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Socioeconomic Status as a Moderator of the Link Between Reappraisal and Anxiety: Laboratory-Based and Longitudinal Evidence

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Cognitive reappraisal reduces anxiety, but we know little about how socioeconomic status (SES) moderates this association. Drawing from developmental, affective, and health psychological frameworks, the present 2 studies investigated SES as a moderator of reappraisal and anxiety using performance-based (Study 1) and self-report (Study 1 and 2) measures of reappraisal; analyzing nonclinical (Study 1) and clinical (Study 2) symptoms of anxiety; and utilizing a small, laboratory-based study (Study 1) and a large-scale 9-year longitudinal study (Study 2). Across studies, findings showed that reappraisal predicted lower anxiety at low levels of SES but did not or less so at high levels of SES. These results were found for self-report measures of reappraisal; generalized across nonclinical and clinical symptoms of anxiety; and emerged both concurrently and prospectively across 9 years. Findings remained stable when controlling for a number of covariates, including age, gender, and race; were more robust for income than education; largely generalized across gender (except for a men-specific moderation effect for education in Study 2); and were directional such that SES did not moderate associations between anxiety and changes in reappraisal. These findings highlight the importance of considering socioeconomic context in the link between reappraisal and anxiety.

Keywords: cognitive reappraisal, socioeconomic status, anxiety, mental health, Midlife in the United States (MIDUS)

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Cognitive reappraisal strategies are powerful emotion regulatory strategies that allow us to modulate emotion through reconsidering, reframing, or gaining a new perspective on lived or anticipated experiences (Gross, 1998b; McRae, 2016). Cognitive reappraisal not only reduces negative emotions in the moment (Gross, 1998a), but also benefits well-being and mental health in the long-term (Aldao, Nolen-Hoeksema, & Schweizer, 2010; Cisler, Olatunji, Feldner, & Forsyth, 2010; Gross & John, 2003; Rottenberg & Johnson, 2007; Silk, Steinberg, & Morris, 2003). Despite profound interest in reappraisal among both researchers and practitioners (Beck, 2011; Gross, 2013) and the importance of socioeconomic context in emotion regulation (Aldao, 2013; McRae, 2016; Troy, Ford, McRae, Zarolia, & Mauss, 2017), we know little about whether and how socioeconomic context shapes associations between reappraisal and mental health. Building on developmental (e.g., Haase, Heckhausen, & Wrosch, 2013), affective science (e.g., Troy, Shallcross, & Mauss, 2013), and health psychological (e.g., Chen & Miller, 2012) frameworks, the present two studies examined how socioeconomic status (SES) moderates the association between cognitive reappraisal and anxiety, as a prevalent mental health issue.

Cognitive Reappraisal and Anxiety

Nonclinical symptoms of anxiety (e.g., restlessness, difficulty concentrating, feeling on edge) are quite prevalent (Crawford, Henry, Crombie, & Taylor, 2001) and generalized anxiety (e.g., excessive anxiety or worry that occurs nearly every day about multiple events and persists more than 6 months) is one of the most common forms of psychopathology with prevalence rates of anxiety disorders up to 18% in the United States (Kessler, Chiu, Demler, Merikangas, & Walters, 2005). In contrast to maladaptive emotion regulation strategies (e.g., rumination, suppression, avoidance), reappraisal is a prominent antidote to anxiety, predicting lower levels of anxiety symptoms in normal (Hofmann, Heering, Sawyer, & Asnaani, 2009) and clinically anxious (cf. Campbell-Sills, Ellard, & Barlow, 2014) samples. At the same time, these

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associations are not very strong (a meta-analysis revealed small to medium effect sizes; Aldao et al., 2010). Thus, researchers have become increasingly interested in moderators of the reappraisal-anxiety link, ranging from physiological arousal (Hofmann et al., 2009) to social competence (Kaeppler & Erath, 2017). Yet, research on contextual moderators, such as SES, has been rare.

Socioeconomic Status as a Moderator

SES can be defined as a representation of an individual's relative position in an economic-social-cultural hierarchy tied to power, prestige, and control over resources (Weber, 1922) and can be measured on a number of dimensions, including income and education (Diemer, Mistry, Wadsworth, López, & Reimers, 2013).

The lives of individuals across the SES spectrum differ in many ways (e.g., Kraus, Piff, Mendoza-Denton, Rheinschmidt, & Keltner, 2012). Individuals from lower-SES backgrounds often face greater uncontrollability in their lives (e.g., unsafe housing; insecure job) and have less control over resources to actively change their environments (e.g., Brady & Matthews, 2002). Several developmental, affective, and health psychological frameworks propose that when individuals face uncontrollability in the external world, it becomes crucial for them to be able to change their inner world (e.g., through reappraisal) to maintain well-being and mental health. This suggests that reappraisal may become particularly important in reducing anxiety for individuals from lower-SES backgrounds (see McRae, 2016) and a substantial body of theoretical and empirical work supports this proposition.

First, developmental-regulation perspectives, such as the motivational theory of life span development (e.g., Haase et al., 2013; Heckhausen, Wrosch, & Schulz, 2010) have long proposed that different regulation strategies (i.e., aimed at changing internal processes vs. changing the environment) are differentially adaptive depending on the amount of control an individual has over their environment. Regulation strategies that seek to change internal processes (e.g., by changing how one thinks about a situation as in cognitive reappraisal) are thought to be adaptive in contexts that offer less control over the environment (cf. Rothbaum, Weisz, & Snyder, 1982), whereas regulation strategies that aim to change the environment are thought to be adaptive in contexts that offer more control over the environment. This proposition has received substantial support in empirical studies, which often have focused on age as a proxy for control opportunities (Heckhausen et al., 2010). Older adults typically have less control due to greater cognitive, health, and financial limitations (Carstensen, Isaacowitz, & Charles, 1999) and they also perceive less control (Heckhausen & Baltes, 1991) vis-à-vis their environment compared with younger adults. As such, regulation strategies that seek to change internal processes, such as reappraisal, have been shown to be most adaptive for well-being and health at older ages in numerous studies (for reviews see Haase et al., 2013; Heckhausen et al., 2010). Although much of the work in this area has focused on age as a proxy for control opportunities, there is also more direct evidence for the differential adaptiveness of reappraisal strategies across different levels of SES. Specifically, reappraisal strategies (e.g., finding "something positive, even in the worst situations") have been found to be particularly beneficial for well-being (i.e., using a composite measure of life satisfaction, worry and disappointment) under financial stress (e.g., difficulties in paying bills; Wrosch, Heckhausen, & Lachman, 2000).

Second, and in a similar vein, person-by-context models of emotion regulation have proposed that reappraisal becomes particularly adaptive in contexts that offer little control opportunities and these models extend this proposition specifically to low-SES contexts (McRae, 2016; Troy et al., 2013). This perspective proposes that, compared with individuals of higher-SES backgrounds, individuals from lower-SES backgrounds have less access to material resources that can be harnessed to change their environment; these constraints shape perceived control and increase the importance of emotion regulation strategies, such as reappraisal. Supporting this view, empirical findings have indeed shown that higher reappraisal (e.g., seeing things "in a more positive light") predicts lower depression under uncontrollable (but not controllable) stress (Troy et al., 2013) and in low- (but not high-) SES contexts (Troy et al., 2017). Similarly, when individuals from higher-SES backgrounds face uncontrollable stressors (e.g., chronic illness), reappraisal is also beneficial for health outcomes (cf. Heckhausen et al., 2010).

Third, the "shift-and-persist model" of SES and physical health has likewise emphasized the adaptiveness of "shift" (i.e., reappraisal) strategies in protecting individuals from the adverse health consequences of low SES (Chen & Miller, 2012). More specifically, individuals from low-SES backgrounds who use "shift" (i.e., akin to reappraisal) and "persist" (i.e., akin to perseverance) strategies are thought to be protected from poor health; individuals from high-SES backgrounds who use these strategies are not thought to have better health. Empirical findings have supported this model in showing that among adults who experienced low childhood SES, individuals that engaged in reappraisal strategies (e.g., finding "something positive, even in the worst situations;" as in Wrosch et al., 2000) have lower levels of physiological health risk (i.e., indexed by a composite risk score of several biological systems including the cardiovascular system, autonomic nervous system and HPA-axis; Chen, Miller, Lachman, Gruenewald, & Seeman, 2012).

Taken together, theory and findings from developmental, affective science, and health psychological frameworks point toward reappraisal—one of the most commonly studied emotion regulation strategies that changes internal processes (e.g., Aldao et al., 2010; Buhle et al., 2014; Gross & John, 2003; McRae, 2016)—as a strategy that might be beneficial for other facets of health in low-SES contexts.

