarding the mediation analyses. First, we did not grand-mean center variables to avoid misestimated mediator effects that can arise when the magnitude of within-person effects differs substantially from the magnitude of between-person affects (Krull and MacKinnon, 2001). Second, in line with the MacArthur approach to mediation, in addition to the steps above we also included an interaction term between the predictor (SES) and mediators (momentary workplace perceptions) in the models (Chmura Kramer, Kiernan, Essex, & Kupfer, 2008). These interactions test whether the mediation holds for all levels of the predictor, or whether the mediator only accounts for the effect of the predictor on the outcome for some subset of the predictor (e.g., for only lower versus higher SES workers).

## Results

### Sample Characteristics

The majority of the sample was female (74.5%) and White (76.1%), with an average age of 41.21 ( $SD = 11.62$ ). Participants had a range of incomes: 20.7% earned  $< \$30,000$ ; 52.3% earned  $\geq \$30,000$  but  $< \$75,000$ ; and 27.0% earned  $\geq \$75,000$ . Participants were fairly educated with 16.5% obtaining some kind of graduate education, another 31.4% having graduated from college, another 42.2% having completed some college, with the remaining 9.9% having a high school degree or less. Roughly half of participants were married (50.4%) and had children under the age of 18 living at home (49.6%).

### Hypothesis 1: SES Predicting Mood, Stress, Cortisol

We first examined whether one's SES level predicted momentary mood, stress, and cortisol levels while a person was at work. For all models, we tested a series of models that included the intercept, time, and the predictor only, and then models that also included age, race, sex, marital status, having children under the age of 18 living at home; results reported in text reflect this latter model. As presented in Table 2, individuals with higher SES reported less happiness at work ( $p = .006$ ), and being more stressed (stressed:  $p = .009$ ; PSS:  $p = .069$ ). No effects were found for cortisol ( $p = .716$ ).

### Hypothesis 2: Momentary Workplace Characteristics Predicting Mood, Stress, and Cortisol

We next examined whether one's SES level predicted momentary reports of workplace characteristics. We ran similar models testing Hypothesis 1, except now included the momentary workplace characteristics as outcomes. As reported in Table 3, individuals with higher SES reported significantly less ability to meet job demands at work ( $p = .047$ ), fewer resources ( $p = .002$ ), and a statistical trend to report that their jobs are less positive ( $p = .072$ ).

We then examined whether the momentary workplace characteristics predicted momentary mood, stress, and cortisol. We ran similar models as Hypothesis 1, except now the momentary workplace perceptions were entered simultaneously as predictors (instead of SES). As reported in Table 4, when one reported meeting job demands more in the moment that person also reported less happiness ( $p = .002$ ), more stress (stressed:  $p < .001$ ; PSS:  $p = .002$ ), and more cortisol ( $p = .019$ ) compared to moments when that person reported less ability to meet job demands. When one reported more resources in the moment that person also reported more happiness ( $p < .001$ ), less stress (stressed:  $p < .001$ ; PSS:  $p < .001$ ), but no difference in cortisol ( $p = .227$ ) compared to moments when that person reported having fewer resources. Finally, when the workplace was seen as more positive at that moment, participants also reported more happiness ( $p < .001$ ), less stress (stressed:  $p < .001$ ; PSS:  $p < .001$ ), and lower cortisol ( $p = .044$ ) compared to moments when that person reported the workplace as less positive.

Finally, to test for statistical mediation, we ran models that included SES, momentary workplace perceptions, and interactions with SES and the workplace perceptions. As reported in Table 5, when the momentary workplace perceptions were included along with



SES, SES was no longer related to any of the measures of health in daily life ( $p > .127$ ). In contrast, the observed relationships between the momentary workplace perceptions and mood, stress, and cortisol remained relatively unchanged, with ability to meet job demands ( $p < .014$ ) and positive work appraisals ( $p < .027$ ) still significantly predicting all outcomes, and resources predicting all outcomes ( $p < .001$ ) but cortisol ( $p = .155$ ). None of the interaction effects of SES by the momentary workplace perceptions were significant ( $p > .116$ ).

