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Social Hierarchy and Depression: The Role of Emotion Suppression

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Abstract

Position in the social hierarchy is a major determinant of health outcomes. We examined the associations between aspects of social hierarchy and depressive symptoms with a specific focus on one potential psychological mechanism: emotion suppression. Suppressing negative emotion has mental health costs, but individuals with low social power and low social status may use these strategies to avoid conflict. Study 1 assessed perceived social power, tendency to suppress negative emotion, and depressive symptoms in a community sample of women. Low social power was related to greater depressive symptoms, and this relationship was partially mediated by emotion suppression. Study 2 examined education as a proxy for social hierarchy position, anger suppression, and depressive symptoms in a national, longitudinal cohort study (The Coronary Artery Risk Development in Young Adults (CARDIA) study). Similar to Study 1, low education levels were correlated with greater depressive symptoms, and this relationship was partially mediated by anger suppression. Further, suppression mediated the relationship between low education and subsequent depression up to 15 years later. These findings support the theory that social hierarchy affects mental health in part through a process of emotion suppression.

Why do individuals with low social status experience poor health outcomes? In addition to a lack of resources, the psychological experience of low status itself appears to affect health (Adler, Epel, Castellazzo, & Ickovics, 2000). Past research suggests that the relationship between low socioeconomic status (SES) and poor health may be mediated by cognitive-emotional factors (Gallo & Matthews, 2003). Researchers have focused on effects of negative affect as well as lack of positive emotion (Cohen & Pressman, 2006; Salovey,

Rothman, Detweiler, & Steward, 2000). However, it may be that it is not only the experience of negative emotion or lack of positive emotion that influences health, but the need to suppress the expression of emotion—particularly negative emotion – that is health-damaging. No studies have examined emotion suppression as a mediator of the relationship between social hierarchy and mental health. We hypothesized that people with low positions in the social hierarchy may feel pressured to suppress outward expression of negative emotion, which harms long-term emotional health, resulting in depressive symptoms. We tested this hypothesis in two samples by first establishing a relationship between an index of social hierarchy position and depressive symptoms, and then examining the extent to which this association was mediated by emotion suppression.

Adverse consequences of emotion suppression

There are different ways of coping with threats, including threats related to one's position in the social hierarchy (Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986). Emotion suppression is a coping strategy for regulating negative emotions that suppresses the outward expression of a negative emotional experience (see Gross & Levenson, 1997). In the short term, emotion suppression can be socially advantageous to those at the bottom of a hierarchy by decreasing conflict with individuals who control resources and outcomes. However, emotion suppression does not reduce the internal experience of negative emotion (Gross & Levenson, 1997; John & Gross, 2004), and its use requires high cognitive effort and is related to decreased positive affect (Gross, 2002). Additionally, the tendency to suppress the expression of emotions reduces opportunities for social support and closeness to others (Srivastava, Tamir, McGonigal, John & Gross, 2009). Perhaps due to corresponding elevated negative emotion, decreased positive emotion, and impaired social relationships, the use of emotion suppression strategies is consistently associated with depression (Bromberger & Matthews, 1996; McDaniel & Richards, 1990; Nolen-Hoeksema, 1987; Riley, Treiber, & Woods, 1989; Thomas & Atakan, 1993).

Indices of Social Hierarchy, and Depression

The constructs of social power and social status capture different aspects of social hierarchy. Social power reflects control relative to others over valued outcomes (Fiske & Berdhal, 2007), whereas social status reflects one's perceived prominence within a social group (Anderson, John, Keltner, & Kring, 2001). Socioeconomic status (education, occupation, and income) provides social resources and influences one's standing within a social group (Adler et al., 2000; Berger, Cohen, & Zelditch, 1972). Social status may serve as a source of social power (Fiske & Berdahl, 2007) perhaps via allocation of resources (Keltner, Gruenfeld, & Anderson, 2003). Past research on social hierarchy, reviewed below, indicates that low social status and low social power are associated with negative emotion and depressive symptoms.

Low SES has been linked to depressive symptoms (Dohrenwend et al., 1992), and longitudinal research suggests that the prevalence and persistence of depressive symptoms are predicted by early life socioeconomic disadvantage (Danese et al., 2009; Wheaton, 1978). Looking at psychological distress more generally, lower SES predicts distress within

all major American ethnic groups (CDC, 2004). In addition to affecting material resources available to individuals, SES appears to affect mental and physical health through subjective perceptions of lower relative status (Adler et al., 2000; Adler et al., 2008; Goodman et al., 2001; Leu et al., 2008; Singh-Manoux, Adler, & Marmot, 2003).