Methodological Considerations

While there has been building momentum in probing how SES moderates associations between reappraisal and aspects of mental health, there have been no studies examining associations with anxiety directly. Moreover, we have yet to examine whether results emerge for (a) measures of self-report and performance-based reappraisal (Bloch, Haase, & Levenson, 2014); (b) nonclinical and clinical symptoms of anxiety (Marcus, Sawaqdeh, & Kwon, 2014); (c) income and education aspects of SES; and (d) not only concurrently, but also longitudinally.

Measures of self-report versus performance-based reappraisal. Reappraisal studies often assess self-reported (habitual) use of reappraisal strategies, such as whether individuals report that they "can find something positive, even in the worst situations" (Wrosch et al., 2000) or "think about it in a way that

helps me stay calm" when faced with a stressful situation (Gross & John, 2003). In contrast, laboratory-based studies of emotion regulation often use more objective measures of reappraisal performance that assess, for example, to what extent individuals can downregulate emotional experience when instructed to reappraise (vs. when instructed to "just watch") emotion-eliciting stimuli (e.g., Gross & Levenson, 1997; Jackson et al., 2003). Measures of self-report reappraisal can easily be administered in large-scale surveys; performance-based measures of reappraisal can assess actual reappraisal ability (cf. Gross, 2013).

Nonclinical versus clinical symptoms of anxiety. Previous studies of how SES moderates the effect of reappraisal on mental health have exclusively examined nonclinical mental health symptoms (and none have examined anxiety). There has been a lively debate over whether mental health and its building blocks can be best conceptualized in terms of continuous symptoms or discrete syndromes (e.g., Insel et al., 2010; Lilienfeld & Treadway, 2016; Morris & Cuthbert, 2012). Regardless of the model adopted, determining whether findings generalize across nonclinical and clinical symptoms of anxiety or not will have important implications for etiology and treatment approaches.

Income versus education. Previous studies have differed widely in the aspects of SES under investigation, mirroring the general diversity in approaches toward measuring SES (Diemer et al., 2013). Income and education are among the most widely studied aspects of SES with substantial, but not high, intercorrelations (Ensminger, Fothergill, Bornstein, & Bradley, 2003; Winkleby, Jatulis, Frank, & Fortmann, 1992). Income captures a dynamic representation of an individual's access to and control over resources and can be quite variable from year to year (Duncan & Rodgers, 1988); education (typically indexed by the highest education level completed) is a more static SES measure.

Concurrent versus longitudinal associations. Previous work on reappraisal and anxiety has often used cross-sectional study designs. Longitudinal work (e.g., McLaughlin, Hatzenbuehler, Mennin, & Nolen-Hoeksema, 2011; Wirtz, Hofmann, Riper, & Berking, 2014) has shown that aspects of emotion (dys-)regulation predict increases in anxiety symptoms over time; however, these studies either did not assess reappraisal or did not find evidence for longitudinal effects of reappraisal specifically and none of them considered SES as a moderator. Cross-sectional study designs can typically be administered at lower costs; longitudinal study designs allow for testing prospective associations of reappraisal with anxiety as an important real-world outcome.

The Present Studies

The present two studies are, to our knowledge, the first to examine how socioeconomic status moderates the association between cognitive reappraisal and anxiety. Drawing from developmental, affective science, and health psychological frameworks (Chen & Miller, 2014; Haase et al., 2013; Troy et al., 2017), we hypothesized that greater reappraisal would predict lower levels of anxiety at lower SES levels but not, or less so, at higher SES levels. We tested this hypothesis in two very different studies, capitalizing on the methodological strengths of each. Study 1 was a small, laboratory-based study of married spouses from highly diverse SES backgrounds that allowed us to examine measures of both self-report reappraisal (through validated questionnaires) and performance-based reappraisal (through an established paradigm assessing emotion in reactivity and reappraisal trials; Gross & Levenson, 1997) and to examine nonclinical anxiety symptoms. Study 2 was a large longitudinal survey study of a national sample (Midlife in the U.S. [MIDUS]) that allowed us to examine clinical symptoms of generalized anxiety and investigate longitudinal associations over a 9-year period. Across studies, we analyzed a composite SES measure of income and education (cf. Diemer et al., 2013). Follow-up analyses were conducted to determine (a) robustness of the findings when controlling for age, gender, race, and marital status (the latter only in Study 2; all participants were married in Study 1); (b) whether SES effects were driven by income or education; (c) generalizability of the findings across gender (because of well-documented gender differences in anxiety; cf. Madden, Barrett, & Pietromonaco, 2000); and (d) directionality of longitudinal associations between reappraisal and anxiety (in Study 2 only).

Study 1

Method

Participants. The sample consisted of 112 married spouses from highly diverse SES backgrounds (49% female; age: M = 43.2 years, SD = 8.7 years; income: M = 4.2, SD = 2.0 [on a scale from 1 = *less than $20,000* to 7 = *greater than $150,000*]; education: M = 15.9 years, SD = 2.6 years; 41.1% White, 34.8% Black, 7.1% Asian, 7.1% Latino, 1.2% Hawaiian/Pacific Islander, and 4.5% Multiracial Race) who had a child between 5 and 18 years as a part of a larger research project.[1] This study was approved by the Northwestern University Institutional Review Board. All couples were compensated with $100 for study participation. Participants completed self-report measures of reappraisal and anxiety. In addition, a subsample (n = 76) completed the laboratory-based paradigms from which we derived measures of performance-based reappraisal. Spouses who completed the laboratory-based paradigms did not differ from other spouses in terms of self-report reappraisal, income, education, anxiety, or gender, ps $> .05$; spouses who completed the laboratory-based paradigms were significantly younger than other spouses, $t(106) = -3.06$, $p = .003$.

Procedure. Our analyses focused on (a) laboratory-based assessments of emotion reactivity and reappraisal and (b) questionnaire assessments of reappraisal, anxiety, and SES. For the laboratory-based assessment, following established procedures (e.g., Shiota & Levenson, 2009), participants individually watched short film clips (average 2.93 min long) designed to elicit specific emotions with (a) a 60-s baseline period before each film clip, and (b) a reactivity trial with instructions: "Please watch the film," (c) a reappraisal trial with instructions: "If you have any feelings as you watch the film clip, please try to think about what you are seeing in such a way that you feel less negative emotion," and (d) a 20-s postfilm-clip period after each film. Participants watched sad film clips in both the reactivity trial (i.e., an excerpt from the movie *21 Grams* in which a mother learns of the death of her two daughters) and the

[1] Data from Study 1 is available to other researchers upon request.

reappraisal trial (i.e., an excerpt from the movie *Champ* in which a young boy tries to wake up his dead father) that have been used successfully in prior research (e.g., Shiota & Levenson, 2009). At the beginning and after each film clip, participants reported on their emotional experiences.

Measures.

Self-report reappraisal. Self-report reappraisal was measured using the reappraisal subscale from the Emotion Regulation Questionnaire (ERQ; six items; e.g., "I control my emotions by changing the way I think about the situation I'm in;" $\alpha = .82$; 1 = *strongly disagree*, 7 = *strongly agree*; Gross & John, 2003).

Performance-based reappraisal. Performance-based reappraisal was measured using sadness experience during the reappraisal trial (controlling for sadness experience in the reactivity trial; Table S1 in the online supplementary material). Specifically, to assess sadness experience, participants rated how strongly they felt sadness during the film clip (0 = *none*, 8 = *the most in my life;* Ekman, Friesen, & Ancoli, 1980) after each film clip. Sadness experience during the reappraisal trial was then reverse-coded such that higher values reflected greater reappraisal.

Socioeconomic status. Socioeconomic status was measured using (a) household income (i.e., "What is your family's annual household income (before taxes)?;" 1 = *less than $20,000*, 7 = *greater than $150,000*); and (b) highest completed years of education (i.e., "What is the highest level of education you have obtained?;" 8 years = *high school/GED*, 21 years = *PhD., MD, or other professional degree*). Income and education were standardized and averaged to create a composite SES measure.

Anxiety. Anxiety was measured using the Beck's Anxiety Inventory (BAI; 21 items; e.g., "fear of worst happening" during the last month; $\alpha = .86$; 0 = *not at all*, 3 = *severely*; Beck, Epstein, Brown, & Steer, 1988).

Covariates. Covariates included age (in years); gender (0 = male; 1 = female); and race (0 = other; 1 = White).