## Discussion

The present study makes a novel addition to the growing literature on the stress of higher status by using an ecologically valid data collection approach in which workers reported their stress levels on the job several times a day. This study is the first, to our knowledge, to truly test the stress of higher status hypothesis with on the job stress reports and makes three main contributions: (1) Workers with higher SES do, in fact, experience greater levels of self-reported stress and lower happiness levels at work than those with lower SES. (2) SES predicts worker's momentary perceptions of the workplace, with higher SES individuals less able to meet work demands and reporting fewer work resources and less positive work appraisals. (3) Momentary perceptions of the workplace are associated with mood, perceived stress, and, in some cases, objective stress levels. Moreover, the momentary perceptions statistically accounted for the relationship between SES and mood and stress. Given the relationships between SES and the momentary perceptions, and the momentary perceptions and mood, stress, and cortisol, these results suggest potential mechanisms for how SES relates to mood and stress. Importantly, the interactions of these momentary perceptions with SES were not significant, indicating invariance in the mediators – put simply, that these momentary perceptions are important for all individuals at work regardless of SES.

That those with higher SES had greater stress and lower happiness on the job than did lower SES workers adds empirical heft to the stress of higher status hypothesis. Historically, research has pointed to high status work as more rewarding and beneficial (financially, emotionally, and physically) than low status work (Tausig 1999). Recent research has critiqued aspects of that stance, suggesting that high status work also brings with it greater stress and greater interpersonal conflict (Schieman et al. 2006), as well as greater job demands (Moen et al. 2013). Our findings are consistent with the view that high status workers experience greater stress at work than low status workers.

Demonstrating the relationship between momentary work experiences and stress is an important contribution of the paper, as it provides ecologically valid support that experiences on the job are related to experiences of stress on the job, and why these experiences may differ by SES. The present results greatly extend earlier work by suggesting a generally consistent and robust relationship of momentary perceptions of the workplace with positive mood, subjective stress, and even objectively measured stress (i.e., cortisol). Moreover, we find that SES does predict momentary experiences at work and high status workers experienced more negative momentary perceptions of the workplace than their low status-peers.

High-status workers were less likely to perceive that they met job demands. Somewhat surprisingly, higher levels of meeting job demands were related to less happiness, greater subjective stress, and greater cortisol levels in the moment. Although meeting demands seems positive, doing so may entail physical, emotional, and cognitive costs as individuals expend effort to these demands. As such, this effort may require a stress-inducing level of effort on the part of workers. Future work would benefit by better understanding the interplay of meeting demands with the effort requiring to do so.

Prior research (Schieman et al. 2009) suggests that elite workers have higher work-family conflict and interpersonal strain, which acts as a countervailing weight to the expected greater resources of high status work. We extend this work by examining worker's perception of resources at work to find that the expected greater resources do not materialize for high status workers—or, at least, that they do not believe they have the resources necessary to do their jobs. This finding may help us to understand the puzzle that resources have long posed—while we anticipate high SES jobs to bring with them higher resources that then mitigate stress at work, this expectation has rarely been confirmed with data (see Aneshensel and Mitchell 2014 for discussion). Instead, our findings suggest that high SES workers do not feel as if they have the resources needed to do their job—this may be because their jobs are more demanding and need resources greater than are available, or simply that high SES workers expect more resources than they are given, which leads to the perception of lack of support at the workplace.

SES only marginally predicted momentary reported positive work appraisals, although it did follow the same trend as the other momentary perceptions, with high SES workers experiencing lower levels of perceived positive work appraisals than their low SES counterparts. Lower positive work appraisals were associated with less happiness, greater subjective stress, and greater cortisol levels (objective stress). Again, this suggests that measures of how the workplace is actually experienced may prove crucial to our understanding of stress at work.

Finally, we did not find the anticipated relationship between cortisol levels and status. In previous research, lower SES individuals had been found to have lower cortisol levels at work than at home, a difference that was less pronounced for those with higher SES (Damaske et al. 2014). This comparison between home and work life may be integral in understanding these cortisol findings, and more generally, how lower SES individuals can report being less stressed at work than higher SES individuals in the present study, but according to past research, also be prone to worse health. Given that cortisol levels may reflect both immediate and more long-term environmental influences (Franz et al. 2010; Smyth et al. 1998), the null effects with cortisol may be a result of competing workplace and home life influences.