The relationship between social power and depression has not been documented as extensively as that of SES and depression has. However, social power may be particularly relevant to the interpersonal processes related to depression because it is instantiated within personal relationships. Past studies of social power indicate that perceiving oneself as having less power than others is associated with low positive emotional experience (Berdahl & Martorana, 2006). Interactions with a powerful partner, whether within a long-term intimate relationship or a new acquaintanceship, are associated with negative emotions (Langner & Keltner, 2008). Within marital relationships, having lower social power than one's partner is associated with greater depressive symptoms (Mirowsky, 1985).

A Theory of Emotion Suppression as a Mediator of the Hierarchy-Depression Relationship

The experience of low social power and status unfolds in a social environment that may increase the need to suppress or inhibit one's experience to the extent that others with more power can punish and threaten those below them (Keltner et al., 2003). Those with low social power and status are not sanctioned to express certain types of negative emotions (e.g., anger), which are seen as inappropriate when displayed by low status individuals (Tiedens, Ellsworth, & Mesquita, 2000). Other aspects of inhibition, such as hiding one's attitudes (Bradberry, 2006; Eaker, Sullivan, Kelly-Hayes, D'Agostino, & Benjamin, 2007; Frank & Thomas, 2003; Krieger, 1990) or behavioral constriction (Tiedens & Fragale, 2003), may also play a mediating role in the relationship between social hierarchy and health. We focus here on emotion suppression because it may be especially potent in relation to depression, an affective disorder.

There is some evidence that individuals with lower social status and power are more likely to suppress the expression of emotion. Social groups who have traditionally experienced less social power and status are more likely to use suppression strategies. For example, compared to European Americans, people of color more frequently use emotion suppression as an emotion regulation strategy (Gross & John, 2003). Further, facial muscle actions associated with the suppression of emotion expressions are more common among individuals with low status compared to those with high status (Keltner, Young, Heerey, Oemig, & Monarch, 1998). Similarly, a cluster of symptoms related to lower status that are more common in women (e.g., low instrumentality, rumination, anger suppression) create vulnerability to depression (Bromberger & Matthews, 1996). The process of silencing the self in order to maintain harmony within a relationship is a proposed mechanism for the prevalence of depression amongst women (Jack & Dill, 1992). These gender-typed processes may be, at least in part, a function of low social power and status. Self-silencing is associated with depression across men and women and multiple American ethnic groups (Gratch, Bassett, & Attra, 2006).

We theorize that individuals with low SES will more frequently be engaged in relationships in which they have low social power which pressures them to suppress their expression of emotion. This is particularly true in work relationships, but may also occur in other social interactions. Individuals with low social status may be more likely to have low social power in a greater number of their interpersonal relationships (for example, an individual with a low level of education filling a subordinate role in the workplace and having low power within a marital relationship due to low income). An individual with less control over outcomes may have a greater need to avoid interpersonal conflict and thereby choose to suppress the expression of negative emotions.

One previous study has examined social status in relation to emotion suppression and depression (Allan & Gilbert, 2002). This study demonstrated that anger suppression was employed significantly more often in imagined interactions with a higher status person than with a lower status person. Further, greater anger suppression was associated with higher depressive symptoms. While this research did not explore the role of emotion suppression as a *mediator* of the relationship between social hierarchy and depression, the findings are supportive of this idea.

In sum, we argue that social pressure to be polite and deferential to people with greater status and power results in more emotion suppression among those who occupy low positions with a social hierarchy. This behavioral pattern of suppression may account in part for why they experience more depressive symptoms. By linking research on social power and health disparities with the literature on emotion suppression, we hypothesize that social hierarchy variables (social power, education) will be associated with depressive symptoms and that emotion suppression will partially mediate this relationship. While other studies have examined various aspects of this process, this is the first study to examine emotion suppression as a mediator of the relationship between social hierarchy and mental health.

We tested the proposed theory in a set of secondary data analyses on two datasets. In Study 1, we measured self-reported social power as an index of social hierarchy position, assessing the relationship between an individual's control over outcomes in interpersonal relationships, the tendency to suppress emotion expression, and depressive symptoms. In Study 2, we examined these relationships in a longitudinal, population-based sample with a more diverse education distribution, utilizing an education measure as the index of social hierarchy position.