Data analyses. Multilevel modeling was conducted using the MIXED command in SPSS with clustering at the couple level[2] to account for nonindependence of dyadic data (Kenny, Kashy, & Cook, 2006). Clustering at the couple level required that data were structured in a person pairwise format (e.g., each row included a spouse's data). To test our main hypothesis, analyses included anxiety as the dependent variable and reappraisal (i.e., self-report reappraisal or sadness experience during reappraisal trial), SES, the interaction between the two, and (because of the nature of this dyadic data set) gender as predictor variables. When analyzing performance-based reappraisal, sadness experience during the reactivity trial was additionally included as a control variable. Simple slopes of reappraisal predicting anxiety were then analyzed at low ($M - 1\ SD$), medium (M), and high ($M + 1\ SD$) levels of SES using software developed by Preacher, Curran, and Bauer; (http://quantpsy.org/interact/mlr2.htm; Preacher et al., 2006). Follow-up analyses were conducted to examine (a) robustness of the findings (i.e., when controlling for age and race in addition to gender);[3] (b) whether the moderating effect of SES was driven by income or education (by examining separate models predicting each SES aspect separately); and (c) generalizability of the findings across gender (i.e., by testing a three-way interaction between reappraisal, SES, and gender on anxiety).

Results

Table 1 presents intercorrelations of key study variables for wives and husbands. The moderating associations for SES for self-report and performance-based reappraisal controlling for age, gender, and race and clustered at the couple level are presented in Table 2.

Self-report reappraisal and anxiety: Moderation by SES. Results showed that SES moderated the association between self-report reappraisal and anxiety ($B = .08$, $SE[B] = .03$, $p = .015$, 95% CI [.02, .15]). Simple slopes analyses showed that higher self-report reappraisal predicted lower anxiety at low ($B = -.13$, $SE[B] = .04$, $p = .003$) but not medium ($B = -.04$, $SE[B] = .03$, $p = .138$) or high ($B = .04$, $SE[B] = .05$, $p = .387$) SES levels.

Performance-based reappraisal and anxiety: Moderation by SES. Results showed that SES did not moderate the association between performance-based reappraisal and anxiety ($B = .01$, $SE[B] = .02$, $p = .373$, 95% CI [−.02, .04]). Simple slopes analyses showed that higher performance-based reappraisal did not predict lower anxiety at low ($B = -.03$, $SE[B] = .02$, $p = .115$), medium ($B = -.02$, $SE[B] = .01$, $p = .210$) or high ($B = -.00$, $SE[B] = .02$, $p = .824$) SES levels.

Follow-up analyses.[4] First, findings remained largely stable when controlling for age, gender, and race. Controlling for all covariates, SES continued to moderate the association between self-report reappraisal and anxiety ($B = .08$, $SE[B] = .03$, $p = .014$, 95% CI [.02, .15]) and simple slopes analyses showed that higher levels of reappraisal most strongly predicted lower levels of anxiety at low ($B = -.11$, $SE[B] = .04$, $p = .008$) but not medium SES ($B = -0.03$, $SE[B] = .03$, $p = .288$) or high ($B = 0.05$, $SE[B] = .05$, $p = .269$) SES levels (see Figure 1a). Similarly, SES again continued to not moderate the association between performance-based reappraisal and anxiety ($B = .01$, $SE[B] = .01$, $p = .416$, 95% CI [−.02, .04]). Yet, simple slope analyses revealed a similar pattern to self-report reappraisal. Controlling for all covariates, higher performance-based reappraisal predicted lower anxiety at low ($B = -.04$, $SE[B] = .02$, $p = .033$) but not medium ($B = -.02$, $SE[B] = .01$, $p = .100$) or high ($B = -.01$, $SE[B] = .02$, $p = .639$) SES levels (see Figure 1b).

Second, the moderating effect of SES on the association between self-report appraisal and anxiety was driven by both income and education. Specifically, associations between self-report reappraisal and anxiety were moderated by both income ($B = .03$, $SE[B] = .02$, $p = .038$, 95% CI [.00, .07]) and education ($B = .02$, $SE[B] = .01$, $p = .025$, 95% CI [.00, .04]) with simple slopes analyses patterning in the expected direction. Associations between performance-based reappraisal and anxiety were not moderated by income ($B = .01$, $SE[B] = .01$, $p = .347$, 95% CI

[2] While nonindependence of dyadic data does not bias effect estimates, this adjustment corrects biased standard errors (Kenny et al., 2006).

[3] Given the ethnic-racial diversity of our sample, we also created indicator variables for Black, Latino, South Asian, White, Hawaiian Pacific Islander, and Multiracial Race. Results remained stable regardless of how race was coded.

[4] Follow-up analyses were also conducted with suppression as a predictor of anxiety rather than reappraisal. Suppression was measured using a composite variable of four suppression items on the Emotion Regulation Questionnaire ($\alpha = .76$). Interactions between suppression and SES were not significant in predicting anxiety ($ps > .05$).

Table 1
Study 1 Intercorrelations Between Key Variables for Spouses

Variables	1	2	3	4	5	6	7
1. Self-report reappraisal	**.08**	.20	−.05	−.16	.04	.09	.03
2. Performance-based reappraisal	−.26	**.31**	−.02	−.09	−.55**	.04	.33*
3. SES	−.04	.24	**.72****	−.17	.07	.11	.40**
4. Anxiety	−.17	−.34*	−.19	**.08**	−.03	−.17	.15
5. Performance-based reactivity	.25	−.30	−.24	.19	**−.10**	.19	−.15
6. Age	.26	−.05	−.13	−.08	.28	**.65****	.17
7. Race (White)	−.05	−.04	.54**	.09	−.05	.09	**.73****

Note. SES = socioeconomic status. Husbands' correlations are below the diagonal; wives' correlations are above the diagonal; correlations between husbands and wives are on the diagonal in bold. Gender was not significantly associated with any of the key study variables, *p*s > .05.
* $p < .05$. ** $p < .01$.

[−.01, .02]) nor education ($B = .00$, $SE[B] = .01$, $p = .561$, 95% CI [−.01, .01]).

Third, findings generalized across gender indicated by nonsignificant three-way interactions between gender, reappraisal, and SES, both for self-report and performance-based reappraisal, *p*s > .05.

Study 2

Method

We analyzed a 9-year longitudinal national sample from the MIDUS study conducted in 1995–1996 (T1) and 2004–2006 (T2). A detailed description and data from the MIDUS study can be found online (http://www.midus.wisc.edu).

Participants and procedure. A national sample of households in the 48 contiguous U.S. states with at least one telephone was selected using random digit dialing. The present study focused on the MIDUS core sample which comprised 7,120 noninstitutionalized adults (which was stratified by gender and age with the greatest number of participants between 40 and 60 years). Participants were interviewed for 20–30 min by telephone and then received a questionnaire by mail (T1). About 9 years later (range: 8–10 years), 75% of survivors from the original sample participated in the second wave of data collection (T2), including follow-up for the core sample (more detailed information on longitudinal retention in MIDUS can be found in Radler & Ryff, 2010). The present analyses are based on individuals for whom T1 and T2 data were available, $N = 2{,}257$, age at T1: $M = 46.65$, $SD = 12.83$, range: 20–74; 52.4% females, 82.5% White.

Measures.

Reappraisal. *Reappraisal* was measured at T1 and T2 using the reappraisal subscale of the Optimization in Primary and Secondary Control (OPS) scale (Heckhausen, Schulz, & Wrosch, 1998; i.e., four items; e.g., "Even when everything seems to be going wrong, I can usually find a bright side to the situation"; reverse coded such that 1 = *not at all*, 4 = *a lot*; T1 and T2: $\alpha = .78$), as in previous MIDUS-based studies of reappraisal (Chen et al., 2012; Wrosch et al., 2000).

Anxiety. *Generalized anxiety disorder* (GAD) symptoms were measured at T1 and T2 using clinical telephone interviews based on DSM-III_R criteria (American Psychiatric Association, 1980; i.e., 10 items; e.g., "How often in the past 12 months have you been restless because of your worry;" reverse coded such that 1 = *never*, 4 = *most days*). Consistent with previous research (Kessler, Andrews, Mroczek, Ustun, & Wittchen, 1998), participants received this interview after being screened for the extent to which they worry "a lot more" than most people (cutoff: "a lot more"), the frequency of their worry (cutoff: "most days"), and how many things they worry about (cutoff:

Table 2
Study 1 Results of Regression Analyses Predicting Level of Anxiety From Self-Report Reappraisal/Performance-Based Reappraisal, SES, and Covariates

Variables	*B*	*SE*(*B*)	[95% CI]	*t*	*p*
Self-report reappraisal					
Intercept	1.50	.16	[1.19, 1.81]	9.66	<.0001
Self-report reappraisal	−.03	.03	[−.09, .03]	−1.10	.276
SES	−.11	.04	[−.19, −.03]	−2.72	.008
Self-report reappraisal × SES	.08	.03	[.02, .15]	2.50	.014
Age	.00	.00	[−.01, .00]	−1.31	.194
Gender (Female)	−.03	.06	[−.15, .09]	−.47	.639
Race (White)	.21	.07	[.08, .34]	3.16	.002
Performance-based reappraisal*					
Intercept	1.63	.17	[1.29, 1.97]	9.55	<.0001
Performance-based reappraisal	−.02	.01	[−.05, .01]	−1.63	.107
Composite SES	−.14	.04	[−.22, −.06]	−3.36	.002
Performance-based reappraisal × SES	.01	.01	[−.02, .04]	.82	.416
Performance-based reactivity	.01	.02	[−.03, .04]	.27	.788
Age	−.01	.00	[−.01, .00]	−1.80	.079
Gender (Female)	−.11	.08	[−.27, .05]	−1.34	.188
Race (White)	.21	.07	[.07, .34]	3.01	.004

Note. SES = socioeconomic status. All analyses reported are clustered by couple to account for interdependence and control for age, gender, and race.
* Analyses for performance-based reappraisal additionally controlled for performance-based reactivity (i.e., sadness experience during reactivity trial).