## Limitations

Despite the use of an innovative data capture approach and objective stress measurement, this study has several measurement limitations. To measure status, we followed recommendations that education and income are strong indicators (Braveman et al 2006). Yet, education and income may be inadequate proxies for some of the particular workplace

characteristics that are associated with stress, such as occupational status, autonomy, and long hours (Schieman et al. 2006; Schieman et al. 2009). Although these occupational status constructs tend to be less stable predictors of health on their own (Krieger et al 1997; Braveman et al 2006), they may provide additional information. Future work may wish to examine these various influences separately and in conjunction to determine which have the strongest impacts on stress and well-being. We also lacked data on experiences of work-home interference which has been found to be an important predictor of stress at work (Schieman and Reid 2009). Some constructs were assessed by single items to reduce participant burden, but this approach may reduce the potential reliability of these measurements.

The sample was skewed predominantly female and white, which likely reduces the generalizability of our findings, as women may experience greater interpersonal conflict at work when they are in high status occupations (Pudrovska and Karraker 2014) and people of color disproportionately face marginalized work (Marshall and Barnett 1992). For instance, although race was not significant in the models in which SES predicted mood and stress, it was significant when predicting momentary workplace perceptions. Although preliminary (i.e., race results were not predicted *a priori*), these patterns suggest that marginalized groups may appraise their workplaces as lacking basic features conducive to lower stress. Future research would benefit by further exploring these relationships.

Generalizability is often of great concern in the social sciences, particularly when convenience samples are taken. Yet the labor intensive data collection that requires in-person lab protocols and EMA makes the use of a nationally representative sample prohibitive. Nonetheless, more research is needed to replicate these findings with different sample populations.

Finally, although we observed associations between momentary workplace perceptions and cortisol, our measure of cortisol may have been less than optimal. Participants provided the saliva sample immediately after completing the EMA, yet, cortisol responses typically do not peak until 20 minutes after a stressor (Kirschbaum & Hellhammer 1994), thus potentially resulting in more conservative estimates. As a result, we suggest caution in interpreting the cortisol findings and recommend that future work utilize protocols that better accommodate the timing issues inherent to the assessment of cortisol.

## Conclusion

These findings provide novel, ecologically valid support for the stress of higher status hypothesis and illustrate how momentary perceptions of the workplace help us to understand factors that are related to stress at work. It is important to caution that these findings do not suggest lower SES workers have ‘good’ jobs or that there may not be unobserved chronic strain to holding a lower SES job (see Heaney et al. 1994). Although our study did not find a relationship between SES and cortisol, the momentary workplace perceptions were related to cortisol; these perceptions were predicted by SES, suggesting a possible indirect association between SES and cortisol. To better understand these relationships, future work may wish to more carefully explore cortisol levels across workers of different SES,

particularly examining how cortisol levels differ over transition periods, such as unemployment, vacations, leaves of absences, and job transitions (over which shorter- and longer-term influences may be teased apart). Moving forward, more research should also be done to measure the momentary perceptions of work and of home across low, middle, and high SES workers to better understand the complex relationship between work, stress, and SES.

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### Highlights

- Higher SES workers report greater stress at work than lower SES workers.
- Higher SES workers report being less able to meet work demands than lower SES.
- Higher SES workers report fewer work resources than lower SES.
- Higher SES workers report fewer positive work appraisals than lower SES.
- Momentary workplace perceptions relate to self-reported and objective stress levels