Study 1

First, we tested our theory of social hierarchy, emotion suppression, and depression in a community sample of women. We examined social power as the operationalization of social hierarchy position in relation to emotion suppression tendencies and depressive symptoms. In this study, we extended past research by examining the relationship between social power and depression and then by testing our hypothesis of emotion suppression as a partial mediator.

Method

Participants

Sixty-nine women, all healthy mothers of young children, participated in a broader study of stress and coping. Forty-five of the women had a child with a serious chronic medical condition and the rest had healthy children. The women ranged in age from 19 to 50 years ($m = 38.46$, $SD = 6.11$). Educational background ranged from 12 to 20 years of schooling, and on average, participants had completed about three years of college/training past high school ($m = 14.96$, $SD = 1.93$). Participants reported the following ethnic backgrounds: 59% Caucasian, 13% Black, 12% Asian, 10% Hispanic, and 6% Other.

Procedure

Participants were recruited through their child's health care professional in San Francisco Bay Area clinics or by public postings. Laboratory sessions took place at the Oakland Children's Hospital Pediatric Clinical Research Center (see Epel et al., 2004). Participants filled out a questionnaire battery at home and returned it to the clinic. This included demographics, social power scale, ways of coping, and depressive symptoms.

Measures

Social power—Social power was measured with the 8-item 'capacity for power' scale (e.g., "I think I have a great deal of power", "If I want to, I get to make the decisions"; Anderson & Galinsky, 2006). Past research demonstrated that scores on this scale are associated with social standing within hierarchies and occupation of powerful roles (Anderson & Galinsky, 2006). Participants rated the degree to which they experienced social power across their interpersonal relationships. Response options ranged from 1 (disagree strongly) to 7 (agree strongly) with higher scores indicating a greater sense of social power. The sample in the current study rated their capacity for social power above the midpoint ($m = 5.28$, $SD = .75$) and the items demonstrated acceptable reliability ($\alpha = .83$).

Emotion suppression—We created a measure of emotion suppression by forming a composite from two items from the Self-Controlling subscale of the Ways of Coping scale (Folkman & Lazarus, 1988) that measure the suppression of emotion and negative experience in the presence of others: "You tried to keep your feelings to yourself" and "You kept others from knowing how bad things were". Participants rated each item on a 4-point scale assessing how often they use the strategy (0: not used, 1: used somewhat, 2: used quite a bit, 3: used a great deal). On average, the participants in this sample scored below the midpoint ($m = .92$, $SD = .77$). The two items demonstrated acceptable internal reliability ($\alpha = .72$).

Depression—The Center for Epidemiologic Studies Depression Scale (CES-D), a 20-item self-report measure, was developed at the National Institute for Mental Health to measure depressive symptomatology and demonstrated high internal reliability and validity in prior research (e.g., correlated with clinical ratings of depression; Radloff, 1977). Participants rated the presence of depressive symptoms during the last two weeks (0: rarely; 3: most of the time; $m = 13.88$, $SD = 10.13$, $\alpha = .91$). Total scores can range from 0–60 on the CES-D,

and a symptom threshold of 16 or above has been designated as clinically significant depressive symptoms (Weissman, Sholomskas, Pottenger, Prusoff, & Locke, 1977). In this sample, 31.9% scored above this threshold, indicating at least mild depressive symptoms.

Results

Before testing the mediational models, we examined the relationships between the primary variables and demographic variables (see Table 1). Ethnic background was coded as white (1) and other (0) because there were not enough participants in any one ethnic minority category to provide statistical power for two-way comparisons. Social power was not significantly related to age, ethnic background. Emotion suppression was not significantly related to age, ethnic background, or education. Depression was significantly related to education, but was not related to age or ethnic background.

As would be expected, the mothers of children with chronic conditions experienced a greater degree of depressive symptoms ($t(67) = 3.46, p < .01, r = .38$). However, there were no differences in mean social power ($t(67) = -1.65, ns$) or emotion suppression ($t(67) = 1.53, ns$) between mothers with healthy children and mothers with chronically ill children. Further, the hypothesized relationships between independent and dependent variables demonstrated the same pattern across groups; given that the subsamples were small, only analyses for the whole sample are presented.