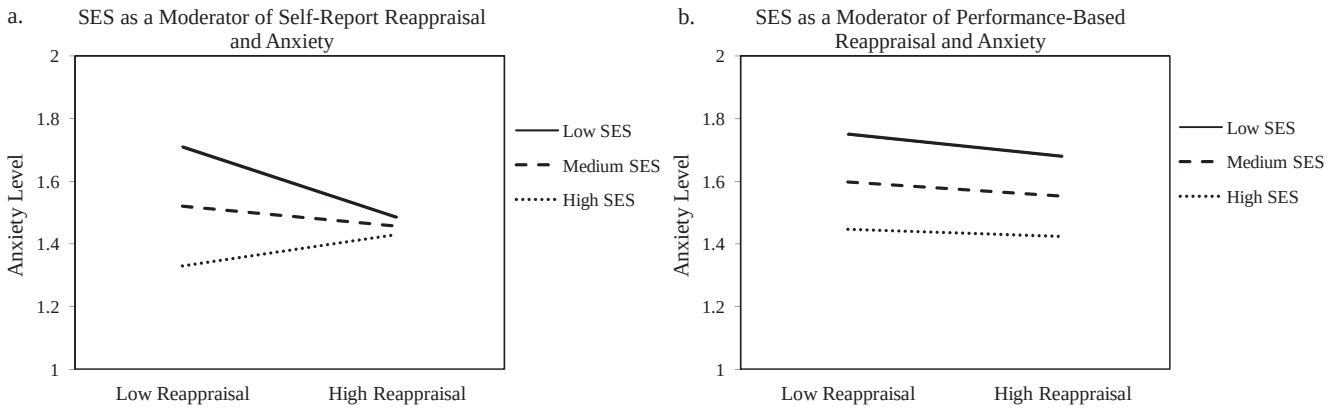


Figure 1. Study 1: Socioeconomic status (SES) moderated the association between self-report reappraisal and anxiety, controlling for age, gender, and race, $p < .05$. SES did not moderate the association between performance-based reappraisal and anxiety, controlling for performance-based reactivity, age, gender, and race, $p > .05$. Simple slopes are plotted at low ($M - 1$ *SD*), medium (M), and high ($M + 1$ *SD*) SES levels.

"more than one thing"). Following established procedures, a continuous generalized anxiety symptom count variable was constructed by taking the sum of reported "most day" responses to items (Marcus et al., 2014). To determine specificity, we also examined the 10 individual GAD items (e.g., "Were you restless because of your worry?") to examine what symptoms of GAD were driving the association in a series of follow-up analyses.

Socioeconomic status. Socioeconomic status was measured at T1 and T2 using (a) income (i.e., T1: average of "What was your personal income during the past 12 months?," 1 = *less than $0/loss* to 31 = *$100,000 or more*; T2: The total income of the respondent during the past 12 months summarizing "personal earning income," "pension income," and "social security income" was top-coded at $200,000; note that an identical item was not available at T1); and (b) education (i.e., "What is the highest grade of school or year of college you completed?;" 1 = *no school/some grade school*, 12 = *Ph.D, Ed.D, MD or other professional degree*). Given the demonstrated volatility of income from year to year (Duncan & Rodgers, 1988), we used an average income measure across T1 and T2 to get a more stable measure of average income. A composite SES measure was computed from the standardized average for income and education.

Covariates. Covariates included age (in years); gender (0 = male; female = 1); race (0 = other; 1 = White); and marital status (0 = not married; 1 = married).

Data analyses. Analyses focused on longitudinal associations between reappraisal and anxiety and were conducted using negative binomial general linear models to account for the low prevalence of clinical anxiety symptoms (Gardner, Mulvey, & Shaw, 1995). To test our main hypothesis, analyses included anxiety at T2 as the dependent variable and reappraisal at T1, SES, the interaction between the two, and anxiety at T1 as predictor variables. Simple slopes of reappraisal predicting changes in anxiety were examined using software developed by Preacher, Curran, and Bauer; (http://quantpsy.org/interact/mlr2.htm; Preacher, Curran, & Bauer, 2006) at low ($M - 1$ *SD*), medium (M), and high ($M + 1$ *SD*) levels of SES.

Follow-up analyses were conducted to examine (a) robustness of the findings when controlling for covariates (i.e., anxiety at T1, age, gender, race, and marital status); (b) whether the moderating effect of SES was driven by income or education (by examining separate models predicting each SES aspect separately); (c) generalizability of the findings across gender (i.e., by testing a three-way interaction between reappraisal, SES, and gender on anxiety); and (d) probe reverse associations by examining reappraisal at T2 as the dependent variable and anxiety at T1 as the independent variable, controlling for reappraisal at T1, age, gender, race, and marital status. Finally, Study 2 also allowed us to test specificity for the moderating association for SES for reappraisal at T1 and anxiety using individual GAD items at T2 as the dependent variables, controlling for respective GAD items at T1 and all covariates. All continuous independent variables reported were z-standardized.

Results

Table 3 presents intercorrelations of key study variables. Longitudinal associations between reappraisal, SES, and anxiety at T2, controlling for anxiety at T1, age, gender, race, and marital status are summarized in Table 4.

Reappraisal and changes in anxiety: Moderation by SES. The association between reappraisal at T1 and 9-year changes in anxiety from T1 to T2 was moderated by SES ($B = .24$, $SE[B] = .10$, $\text{Exp}[B] = 1.27$, $p = .013$, 95% CI [.05, .43]). Simple slope analyses showed that reappraisal predicted decreases in anxiety over 9 years at low ($B = -.40$, $SE[B] = .09$, $\text{Exp}[B] = .67$, $p < .001$) and medium ($B = -.17$, $SE[B] = .08$, $\text{Exp}[B] = .84$, $p = .027$), but not high ($B = .07$, $SE[B] = .14$, $\text{Exp}[B] = 1.07$, $p = .628$) SES levels. Similar patterns were also observed for concurrent associations at T1 and T2.[5]

[5] Results showed that SES moderated the concurrent association between reappraisal and anxiety at T1 ($B = .14$, $SE[B] = .06$, $\text{Exp}[B] = 1.15$, $p = .024$, 95% CI [.02, .26]) but not at T2 ($B = .16$, $SE[B] = .10$, $\text{Exp}[B] = 1.17$, $p = .121$, 95% CI [−.04, .36]). Simple slope analyses showed that reappraisal predicted lower anxiety at low ($B = -.61$, $SE[B] = .06$, $\text{Exp}[B] = .54$, $p < .001$), medium ($B = -.47$, $SE[B] = .05$, $\text{Exp}[B] = .63$, $p < .001$), and high ($B = -.33$, $SE[B] = .09$, $\text{Exp}[B] = .72$, $p < .001$) T1 SES levels, with associations becoming somewhat attenuated with increasing T2 SES levels.

Table 3
Study 2 Intercorrelations Between Key Variables

Variables	1	2	3	4	5	6	7	8
n	2,090	2,257	2,257	2,257	2,257	2,257	2,257	2,257
1. Reappraisal T1								
2. SES	.04							
3. Anxiety T1	−.11**	−.08**						
4. Anxiety T2	−.07**	−.09**	.33**					
5. Age	.05*	−.14**	−.07**	−.10**				
6. Gender (Female)	.02	−.28**	.08**	.09**	.01			
7. Race (White)	−.03	.07**	−.07**	−.07**	.12**	−.01		
8. Marital status	−.03	.02	−.05*	−.04	.03	−.12**	.13**	

Note. SES = socioeconomic status.
* $p < .05$. ** $p < .01$.