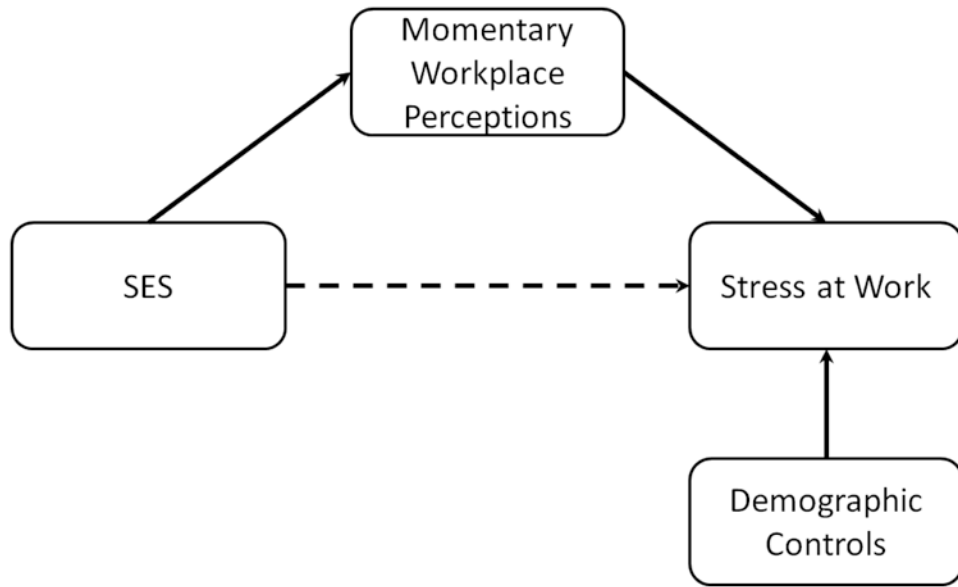


Figure 1.



Table 1

Factor Analysis of the Momentary Workplace Perception Items

|  | <i>M</i> | <i>SD</i> | Factor 1 (22.6%) | Factor 2 (17.5%) | Factor 3 (13.8%) |
|--|----------|-----------|------------------|------------------|------------------|
| 1. The work I am doing right now is very important.        | 3.69     | 1.17      | <b>.76</b>       | .13              | .09              |
| 2. I am very interested in my work right now.              | 3.62     | 1.12      | <b>.65</b>       | .17              | .49              |
| 3. I am making progress in my work right now.              | 3.86     | 1.10      | <b>.61</b>       | .37              | .18              |
| 4. I am using my strengths in my work right now.           | 3.72     | 1.14      | <b>.58</b>       | .26              | .17              |
| 5. The work I am doing right now requires a lot of effort. | 3.03     | 1.14      | <b>.48</b>       | -.08             | .12              |
| 6. I have the resources I need to do my current work.      | 4.29     | 0.91      | .05              | <b>.97</b>       | .21              |
| 7. I know what I'm supposed to be doing right now.         | 4.28     | 0.96      | .19              | <b>.67</b>       | .16              |
| 8. The work I am doing right now energizes me.             | 3.11     | 1.19      | .46              | -.06             | <b>.69</b>       |
| 9. I enjoy the work I am doing right now.                  | 3.81     | 1.07      | .26              | .25              | <b>.58</b>       |
| 10. I like the people/person I am working with right now.  | 4.30     | 0.97      | .01              | .19              | <b>.42</b>       |

Note. Items in bold were those used to create the momentary perceptions of meeting job demands (Factor 1), resources (Factor 2), and positive work appraisals (Factor 3) scales used to test Hypothesis 3.