Following Baron and Kenny (1986), a series of simultaneous regressions were performed to test for statistical mediation. All hypothesis testing was directional and therefore tested at the one-tailed significance level. Emotion suppression was examined as a mediator of the relationship between social power and depression (see Figure 1). First, emotion suppression was regressed onto social power ($\beta = -.35, p < .01$). Second, depression scores (CES-D) were regressed on to social power ($\beta = -.25, p < .05$). Third, depression scores were regressed on to emotion suppression, controlling for social power ($\beta = .35, p < .01$). Lastly, the relationship between social power and depression was assessed after controlling for emotion suppression ($\beta = -.12, ns$).

The results indicate that the relationship between social power and depression was reduced when emotion suppression was included in the model; however, the relationship did not drop to zero. A Sobel test of the variance explained by the mediator was statistically significant ($z = -2.38, p < .01$), indicating that the effects of social power on depression are partially mediated by emotion suppression.¹ The same pattern of results and significance held when controlling for education, ethnicity, and age.

Discussion of Study 1

Study 1 provided evidence that emotion suppression partially mediates the relationship between social power and depressive symptoms. This initial evidence is a first step in documenting the role of emotion suppression in health disparities. The current work adds

¹Analyses using bootstrapping, an alternative approach to mediation testing appropriate for small samples (Preacher & Hayes, 2004), replicated the findings in pattern and significance (with bootstrap samples set at 3000).

support to the approach/inhibition theory of social power (Keltner et al., 2003). Considering emotion suppression as a specific type of behavioral inhibition, we demonstrated that individuals with low social power are more likely to report inhibiting emotionally expressive behavior. The current work connects the approach/inhibition theory to the field of health disparities by suggesting that in addition to negative emotional experience consequences of power, inhibition of emotion expression plays a role in mediating the relationship between power and depressive symptoms.

Education was not significantly correlated with social power or emotion suppression in this sample. Study 1 had a small sample and unfortunately there was not a large range of educational levels (the vast majority were college-educated). In addition to the restricted range, the lack of correlation may have been due to the fact that a majority of our sample were women who were caring for children with a chronic health condition. This caretaking role might decrease social power due to a reduction in time spent within the public sphere regardless of education level. It is possible that the demands of this role countered any potential social power boost from high education. In contrast, some women may experience increased social power if their caregiving role leads them to advocate on behalf of their children. Future research might examine the possibility that the strength of the link between socioeconomic status and power varies depending on the number and type of social roles individuals enact in their daily lives.

The research design in Study 1 was cross-sectional, so it was not possible to establish whether reported social hierarchy position and emotion suppression preceded or followed from depressive symptoms. Examining longitudinal relationships between social hierarchy, emotion suppression, and depression could help address this ambiguity. Study 2 addresses these limitations and also tests our hypotheses in a sample with gender, ethnic, and educational diversity.

Study 2

Study 2 utilized data from The Coronary Artery Risk Development in Young Adults (CARDIA) study (see Cutter et al., 1991). This longitudinal study was conducted by the National Heart, Lung, and Blood Institute to examine how heart disease risk develops in young adults. Taking advantage of the measures included in this longitudinal dataset, we examined education level as the indicator of social hierarchy position and a specific type of emotion suppression: anger suppression. Education level is one of the most commonly used indicators of socioeconomic position used in health research (Liberatos, Link, & Kelsey, 1988). Anger may be a particularly important emotion for the study of social hierarchy and suppression as this is an emotion in which expression is deemed appropriate only for those with high social power (Tiedens, et al., 2000). In this study, we tested whether education level was related to subsequent level of depressive symptoms and whether this relationship was mediated in part by anger suppression.

Method

The study included African American and European American men and women in four regions of the United States and was stratified on race, gender, and education. The study began with participants aged 18–30 years and included six follow-up examinations. Within this sample, we examined participants with complete data for the variables of interest (time 1 education measured 1985–1986, time 2 anger suppression measured 1990–1991, and time 3 depressive symptoms reported in 1995–1996). We also explored depressive symptoms at two later measurement time points (2000–2001 and 2005–06).

Participants

A total of 5,115 participants were recruited in 1985–86 (time 1) and were followed over time. Of the original sample, 4,352 participants participated in the 5-year follow-up in 1990–91 (time 2), and 3,950 in the 10-year follow-up in 1995–96 (time 3). Our sub-sample with complete data across all of the three primary time points was composed of 3,644 participants (55.6% women, 47.1% African American). An assessment of attrition over time indicated that in comparison with the time 1 sample (54.5% women, 48.4% African American), the remaining sample at time 2 contained a slightly greater proportion of women (55.1%) and a similar ethnic distribution (48.5% African American) and the sample at time 3 contained a slightly greater proportion of women (55.3%) and similar ethnic distribution (48.5% African American).