Follow-up analyses. First, findings remained stable when controlling for anxiety (T1), age, gender, race, and marital status ($B = .23$, $SE[B] = .09$, $\text{Exp}[B] = 1.26$, $p = .007$, 95% CI [.06, .40]). Simple slopes analyses revealed that higher reappraisal continued to predict decreases in anxiety across 9 years at low ($B = -.35$, $SE[B] = .09$, $\text{Exp}[B] = .70$, $p < .001$) but not at medium ($B = -.12$, $SE[\text{B}] = .08$, $\text{Exp}[B] = .89$, $p = .117$) or high ($B = .11$, $SE[\text{B}] = .14$, $\text{Exp}[B] = 1.12$, $p = .431$) SES levels (Figure 2; Table 4).

Second, the association between reappraisal at T1 and 9-year changes in anxiety from T1 to T2 was significantly moderated by income ($B = .23$, $SE[B] = .08$, $\text{Exp}[B] = 1.26$, $p = .006$, 95% CI [.06, .39]) and was not moderated by education ($B = .09$, $SE[B] = .08$, $\text{Exp}[B] = 1.09$, $p = .247$, 95% CI [−.06, .24]). The income moderating association between reappraisal at T1 and 9-year change in anxiety remained robust when controlling for anxiety at T1, age, gender, race, and marital status ($B = .24$, $SE[B] = .08$, $\text{Exp}[B] = 1.27$, $p = .005$, 95% CI [.07, .41]). Simple slope analyses patterned in the expected direction (i.e., simple slopes for low income: $B = -.41$, $SE[B] = .10$, $\text{Exp}[B] = .66$, $p < .001$; medium income: $B = -.17$, $SE[B] = .07$, $\text{Exp}[B] = .84$, $p = .024$; high income: $B = .07$, $SE[\text{B}] = .13$, $\text{Exp}[\text{B}] = 1.07$, $p = .569$).

Third, findings differed across gender, indicated by a three-way interaction between reappraisal, SES, and gender ($B = -.99$, $SE[B] = .20$, $\text{Exp}[B] = .90$, $p < .001$, 95% CI [−1.39, −.60]) controlling for anxiety (T1), age, race, and marital status in addition to gender. This three-way-interaction was driven specifically by education (three-way interaction with education: $B = -1.2$, $SE[B] = .20$, $\text{Exp}[B] = .37$, $p < .001$, 95% CI [−1.61, −.82]) and was not present for income (three-way interaction with income: $B = -.32$, $SE[B] = .20$, $\text{Exp}[B] = .72$, $p = .110$, 95% CI [−.72, .07]). Decomposing this three-way interaction for education revealed that there was a significant interaction between reappraisal and education for men ($B = .77$, $SE[B] = .16$, $\text{Exp}[B] = 2.16$, $p < .001$, 95% CI [.45, 1.09]), but not for women ($ps > .05$), on clinical symptoms of anxiety. Simple slope analyses patterned in the expected direction. Higher levels of reappraisal predicted lower levels of anxiety at low education levels ($B = -.76$, $SE[B] = .23$, $\text{Exp}[B] = .47$, $p < .001$) but not at medium education levels ($B = .02$, $SE[B] = .19$, $\text{Exp}[B] = 1.02$, $p = .930$), and predicted higher levels of anxiety at high education levels ($B = .79$, $SE[B] = .28$, $\text{Exp}[B] = 2.20$, $p = .005$). For women, reappraisal predicted decreases in anxiety regardless of level of education.

Fourth, to determine directionality, we switched the dependent and independent variables to test whether SES might also moderate the relationship between anxiety at T1 and changes in reappraisal from T1 and T2. Controlling for reappraisal (T1), age, gender, race, and marital status, SES did not moderate the association between anxiety (T1) and reappraisal (T2), $ps > .10$.

Finally, to determine specificity for longitudinal associations, we examined the 10 individual GAD items at T2 separately. Items

Table 4
Study 2 Results of Regression Analyses Predicting Anxiety at T2 From Cognitive Reappraisal, SES, and Covariates

Variables	*B*	*SE*	Exp(*B*)	[95% CI]	*p*
Intercept	−4.04	.38	.02	[−4.80, −3.29]	<.001
Reappraisal T1	−.12	.08	.89	[−.28, .03]	.116
SES	−.44	.10	.64	[−.63, −.25]	<.001
Reappraisal T1 × SES	.23	.09	1.26	[.06, .40]	.007
Anxiety T1	.37	.04	1.44	[.29, .44]	<.001
Age	−.72	.09	.49	[−.89, −.55]	<.001
Gender (Female)	.97	.18	2.64	[.62, 1.32]	<.001
Race (White)	.11	.22	1.12	[−.31, .53]	.608
Marital status	−.48	.15	.62	[−.78, −.18]	.002

Note. SES = socioeconomic status. Regression controlled for anxiety at T1, age, gender, race, and marital status.

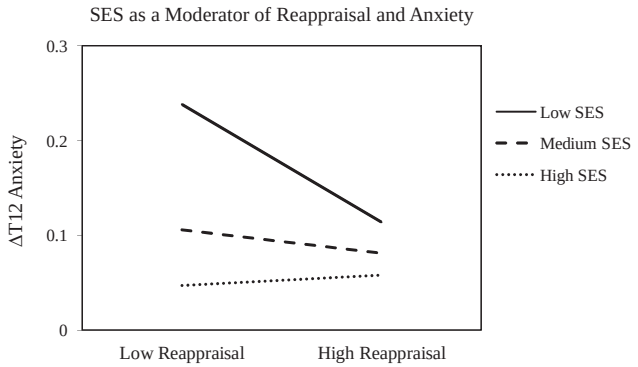


Figure 2. Study 2: Socioeconomic status (SES) moderated the association between reappraisal and anxiety (T2) controlling for anxiety (T1), age, gender, race, and marital status. Interaction was significant, $p < .05$. Simple slopes are plotted at low ($M - 1\ SD$), medium (M), and high ($M + 1\ SD$) SES levels.

were normally distributed (kurtosis $< |1.3|$ for all items; Gravetter & Wallnau, 2014). Controlling for the respective GAD item (T1), age, gender, race, and marital status, there were significant moderating associations of SES for three of 10 individual GAD items at T2, including "How often [over the past 12 months] . . . were you restless because of your worry?:" $B = .09$, $SE(B) = .04$, $\text{Exp}(B) = 1.09$, $p = .043$, 95% CI [.002, .170]; "How often [over the past 12 months] . . . were you keyed up, on edge, or had a lot of nervous energy?:" $B = .09$, $SE(B) = .04$, $\text{Exp}(B) = 1.09$, $p = .047$, 95% CI [.001, .171]; "How often [over the past 12 months] . . . did you have trouble staying asleep because of your worry?:" $B = .14$, $SE[B] = .05$, $\text{Exp}[B] = 1.15$, $p = .011$, 95% CI [.03, .24]. Simple slope analyses for individual GAD items yielded findings similar to the analyses for anxiety symptoms, showing that reappraisal had stronger negative longitudinal associations with individual GAD items at lower SES levels. (Table S2 in the online supplementary material).

Discussion

Drawing from affective, developmental and health psychological frameworks and using data from a laboratory-based and a 9-year longitudinal study, the present findings showed that reappraisal predicted lower anxiety at low levels of SES but did not or less so at high levels of SES. These results emerged for self-report reappraisal (Studies 1 and 2) and for nonclinical (Study 1) and clinical (Study 2) symptoms of anxiety. Moreover, associations emerged not only concurrently (Study 1), but also longitudinally over a 9-year period (Study 2). Findings remained stable when controlling for a variety of covariates, including age, gender, and race; were more robust for income than education; largely generalized across gender (except for a men-specific moderation effect of education in Study 2); and were directional such that SES did not moderate associations between anxiety and changes in reappraisal.

Reappraisal and Anxiety: One Strategy Does Not Always Fit All Socioeconomic Contexts

Reappraisal has been widely linked to lower anxiety (e.g., Campbell-Sills et al., 2014; Hofmann et al., 2009). The present findings represent the first evidence that reappraisal does not reduce anxiety in a "one-strategy-fits-all" manner but that the association varies across levels of SES. This finding contributes to the growing literature on contextual moderators of reappraisal effects (McRae, 2016) and converges with theoretical and empirical work from developmental, affective, and health science (Chen & Miller, 2014; Haase et al., 2013; Troy et al., 2017), which jointly suggest that regulation strategies that aim to change internal processes, such as reappraisal, become especially adaptive when opportunities to change the environment are limited. Low SES is intimately linked to low control over the environment (Chen & Miller, 2012; Lachman & Weaver, 1998) and high threat (Adler & Ostrove, 1999). Low controllability and high threat in turn figure prominently in etiology models of anxiety (Derryberry & Reed, 2002). Individuals from low-SES backgrounds may reduce anxiety effectively by reappraising loss and threat—for example, by finding "when everything seems to be going wrong, (. . .) a bright side to the situation" (example item from the reappraisal measure in Study 2; see Wrosch et al., 2000). In contrast, individuals from high-SES backgrounds may not benefit from reappraisal as much, as they could (instead) use regulation strategies to directly change their environment to reduce threat (e.g., move to a new job or a new neighborhood). The present studies thus expand existing work (e.g., Troy et al., 2013; Wrosch et al., 2000) that has highlighted contexts in which reappraisal is particularly beneficial (i.e., uncontrollable stress, old age) to include low SES.