**Table 2**  
**Estimates (Standard Errors) of SES Predicting Measures of Daily Health**

|                       | Happy                  |                        |               | Stressed      |                        |                         | PSS           |               |  | Cortisol |  |  |
|-----------------------|------------------------|------------------------|---------------|---------------|------------------------|-------------------------|---------------|---------------|--|----------|--|--|
| Intercept             | 3.99*** (.16)          | 3.93*** (.34)          | 1.66*** (.21) | 2.03*** (.46) | 1.65*** (.09)          | 1.77*** (.20)           | .84*** (.05)  | .80*** (.11)  |  |          |  |  |
| Time                  | .09 <sup>+</sup> (.05) | .09 <sup>+</sup> (.05) | -.06 (.06)    | -.06 (.06)    | .05 <sup>+</sup> (.02) | .04 (.02)               | -.10*** (.01) | -.10*** (.01) |  |          |  |  |
| Age                   | --                     | .02* (.01)             | --            | -.02* (.01)   | --                     | -.004 (.004)            | --            | -.0001 (.002) |  |          |  |  |
| Race                  | --                     | -.46* (.19)            | --            | .62* (.26)    | --                     | .16 (.12)               | --            | -.06 (.06)    |  |          |  |  |
| Sex                   | --                     | -.12 (.18)             | --            | .12 (.25)     | --                     | -.03 (.11)              | --            | .06 (.06)     |  |          |  |  |
| Married               | --                     | .06 (.17)              | --            | -.29 (.23)    | --                     | -.20 <sup>+</sup> (.10) | --            | -.001 (.06)   |  |          |  |  |
| Children              | --                     | -.39* (.17)            | --            | .35 (.23)     | --                     | .10 (.10)               | --            | .09 (.06)     |  |          |  |  |
| SES                   | -.23* (.11)            | -.29*** (.11)          | .29* (.14)    | .38*** (.14)  | .07 (.06)              | .12 <sup>+</sup> (.06)  | .01 (.03)     | .01 (.04)     |  |          |  |  |
| AIC                   | 1741.0                 | 1664.1                 | 2043.5        | 19669.2       | 1021.4                 | 986.2                   | 243.0         | 258.5         |  |          |  |  |
| BIC                   | 1751.9                 | 1674.9                 | 2054.4        | 1980.0        | 1029.6                 | 994.3                   | 253.9         | 269.3         |  |          |  |  |
| Pseudo-r <sup>2</sup> | .021                   | .097                   | .018          | .080          | .008                   | .043                    | .074          | .097          |  |          |  |  |

*Note.*

<sup>+</sup>  $p < .10$ ,

\*  $p < .05$ ,

\*\*  $p < .01$ ,

\*\*\*  $p < .001$ .

PSS refers to the perceived stress scale, and SES refers to socioeconomic status. Race (1 = White, 0 = Non-white), Sex (1 = female, 0 = male), married (1 = married, 0 = not married), and children (1 = have children under the age of 18 living at home, 0 = no children under 18 living at home) are dichotomous variables. Time is coded to indicate the EMA interval (ranging from 1 to 6). Cortisol is log-transformed.

**Table 3**  
**Estimates (Standard Errors) of SES Predicting Momentary Workplace Perceptions**

|                       | Meeting Job Demands       |                           | Resources                 |                           | Positive Work Appraisals  |                           |
|-----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| Intercept             | 3.55 <sup>***</sup> (.11) | 3.64 <sup>***</sup> (.27) | 4.41 <sup>***</sup> (.10) | 4.55 <sup>***</sup> (.26) | 3.62 <sup>***</sup> (.12) | 3.35 <sup>***</sup> (.28) |
| Time                  | -.002 (.03)               | .0003 (.03)               | -.03 (.03)                | -.02 (.03)                | -.04 (.04)                | -.03 (.04)                |
| Age                   | --                        | .01 (.01)                 | --                        | .01 (.01)                 | --                        | .02 <sup>**</sup> (.01)   |
| Race                  | --                        | -.49 <sup>**</sup> (.15)  | --                        | -.40 <sup>**</sup> (.14)  | --                        | -.47 <sup>**</sup> (.16)  |
| Sex                   | --                        | -.08 (.15)                | --                        | -.04 (.14)                | --                        | -.23 (.16)                |
| Married               | --                        | .19 (.14)                 | --                        | .15 (.13)                 | --                        | .14 (.14)                 |
| Children              | --                        | .08 (.14)                 | --                        | -.24 <sup>+</sup> (.13)   | --                        | -.05 (.15)                |
| SES                   | -.08(.09)                 | -.17 <sup>*</sup> (.09)   | -.22 <sup>**</sup> (.08)  | -.25 <sup>**</sup> (.08)  | -.06 (.09)                | -.16 <sup>+</sup> (.09)   |
| AIC                   | 1202.4                    | 1156.3                    | 1148.0                    | 1126.9                    | 1263.8                    | 1210.0                    |
| BIC                   | 1210.5                    | 1164.4                    | 1156.2                    | 1135.0                    | 1274.7                    | 1220.8                    |
| Pseudo-r <sup>2</sup> | .010                      | .091                      | .010                      | .118                      | .010                      | .129                      |

Note.