Follow-up samples in 2000–01 and 2005–06 included 3,672 participants and 3,549 participants, respectively. In comparison with time 1, the 15-year follow-up sample (2000–01) contained a slightly greater proportion of women (55.7%) and a slightly smaller proportion of African American participants (46.9%). In comparison with time 1, the 20-year follow-up sample (2005–06) contained a slightly greater proportion of women (56.7%) and a slightly smaller proportion of African American participants (46.1%).

Measures

Socioeconomic status—Education level was measured at baseline, before our hypothesized mediator. Participants reported the number of years of schooling they had completed, ranging from 1 to 20 (1–6: elementary school grades, 9–12: high school, 13–16: college, 17–20: graduate school). On average participants had completed 1–2 years of college ($m = 13.95$, $SD = 2.26$). The lowest score in the sample was seventh grade (7) and the highest was four or more years of graduate school (20). Participants who did not participate at time 2 and time 3 had less education ($m = 13.24$, $m = 13.52$; respectively) than the original sample. Although there were some small increases in education level from time 1 to time 2 ($m = 14.37$) in the retained sample, using time 2 education in place of time 1 education produced the same pattern and significance of results. In order to test mediation, we use time 1 education as the predictor as it preceded the mediator.

Emotion suppression—Several items from the “Anger-In” subscale of the Spielberger State, Trait, Expression of Anger Inventory (Spielberger, 1985) were administered in the 1990 CARDIA survey administration. Prior research indicated a relationship between scores

on the anger-in scale and internalizing responses to hypothetical anger scenarios (Spielberger, 1988). The instructions for the scale were: “Here is a list of things people do when they get angry, irritated, or annoyed. Please check whether, when you are really angry or annoyed, you are likely, somewhat likely or not too likely to do the following things”. Two scale items (“Try to act as though nothing much happened”, “Keep it to yourself”; 3: not too likely, 2: somewhat likely, 1: very likely) were averaged to form a composite measure of anger suppression ($m = 2.14$, $SD = .64$; $\alpha = .67$). A third item (“Apologize even though you are right”) was not included because it had low face validity as a measure of emotion suppression. Apologizing to avoid conflict is a behavior that extends beyond suppressing the visible manifestations of an experienced emotion. Further, the item demonstrated a lower item-total correlation ($r = .25$ vs. $r = .47$ and $r = .49$ for the two retained items) and would have reduced the overall scale reliability ($\alpha = .59$). Mean scale scores are reverse-scored for analyses so that larger numbers reflect a greater tendency to suppress anger.

Depressive Symptoms—The *CES-D* (Radloff, 1977), described in relation to Study 1, was also used in the CARDIA study. At the time 3 (ten year follow-up) measurement (1995–96), 21.7% of the sample scored above the threshold (total score greater than 16) indicating at least mild depressive symptoms ($m = 10.65$, $SD = 8.19$; $\alpha = .89$). At the fifteen-year follow-up measurement (2000–01), 17% scored above the threshold indicating at least mild depressive symptoms ($m = 9.07$, $SD = 7.78$; $\alpha = .88$). At the twenty-year follow-up measurement (2005–06), 17.7% scored above the threshold indicating at least mild depressive symptoms ($m = 9.27$, $SD = 7.87$; $\alpha = .88$).

Results

Before testing the mediational models, we examined the relationships between the primary variables and demographic variables (age, sex, race; see Table 2). Education levels were higher among European American than among African American participants and for older participants in comparison with younger participants. Emotion suppression was significantly greater among African American participants, men, and older participants. Depressive symptom mean scores were higher among African American participants and women. Despite these significant relationships between some of the demographic variables and our primary variables, controlling for age, race, and gender did not alter the pattern or significance of results from hypothesis testing reported below.