Generalizability and Specificity Across Measures of Reappraisal, Symptoms of Anxiety, Aspects of SES, and Gender

The present studies probed generalizability versus specificity of the findings across measures of reappraisal, nonclinical and clinical symptoms of anxiety, income and education, and gender. First, findings generalized across different measures of self-report reappraisal (including the widely used reappraisal subscale of the Emotion Regulation Questionnaire, Gross & John, 2003; reappraisal subscale of the Optimization in Primary and Secondary Control [OPS] scale, Heckhausen et al., 1998) but were not found for performance-based reappraisal in Study 1. While the interaction effect between SES and performance-based reappraisal (assessed employing a widely used laboratory-based paradigm of instructed reappraisal controlling for reactivity in response to sad film clips; Shiota & Levenson, 2009) was not significant, simple slope analyses mirrored those found with self-report reappraisal.

Second, findings generalized across nonclinical (using the widely used Beck's Anxiety Inventory; Beck, Epstein, Brown, & Steer, 1988) and clinical (using a *DSM*-based phone measure of generalized anxiety disorder symptoms; Kessler et al., 1998) symptoms of anxiety. While the present studies were not designed to address debates about the structure of mental health and its building blocks (e.g., Lilienfeld & Treadway, 2016), the present findings are relevant to understanding reappraisal as a protective factor for both nonclinical and clinical symptoms of anxiety. Nonclinical symptoms of anxiety can significantly impair individuals' quality of life and generalized anxiety disorder can have devastating consequences for individuals and society alike (total annual costs of anxiety disorders were estimated at $42.3 billion in 1990 in the U.S.; Hoffman, Dukes, & Wittchen, 2008). In addition, Study 2 revealed that effects on clinical anxiety were driven by symptoms possibly indicating hyperarousal and hypervigilance, such that reappraisal specifically predicted decreases in feeling restless, being "keyed up," and experiencing sleep problems at lower levels of SES. Heightened arousal and vigilance are key symptoms of generalized anxiety disorder (Craighead, Miklowitz, & Craighead, 2008). As such, reappraisal may be reducing anxiety for individuals from low-SES backgrounds by reducing hyperarousal and hypervigilance (e.g., by getting more restful sleep).

Third, across studies, we analyzed a composite measure of SES; follow-up analyses showed that findings were driven more robustly by income than education. It has long been noted that different dimensions of SES likely operate through different pathways, interacting with different social and developmental characteristics to produce differential health outcomes (Braveman et al., 2005). It may be that someone's income is more strongly tied to how much control they have over their environment (e.g., purchasing power) than their education level (cf. Wrosch et al., 2000) or

that income is more closely linked with perceived social position which in turn relates to controllability (Robert & House, 1996). Clearly, further research is needed to understand the different pathways through which different aspects of SES such as income and education operate (Diemer et al., 2013).

Fourth, the moderating association between SES and reappraisal on anxiety largely generalized across gender across studies, with the exception of one men-specific moderation effect for education in Study 2 (i.e., reappraisal was most helpful for reducing anxiety for men at low-education but not high-education backgrounds, whereas education did not moderate the reappraisal-anxiety link for women). We speculate that lower levels of education may be particularly disadvantageous for men in the MIDUS cohorts, making reappraisal particularly important for these men. Future research is needed to elucidate pathways for how reappraisal, education, and gender (along with other intersections with race, cohort, gender roles, and occupations) operate to predict anxiety.

Longitudinal Associations

The present findings are, to our knowledge, the first to show that reappraisal predicted decreases in anxiety longitudinally over 9 years at low levels of SES. We were able to (a) show that this association remained robust when controlling for a variety of covariates, including age, gender, race, and marital status; and (b) test and rule out a similar moderating effect for the reverse longitudinal association (anxiety predicting reappraisal). Existing research (Wirtz et al., 2014) has been able to establish longitudinal links between emotion regulation and anxiety, but no prior studies showed (a) a link for reappraisal in particular and (b) associations over almost a decade. Although the present findings cannot establish causality, they emphasize the usefulness of probing reappraisal skills (or their absence) as a protective (or risk) factor among individuals from low-SES backgrounds with long-term effects on anxiety (Schetter & Dolbier, 2011; Troy & Mauss, 2011).

Strengths and Limitations

The present studies had a number of strengths. We assessed reappraisal and anxiety using measures of performance-based (Study 1) and self-report (Study 1 and 2) reappraisal; used nonclinical (Study 1) and clinical (Study 2) symptoms of anxiety; and drew from a small, laboratory-based (Study 1) study and a large-scale 9-year longitudinal (Study 2) study.

The studies also had limitations. First, the sample size for Study 1 may seem small for researchers working with large-scale survey data, and a larger sample size would have undoubtedly provided greater statistical power. Yet, we decided not to let Study 1 become part of the file drawer as this sample size is similar to other laboratory-based studies of SES and emotion regulation (e.g., Troy et al., 2017) and to our knowledge unparalleled in a ethnic-racially diverse sample of married couples. Moreover, we relied on Study 2, with power analyses using Gpower (Faul, Erdfelder, Lang, & Buchner, 2007) revealing that for regression-based analyses using an alpha level of .05, statistical power of .80, with two-tailed significance testing, a sample size of 2,257 participants was sufficient to test whether findings from Study 1 patterned in a similar way in this large national sample.

Second, in Study 2, we ideally would have been able to measure reappraisal using the same measure we used in Study 1 (i.e., ERQ reappraisal subscale; Gross & John, 2003). However, at the time that MIDUS was implemented, the ERQ was not yet developed. The reappraisal subscale of the OPS scale that was used in Study 2 was one of the best measurements for reappraisal (Peng & Lachman, 1994; Wrosch et al., 2000) at the time and has since been used in numerous studies (Chen et al., 2012; Wrosch et al., 2000). We note that the OPS reappraisal and the ERQ reappraisal subscales have similar correlates and profiles for emotional functioning, (Gunaydin, Selcuk, & Ong, 2016; Williams, Bargh, Nocera, & Gray, 2009) and there is a considerable amount of overlap in individual items across the two scales (i.e., ERQ reappraisal: "I control my emotions by changing the way I think about the situation I'm in;" OPS reappraisal: "When I am faced with a bad situation, it helps to find a different way of looking at things").

Moreover, in Study 2, we would have wished for an additional analysis of nonclinical symptoms of anxiety; however, these measures were not available for the core MIDUS sample. It is important to note the low 12-month prevalence of general anxiety disorder (~3%), which is in line with established 12-month generalized anxiety disorder rates in that range from 2.9%–3.3% in the United States (Kessler et al., 2005). We addressed this by using appropriate statistical procedures (e.g., negative binomial analyses) to account for skewness in GAD symptoms. Moreover, when examining which individual items (e.g., "Were restless because of your worry") drove the overall effect on general anxiety disorder diagnosis, results for these individual items (which were normally distributed) mirrored the overall results for GAD symptoms.

Directions for Future Research and Applications

Emotion regulation and mental health are intimately linked (Aldao et al., 2010; Kring & Sloan, 2009). In fact, emotion regulation dysfunction is at the core of most mental health symptoms, including nonclinical (Aldao et al., 2010) as well as clinical (over 50% of Axis I disorders and 100% of Axis II disorders involve emotion regulation deficits; Gross, 1998b) symptoms. Cognitive reappraisal is one of the most common adaptive emotion regulation strategies and has received enormous attention in research, with studies uncovering its developmental trajectories, sources (e.g., neural correlates), and consequences (e.g., anxiety; Buhle et al., 2014; John & Gross, 2004; McRae, 2016). Moreover, reappraisal is often targeted in cognitive–behavioral therapy (CBT), which is one of the most common kinds of psychotherapy used to treat anxiety disorders (Campbell-Sills & Barlow, 2007) and seeks to alter distorted and maladaptive beliefs and thought patterns. For instance, individuals high in anxiety, such as those with generalized anxiety disorder, might "imagine themselves in feared situations and . . . practice making positive, adaptive self-statements that emphasize personal control and reduce the anticipated aversiveness of the consequences" (Brewin, 1996). While reappraisal-based anxiety treatments (e.g., CBT) are the most common, other emotion regulation strategies, such as acceptance, have also been shown to decrease anxiety in nonclinical and clinical populations (see Aldao et al., 2010). Future research could examine whether the present findings generalize to other emotion regulation strategies that also target internal processes (e.g., acceptance), such that acceptance would also be particularly beneficial at lower SES levels. In contrast, we would expect that emotion regulation strategies that seek to change the external environment

(e.g., situation modification) might be particularly beneficial at higher SES levels (cf. Heckhausen et al., 2010).