<sup>+</sup>  $p < .10$ ,

<sup>\*</sup>  $p < .05$ ,

<sup>\*\*</sup>  $p < .01$ ,

<sup>\*\*\*</sup>  $p < .001$ .

PSS refers to the perceived stress scale, and SES refers to socioeconomic status. Race (1 = White, 0 = Non-white), Sex (1 = female, 0 = male), married (1 = married, 0 = not married), and children (1 = have children under the age of 18 living at home, 0 = no children under 18 living at home) are dichotomous variables. Time is coded to indicate the EMA interval (ranging from 1 to 6). Cortisol is log-transformed.

**Table 4**  
**Estimates (Standard Errors) of Momentary Workplace Perceptions Predicting Measures of Daily Health**

|                       | Happy                     | Stressed                  | PSS                       | Cortisol                  |
|-----------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| Intercept             | 1.31 <sup>***</sup> (.35) | 1.54 <sup>***</sup> (.44) | 4.52 <sup>***</sup> (.46) | 4.29 <sup>***</sup> (.60) |
| Time                  | .10 <sup>*</sup> (.05)    | .09 <sup>+</sup> (.05)    | -1.0 (.06)                | -1.0 (.06)                |
| Age                   | --                        | .005 (.01)                | --                        | -.01 (.01)                |
| Race                  | --                        | -.12 (.17)                | --                        | .33 (.23)                 |
| Sex                   | --                        | .04 (.16)                 | --                        | .07 (.22)                 |
| Married               | --                        | -.11 (.15)                | --                        | -.10 (.20)                |
| Children              | --                        | -.34 <sup>*</sup> (.15)   | --                        | .22 (.21)                 |
| Meeting Job Demands   | -.22 <sup>***</sup> (.07) | -.21 <sup>**</sup> (.07)  | .45 <sup>***</sup> (.09)  | .49 <sup>***</sup> (.10)  |
| Resources             | .26 <sup>***</sup> (.06)  | .25 <sup>***</sup> (.06)  | -.49 <sup>***</sup> (.09) | -.49 <sup>***</sup> (.09) |
| Positive Work         | .65 <sup>***</sup> (.06)  | .63 <sup>***</sup> (.06)  | -.63 <sup>***</sup> (.09) | -.58 <sup>***</sup> (.09) |
| Appraisals            |                           |                           | -.21 <sup>***</sup> (.04) | -.20 <sup>***</sup> (.04) |
| AIC                   | 1539.0                    | 1473.7                    | 1853.0                    | 1791.0                    |
| BIC                   | 1549.7                    | 1484.3                    | 1863.7                    | 1801.6                    |
| Pseudo-r <sup>2</sup> | .254                      | .282                      | .225                      | .239                      |
|                       |                           |                           | .175                      | .199                      |
|                       |                           |                           | .175                      | .096                      |
|                       |                           |                           | .175                      | .117                      |

Note.

- <sup>+</sup>  $p < .10$ ,
- <sup>\*</sup>  $p < .05$ ,
- <sup>\*\*</sup>  $p < .01$ ,
- <sup>\*\*\*</sup>  $p < .001$ .

PSS refers to the perceived stress scale, and SES refers to socioeconomic status. Race (1 = White, 0 = Non-white), Sex (1 = female, 0 = male), married (1 = married, 0 = not married), and children (1 = have children under the age of 18 living at home, 0 = no children under 18 living at home) are dichotomous variables. Time is coded to indicate the EMA interval (ranging from 1 to 6). Cortisol is log-transformed.