Following the mediation approach used in Study 1, a series of simultaneous regressions were performed to test for statistical mediation (Baron & Kenny, 1986). All hypothesis testing was directional and therefore tested at the one-tailed significance level. In order to test for changes in depressive symptoms over time, depressive symptoms levels at time 2 (depressive symptom measurement concurrent with the measurement of the mediator) were included as a control variable in each step. First, anger suppression was regressed onto education ($\beta = -.09$, $p < .01$). Second, mean depressive symptom levels (CES-D) were regressed on to education ($\beta = -.11$, $p < .001$). Third, mean depressive symptom levels were regressed on to anger suppression, controlling for education ($\beta = .04$, $p < .05$). Lastly, the relationship

between education and depressive symptoms was assessed after controlling for anger suppression ($\beta = -.10, p < .001$; see Figure 2).

The results indicate that although the relationship between education and depressive symptoms was reduced when anger suppression was included in the model, the change in the size of the relationship is small. However, a Sobel test revealed that significant variance was explained by the mediator ($z = -2.37, p < .05$), indicating that the effect of education on depressive symptom levels is partially mediated by anger suppression.

Further, the same pattern of results and significance was obtained when examining depressive symptoms measured years later. Anger suppression partially mediated the relationship between education and mean depressive symptom levels at year-15 (2000–2001; $z = -2.80, p < .001$) and between education and mean depressive symptom levels at year-20 (2005–2006; $z = -2.82, p < .001$).

The mediation hypothesis was tested separately in the four ethnicity X sex subgroups; the pattern was significant for African American women ($z = -3.09, p < .01$), European American women ($z = -2.79, p < .01$), and African American men ($z = -1.69, p < .05$). There was not a significant mediation effect for European American men ($z = .84, p > .10$).

Discussion of Study 2

In sum, anger suppression partially mediated the relationship between education and depressive symptoms at ten, fifteen, and twenty year follow-ups. For the most part, the pattern of results was consistent across gender and ethnic groups. This replicates the pattern of results found in Study 1, but with a measure of education as the proxy for social hierarchy position.

While the second study had some longitudinal features, we lacked multiple time measurements for some of our variables (e.g., anger suppression). Therefore, we could not analyze changes in anger suppression over time in addition to changes in depression over time in order to more fully understand the temporal ordering of these relationships. In a longitudinal dataset designed to test these particular relationships, multi-faceted measures of social status and emotion suppression could be administered at multiple time points.

General Discussion

The proposed model was supported in two samples, garnering initial evidence for the theory-based prediction that emotion suppression would partially mediate the relationship between indicators of social hierarchy and depressive symptoms. Further, within Study 2 the small but consistent mediation effect of emotion suppression was replicated at ten, fifteen, and twenty year time-lagged measures of depressive symptoms. To our knowledge, these are the first studies to examine emotion suppression as a pathway by which social hierarchy variables affect mental health. These findings lend support to the idea that those on the lower end of a social hierarchy are more likely to use emotion suppression strategies, providing evidence of a relationship between direct measures of social power and status (vs. indirect measures such as race and gender) and emotion suppression. Further, these data indicate that

chronic emotion suppression is one factor contributing to the disproportionate experience of depression among those with lower social power and status. This initial evidence is a first step in documenting the role of emotion suppression in health disparities.

The current investigation examined two aspects of social hierarchy: self-reported social power and education level. We theorized that social hierarchy position will affect depression through emotion suppression processes. We found support for the model using two aspects of social hierarchy: social power and education level. The current studies were limited with regard to examining multiple aspects of hierarchy simultaneously. In Study 1's small sample, the education measure had restricted range which hampered our ability to use it as a proxy for social hierarchy position in our proposed model. In Study 2, SES was the only aspect of social hierarchy that was measured. Ideally, the CARDIA data (Study 2) would have included a measure of social power in addition to assessing SES. Multiple aspects of social hierarchy are interrelated and may have varying degrees of effect on emotion suppression and depressive symptoms. Further research could assess multiple measures of social hierarchy position in a large sample, testing whether our findings translate to other hierarchy-related phenomena (e.g., peer-nominated social status, role-based social power, etc.). While education is likely to be the best predictor of health compared to other socioeconomic status parameters (Winkelby, Jatulis, Frank, & Formann, 1992), future research might examine multiple measures of social hierarchy simultaneously to assess their relative contributions to emotion suppression and health.