The present findings emphasize the value of moving toward person-by-context models in future research on emotion regulation and anxiety (Aldao, 2013; McRae, 2016; Troy et al., 2013). An emerging body of research has been seeking to uncover "when and for whom" (McRae, 2016) certain emotion regulation strategies are adaptive or maladaptive. In moving forward with this work, researchers may draw not only from work in affective science (e.g., on reappraisal in context; McRae, 2016; Troy et al., 2013), but also converging evidence from developmental (e.g., on "secondary control"; Haase et al., 2013; Heckhausen et al., 2010) and health (e.g., on "shift" strategies; Chen & Miller, 2012) science. We believe that a stronger consideration of contextual moderators such as SES in particular will not only benefit emotion regulation research but might also enhance the replicability of empirical findings (cf. Van Bavel, Mende-Siedlecki, Brady, & Reinero, 2016) by alerting us to the fact that sample SES composition might matter in whether reappraisal-anxiety links are found or not found (Aldao, 2013). Following up on the present findings, future research may want to examine underlying mechanisms (e.g., low vs. high controllability associated with low vs. high SES; Gallo, de los Monteros, & Shivpuri, 2009); other reappraisal strategies specifically (Troy et al., 2017) and other emotion regulation strategies more broadly (e.g., acceptance; situation modification; Gross, 2013); other SES dimensions (e.g., childhood SES; Chen et al., 2012; subjective social status; Adler, Epel, Castellazzo, & Ickovics, 2000); and other health behaviors and symptoms (e.g., sleep; see Study 2).

The present findings also have implications for policy. Together with other studies (Troy et al., 2017), they suggest that psychotherapy approaches that target reappraisal such as CBT may be most beneficial for those least able to afford them (Bystritsky, Khalsa, Cameron, & Schiffman, 2013): individuals from lower socioeconomic backgrounds. Although CBT is the most empirically supported form of psychotherapy for treating anxiety (Hofmann, Asnaani, Vonk, Sawyer, & Fang, 2012), it can cost more than $100 an hour in the U.S. (Anxiety and Depression Association of America, n.d.). Resources such as Medicaid, the largest funder of mental health treatment in the U.S., work to make such treatments accessible for all.

Conclusion

The present findings show that SES powerfully shapes concurrent and longitudinal associations between reappraisal and anxiety, with individuals from low-SES backgrounds benefiting the most and individuals from high-SES backgrounds benefiting the least from reappraisal. As social inequality continues to rise, with wealth increasingly concentrating in the top 1%–2% (Reardon, 2011; Wolff, 2010) and half of the population considered poor or low income in the U.S. (Bishaw, 2013), it becomes increasingly important to understand how emotion regulation strategies might benefit mental health differently across socioeconomic backgrounds.

References

Adler, N. E., Epel, E. S., Castellazzo, G., & Ickovics, J. R. (2000). Relationship of subjective and objective social status with psychological and physiological functioning: Preliminary data in healthy white women. *Health Psychology, 19,* 586–592. http://dx.doi.org/10.1037/0278-6133.19.6.586

Adler, N. E., & Ostrove, J. M. (1999). Socioeconomic status and health: What we know and what we don't. *Annals of the New York Academy of Sciences, 896,* 3–15. http://dx.doi.org/10.1111/j.1749-6632.1999.tb08101.x

Aldao, A. (2013). The future of emotion regulation research: Capturing context. *Perspectives on Psychological Science, 8,* 155–172. http://dx.doi.org/10.1177/1745691612459518

Aldao, A., Nolen-Hoeksema, S., & Schweizer, S. (2010). Emotion-regulation strategies across psychopathology: A meta-analytic review. *Clinical Psychology Review, 30,* 217–237. http://dx.doi.org/10.1016/j.cpr.2009.11.004

American Psychiatric Association. (1980). *Diagnostic and statistical manual of mental disorders*. Washington, DC: Author.

Anxiety and Depression Association of America. (n.d.). *Low-cost treatment*. Retrieved from https://adaa.org/finding-help/treatment/low-cost-treatment

Beck, A. T., Epstein, N., Brown, G., & Steer, R. A. (1988). An inventory for measuring clinical anxiety: Psychometric properties. *Journal of Consulting and Clinical Psychology, 56,* 893–897. http://dx.doi.org/10.1037/0022-006X.56.6.893

Beck, J. S. (2011). *Cognitive behavior therapy: Basics and beyond*. New York, NY: Guilford Press.

Bishaw, A. (2013). Poverty: 2000 to 2012. *American community survey briefs*. Retrieved from https://www.census.gov/content/dam/Census/library/publications/2013/acs/acsbr12-01.pdf

Bloch, L., Haase, C. M., & Levenson, R. W. (2014). Emotion regulation predicts marital satisfaction: More than a wives' tale. *Emotion, 14,* 130–144. http://dx.doi.org/10.1037/a0034272

Brady, S. S., & Matthews, K. A. (2002). The influence of socioeconomic status and ethnicity on adolescents' exposure to stressful life events. *Journal of Pediatric Psychology, 27,* 575–583. http://dx.doi.org/10.1093/jpepsy/27.7.575

Braveman, P. A., Cubbin, C., Egerter, S., Chideya, S., Marchi, K. S., Metzler, M., & Posner, S. (2005). Socioeconomic status in health research: One size does not fit all. *Journal of the American Medical Association, 294,* 2879–2888. http://dx.doi.org/10.1001/jama.294.22.2879

Brewin, C. R. (1996). Theoretical foundations of cognitive-behavior therapy for anxiety and depression. *Annual Review of Psychology, 47,* 33–57. http://dx.doi.org/10.1146/annurev.psych.47.1.33

Buhle, J. T., Silvers, J. A., Wager, T. D., Lopez, R., Onyemekwu, C., Kober, H., . . . Ochsner, K. N. (2014). Cognitive reappraisal of emotion: A meta-analysis of human neuroimaging studies. *Cerebral Cortex, 24,* 2981–2990.

Bystritsky, A., Khalsa, S. S., Cameron, M. E., & Schiffman, J. (2013). Current diagnosis and treatment of anxiety disorders. *P&T, 38,* 30–57.

Campbell-Sills, L., & Barlow, D. H. (2007). Incorporating emotion regulation into conceptualizations and treatments of anxiety and mood disorders. In J. Gross (Ed), *Handbook of emotion regulation* (pp. 542–559). New York, NY: Guilford Press.

Campbell-Sills, L., Ellard, K. K., & Barlow, D. H. (2014). Emotion regulation in anxiety disorders. In J. Gross (Ed.), *Handbook of emotion regulation* (2nd ed., pp. 393–412). New York, NY: Guilford Press.

Carstensen, L. L., Isaacowitz, D. M., & Charles, S. T. (1999). Taking time seriously. A theory of socioemotional selectivity. *American Psychologist, 54,* 165–181. http://dx.doi.org/10.1037/0003-066X.54.3.165

Chen, E., & Miller, G. E. (2012). "Shift-and-persist" strategies: Why low socioeconomic status isn't always bad for health. *Perspectives on Psychological Science, 7,* 135–158. http://dx.doi.org/10.1177/1745691612436694

Chen, E., & Miller, G. E. (2014). Early-life socioeconomic status, emotion regulation, and the biological mechanisms of disease across the lifespan. In J. Gross (Ed.), *Handbook of emotion regulation* (2nd ed., pp. 586–595). New York, NY: Guilford Press.

Chen, E., Miller, G. E., Lachman, M. E., Gruenewald, T. L., & Seeman, T. E. (2012). Protective factors for adults from low-childhood socioeconomic circumstances: The benefits of shift-and-persist for allostatic load. *Psychosomatic Medicine, 74,* 178–186. http://dx.doi.org/10.1097/PSY.0b013e31824206fd

Cisler, J. M., Olatunji, B. O., Feldner, M. T., & Forsyth, J. P. (2010). Emotion regulation and the anxiety disorders: An integrative review. *Journal of Psychopathology and Behavioral Assessment, 32,* 68–82. http://dx.doi.org/10.1007/s10862-009-9161-1

Craighead, W. E., Miklowitz, D. J., & Craighead, L. W. (2008). *Psychopathology: History, diagnosis, and empirical foundations*. New York, NY: Wiley.