**Table 5**  
**Estimates (Standard Errors) of SES and Momentary Workplace Perceptions Predicting Measures of Daily Health**

|                                | Happy         |                        |                         | Stressed      |               |               | PSS                     |               |  | Cortisol |  |  |
|--------------------------------|---------------|------------------------|-------------------------|---------------|---------------|---------------|-------------------------|---------------|--|----------|--|--|
| Intercept                      | 1.37*** (.56) | 1.61** (.44)           | 4.34*** (.47)           | 4.12*** (.61) | 2.62*** (.20) | 2.57*** (.27) | .91*** (.12)            | .84*** (.16)  |  |          |  |  |
| Time                           | .10* (.05)    | .09 <sup>+</sup> (.05) | -.10 <sup>+</sup> (.06) | -.10 (.06)    | .03 (.03)     | .02 (.03)     | -.10*** (.02)           | -.09*** (.02) |  |          |  |  |
| Age                            | --            | .01 (.01)              | --                      | -.01 (.01)    | --            | .0002 (.004)  | --                      | .001 (.002)   |  |          |  |  |
| Race                           | --            | -.17 (.17)             | --                      | .35 (.24)     | --            | .06 (.11)     | --                      | -.07 (.07)    |  |          |  |  |
| Sex                            | --            | .01 (.16)              | --                      | .08 (.23)     | --            | -.05 (.11)    | --                      | .06 (.06)     |  |          |  |  |
| Married                        | --            | -.09 (.15)             | --                      | -.17 (.21)    | --            | -.16 (.10)    | --                      | .004 (.06)    |  |          |  |  |
| Children                       | --            | -.32 (.15)             | --                      | .21 (.21)     | --            | .06 (.10)     | --                      | .08 (.06)     |  |          |  |  |
| SES                            | -.28 (.43)    | -.25 (.43)             | .69 (.57)               | .89 (.58)     | .09 (.24)     | .23 (.24)     | -.08 (.14)              | -.11 (.15)    |  |          |  |  |
| Meeting Job Demands            | -.22** (.07)  | -.22** (.07)           | .44*** (.09)            | .49*** (.10)  | .09* (.04)    | .12*** (.04)  | .06** (.02)             | .06* (.02)    |  |          |  |  |
| Meeting Job Demands × SES      | .05 (.10)     | .06 (.10)              | .02 (.14)               | -.01 (.14)    | -.06 (.06)    | -.09 (.06)    | -.02 (.03)              | -.02 (.03)    |  |          |  |  |
| Resources                      | .25*** (.07)  | .24*** (.07)           | -.46*** (.09)           | -.45*** (.09) | -.12** (.04)  | -.13*** (.04) | -.03 (.02)              | -.03 (.02)    |  |          |  |  |
| Resources × SES                | -.08 (.09)    | -.11 (.09)             | -.20 <sup>+</sup> (.12) | -.17 (.12)    | .01 (.05)     | .02 (.05)     | .02 (.03)               | .02 (.03)     |  |          |  |  |
| Positive Work Appraisals       | .65*** (.06)  | .63*** (.07)           | -.61*** (.09)           | -.55*** (.09) | -.21*** (.04) | -.20*** (.04) | -.04 <sup>+</sup> (.02) | -.05* (.02)   |  |          |  |  |
| Positive Work Appraisals × SES | .10 (.09)     | .11 (.09)              | .06 (.12)               | .02 (.12)     | .03 (.05)     | .01 (.05)     | .02 (.03)               | .03 (.03)     |  |          |  |  |
| AIC                            | 1546.8        | 1480.0                 | 1858.8                  | 1796.1        | 934.5         | 902.3         | 266.3                   | 280.3         |  |          |  |  |
| BIC Pseudo-r <sup>2</sup>      | 1557.5 .263   | 1490.6 .297            | 1869.6 .226             | 1806.7 .243   | 942.5 .162    | 910.2 .177    | 277.1 .097              | 290.9 .120    |  |          |  |  |

Note.

<sup>+</sup>  $p < .10$ ,

\*  $p < .05$ ,

\*\*  $p < .01$ ,

\*\*\*  $p < .001$ .

PSS refers to the perceived stress scale, and SES refers to socioeconomic status. Race (1 = White, 0 = Non-white), Sex (1 = female, 0 = male), married (1 = married, 0 = not married), and children (1 = have children under the age of 18 living at home, 0 = no children under 18 living at home) are dichotomous variables. Time is coded to indicate the EMA interval (ranging from 1 to 6). Cortisol is log-transformed.