It will also be important to test this theory with other measures of emotion suppression. The items used in both studies have good face validity and acceptable reliability and are a first step. However, one scale was specific to anger suppression and each scale had a limited number of items. It would have been preferable to use a more extensively validated scale of emotion suppression with a greater number of items (e.g., Gross & John, 2003). While epidemiological datasets have the advantage of large, representative samples, they often have the disadvantage of shortened scales due to space constraints and with secondary data analyses the measures have not necessarily been designed to test the specific hypotheses. Moving beyond self-reported emotion suppression, future research could examine the nonverbal and physiological markers of emotion suppression following from changes in social status or social power. More reliable measures of emotion suppression would help indicate whether the small effect sizes found in Study 2 are consistent effects or if the effect size was constrained by the reliability of the available measures.

Experimental data could provide complementary evidence for the effects of low social hierarchy positions on emotion suppression and subsequent depressive symptoms. Although we found support for the theorized relationships in a longitudinal dataset, an experimental design could isolate the causal direction between hierarchy and emotion suppression. Researchers are beginning to examine the extent to which engagement in emotion regulation is deliberate or automatic (Mauss, Bunge, & Gross, 2007) and experimental work might test the effects of social status and power manipulations on automatic emotion suppression.

Additional studies might examine the suppression of both positive and negative emotions to compare the effects of these aspects of emotion suppression. It may be that people with low

positions in a social hierarchy are most often suppressing negative emotions (e.g., anger at a boss) and only occasionally suppressing positive emotion (e.g., amusement at a highly educated acquaintance's gaffe). Alternatively, emotion suppression may be difficult to enact selectively based upon emotional valence and therefore chronic use of emotion suppression strategies might lead to a broader inhibitory disposition (Gross & John, 2003).

These findings can be linked to recent work on the embodiment of social hierarchy position. Differential nonverbal markers of SES are distinct enough that observers can guess the SES level of strangers (Kraus & Keltner, 2009). Individuals with low SES display "engagement" (nonverbal markers of attention to one's partner such as gaze) in contrast with a disinhibited lack of engagement displayed by those with high SES. An emotionally "controlled" appearance resulting from emotion suppression may be another nonverbal signal of an individual's social power or status. The embodiment of social hierarchy position has implications for physiological and behavioral facets. Carney and colleagues (2010) found that posing in a position of low power was associated with decreased testosterone, increased cortisol, and decreased feelings of power and tolerance of risk. This suggests that an individual with low social standing who suppresses emotions might experience physiological reactions which in turn lead the individual to feel less powerful, perhaps perpetuating a cycle that maintains the stability of a hierarchy.

Future research should address the boundary conditions of the current model. Cultural differences in the meaning and evaluation of emotion suppression strategies may mean that the effects of emotion suppression are not as deleterious in some cultures (e.g., East Asian cultures, see Butler, Lee & Gross, 2007). In cultures where hierarchy is valued and individuals employing emotion suppression strategies are still able to be socially responsive, emotion suppression may not have as strong an association with depression and may not play a mediating role in the relationship between social hierarchy and health. The current samples are from a Western culture (U.S.) where egalitarianism and self-expression are valued and emotion suppression is less likely to feel comfortable.

We propose emotion suppression as one pathway from social hierarchy to depression. Other pathways that would be interesting to investigate in relation to emotion suppression include: postural constriction, attitude expression, rumination, and social support. For example, emotion suppression makes interpersonal interactions more stressful (Butler et al., 2003) and affects the quality of social relationships (Srivastava et al., 2009), suggesting that the chronic use of emotion suppression could contribute to and exacerbate depressive symptoms due to a reduction in social support. Additionally, mediating processes that may run in the opposite direction could be investigated simultaneously (e.g., self-control associated with high education and good health; Moffitt et al., 2011).² It remains to be seen what the relative contribution of emotion suppression is to the hierarchy-health relationship in comparison with other mediating processes.

²We thank an anonymous reviewer for the idea that self-regulation could be a possible conflicting process in mediating the relationship between status and emotion suppression, in part accounting for the small effect size.

In conclusion, these findings offer preliminary support for the theory that low social hierarchy position promotes depression, in part through emotion suppression. These findings have implications for our understanding of how perceptions of social status and social power may affect mental health, and in turn, possibly physical health. The plethora of research findings demonstrating a relationship between social stratification and health may be partly explained by emotion suppression, a hypothesis that is testable both in experimental studies and in population health studies.

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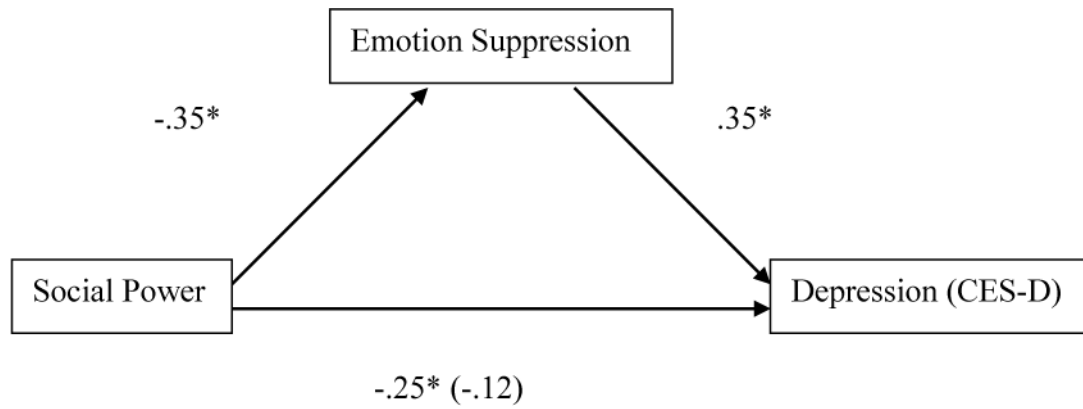


Figure 1. Mediation Role of Emotion Suppression in the Relationship between Social Power and Depressive Symptoms (Study 1).

Note. The reduction in the relationship between social power and depression when controlling for emotion suppression was significant (Sobel $z = -2.38$, $p < .01$).

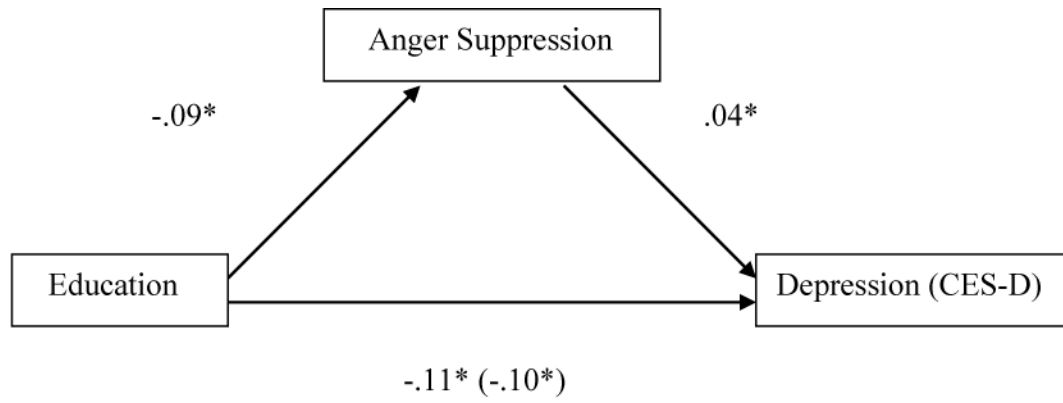


Figure 2.
Mediational Role of Emotion Suppression in the Relationship between Education and Depressive Symptoms (Study 2).
Note. The reduction in the relationship between education and depressive symptoms when controlling for anger suppression was significant (Sobel = -2.37 , $p < .05$).

Table 1
Interrelationships Between Primary Variables and Demographic Variables in Study 1

	Suppression	Depression	Age	Education	Ethnicity ^a
Social Power	-.35*	-.25*	-.11	.02	.15
Suppression		.39*	-.13	-.04	-.13
Depression			.08	-.36*	-.10
Age				.33*	.09
Education					.11

^aEthnic groups coded as White (1) and Other (0) due to small sample size.

* $p < 0.05$

Table 2
Interrelationships Between Primary Variables and Demographic Variables in Study 2

Primary Variables	Demographic Variables				
	Age	Race		Sex	
		African American (1)	European American (2)	Male (1)	Female (2)
Education					
Effect (<i>r</i>)	.31*		.34*		-.01
Mean		13.12	14.67	13.95	13.93
SD		1.86	2.32	2.48	2.15
Suppression					
Effect (<i>r</i>)	-.05*		-.14*		-.13*
Mean		1.95	1.78	1.95	1.79
SD		.63	.63	.63	.63
Depression					
Effect (<i>r</i>)	-.04*		-.20*		.08*
Mean		1.62	1.45	1.49	1.56
SD		.45	.35	.37	.44

* $p < .05$