Crawford, J. R., Henry, J. D., Crombie, C., & Taylor, E. P. (2001). Normative data for the HADS from a large non-clinical sample. *British Journal of Clinical Psychology, 40,* 429–434. http://dx.doi.org/10.1348/014466501163904

Derryberry, D., & Reed, M. A. (2002). Anxiety-related attentional biases and their regulation by attentional control. *Journal of Abnormal Psychology, 111,* 225–236. http://dx.doi.org/10.1037/0021-843X.111.2.225

Diemer, M. A., Mistry, R. S., Wadsworth, M. E., López, I., & Reimers, F. (2013). Best practices in conceptualizing and measuring social class in psychological research. *Analyses of Social Issues and Public Policy, 13,* 77–113. http://dx.doi.org/10.1111/asap.12001

Duncan, G. J., & Rodgers, W. L. (1988). Longitudinal aspects of childhood poverty. *Journal of Marriage and the Family, 50,* 1007–1021. http://dx.doi.org/10.2307/352111

Ekman, P., Friesen, W. V., & Ancoli, S. (1980). Facial signs of emotional experience. *Journal of Personality and Social Psychology, 39,* 1125–1134. http://dx.doi.org/10.1037/h0077722

Ensminger, M. E., Fothergill, K. E., Bornstein, M. H., & Bradley, R. H. (2003). A decade of measuring SES: What it tells us and where to go from here. *Socioeconomic Status, Parenting, and Child Development, 13,* 27.

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39,* 175–191. http://dx.doi.org/10.3758/BF03193146

Gallo, L. C., de Los Monteros, K. E., & Shivpuri, S. (2009). Socioeconomic status and health: What is the role of reserve capacity? *Current Directions in Psychological Science, 18,* 269–274. http://dx.doi.org/10.1111/j.1467-8721.2009.01650.x

Gardner, W., Mulvey, E. P., & Shaw, E. C. (1995). Regression analyses of counts and rates: Poisson, overdispersed Poisson, and negative binomial models. *Psychological Bulletin, 118,* 392–404. http://dx.doi.org/10.1037/0033-2909.118.3.392

Gravetter, F. J., & Wallnau, L. B. (2014). Introduction to the t statistic. *Essentials of Statistics for the Behavioral Sciences, 8,* 252.

Gross, J. J. (1998a). Antecedent- and response-focused emotion regulation: Divergent consequences for experience, expression, and physiology. *Journal of Personality and Social Psychology, 74,* 224–237. http://dx.doi.org/10.1037/0022-3514.74.1.224

Gross, J. J. (1998b). The emerging field of emotion regulation: An integrative review. *Review of General Psychology, 2,* 271–299. http://dx.doi.org/10.1037/1089-2680.2.3.271

Gross, J. J. (2013). *Handbook of emotion regulation*. New York, NY: Guilford Press publications.

Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology, 85,* 348–362. http://dx.doi.org/10.1037/0022-3514.85.2.348

Gross, J. J., & Levenson, R. W. (1997). Hiding feelings: The acute effects of inhibiting negative and positive emotion. *Journal of Abnormal Psychology, 106,* 95–103. http://dx.doi.org/10.1037/0021-843X.106.1.95

Gunaydin, G., Selcuk, E., & Ong, A. D. (2016). Trait reappraisal predicts affective reactivity to daily positive and negative events. *Frontiers in Psychology, 7,* 1000. http://dx.doi.org/10.3389/fpsyg.2016.01000

Haase, C. M., Heckhausen, J., & Wrosch, C. (2013). Developmental regulation across the life span: Toward a new synthesis. *Developmental Psychology, 49,* 964–972. http://dx.doi.org/10.1037/a0029231

Heckhausen, J., & Baltes, P. B. (1991). Perceived controllability of expected psychological change across adulthood and old age. *Journal of Gerontology, 46,* 165–173. http://dx.doi.org/10.1093/geronj/46.4.P165

Heckhausen, J., Schulz, R., & Wrosch, C. (1998). *Developmental regulation in adulthood: Optimization in primary and secondary control—A multiscale questionnaire (OPS-Scales)*. Unpublished Tech. Rep. No., Max Planck Institute for Human Development and Education, Berlin, Germany.

Heckhausen, J., Wrosch, C., & Schulz, R. (2010). A motivational theory of life-span development. *Psychological Review, 117,* 32–60. http://dx.doi.org/10.1037/a0017668

Hoffman, D. L., Dukes, E. M., & Wittchen, H.-U. (2008). Human and economic burden of generalized anxiety disorder. *Depression and Anxiety, 25,* 72–90. http://dx.doi.org/10.1002/da.20257

Hofmann, S. G., Asnaani, A., Vonk, I. J., Sawyer, A. T., & Fang, A. (2012). The efficacy of cognitive behavioral therapy: A review of meta-analyses. *Cognitive Therapy and Research, 36,* 427–440. http://dx.doi.org/10.1007/s10608-012-9476-1

Hofmann, S. G., Heering, S., Sawyer, A. T., & Asnaani, A. (2009). How to handle anxiety: The effects of reappraisal, acceptance, and suppression strategies on anxious arousal. *Behaviour Research and Therapy, 47,* 389–394. http://dx.doi.org/10.1016/j.brat.2009.02.010

Insel, T., Cuthbert, B., Garvey, M., Heinssen, R., Pine, D. S., Quinn, K., . . . Wang, P. (2010). *Research domain criteria (RDoC): Toward a new classification framework for research on mental disorders*. Washington, DC: American Psychiatric Association.

Jackson, D. C., Mueller, C. J., Dolski, I., Dalton, K. M., Nitschke, J. B., Urry, H. L., . . . Davidson, R. J. (2003). Now you feel it, now you don't: Frontal brain electrical asymmetry and individual differences in emotion regulation. *Psychological Science, 14,* 612–617. http://dx.doi.org/10.1046/j.0956-7976.2003.psci_1473.x

John, O. P., & Gross, J. J. (2004). Healthy and unhealthy emotion regulation: Personality processes, individual differences, and life span development. *Journal of Personality, 72,* 1301–1333. http://dx.doi.org/10.1111/j.1467-6494.2004.00298.x

Kaeppler, A. K., & Erath, S. A. (2017). Linking social anxiety with social competence in early adolescence: Physiological and coping moderators. *Journal of Abnormal Child Psychology, 45,* 371–384. http://dx.doi.org/10.1007/s10802-016-0173-5

Kenny, D. A., Kashy, D. A., & Cook, W. L. (2006). *The analysis of dyadic data*. New York, NY: Guilford Press.

Kessler, R. C., Andrews, G., Mroczek, D., Ustun, B., & Wittchen, H.-U. (1998). The world health organization composite international diagnostic interview short-form (cidi-sf). *International Journal of Methods in Psychiatric Research, 7,* 171–185. http://dx.doi.org/10.1002/mpr.47

Kessler, R. C., Chiu, W. T., Demler, O., Merikangas, K. R., & Walters, E. E. (2005). Prevalence, severity, and comorbidity of 12-month *DSM–IV* disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry, 62,* 617–627. http://dx.doi.org/10.1001/archpsyc.62.6.617

Kraus, M. W., Piff, P. K., Mendoza-Denton, R., Rheinschmidt, M. L., & Keltner, D. (2012). Social class, solipsism, and contextualism: How the rich are different from the poor. *Psychological Review, 119,* 546–572. http://dx.doi.org/10.1037/a0028756

Kring, A. M., & Sloan, D. M. (2009). *Emotion regulation and psychopathology: A transdiagnostic approach to etiology and treatment*. New York, NY: Guilford Press.

Lachman, M. E., & Firth, K. M. (2004). The adaptive value of feeling in control during midlife. In O. G. Brim, C. D. Ryff, & R. Kessler (Eds.), *How healthy are we?: A national study of well-being at midlife* (pp. 320–349). Illinois: University of Chicago Press.

Lachman, M. E., & Weaver, S. L. (1998). Sociodemographic variations in the sense of control by domain: Findings from the MacArthur studies of midlife. *Psychology and Aging, 13,* 553–562. http://dx.doi.org/10.1037/0882-7974.13.4.553

Lilienfeld, S. O., & Treadway, M. T. (2016). Clashing diagnostic approaches: DSM-ICD versus RDoC. *Annual Review of Clinical Psychology, 12,* 435–463. http://dx.doi.org/10.1146/annurev-clinpsy-021815-093122

Madden, T. E., Barrett, L. F., & Pietromonaco, P. R. (2000). Sex differences in anxiety and depression: Empirical evidence and methodological questions. In A. H. Fischer (Ed.), *Studies in emotion and social interaction. Second series. Gender and emotion: Social psychological perspectives* (pp. 277–298). New York, NY: Cambridge University Press.

Marcus, D. K., Sawaqdeh, A., & Kwon, P. (2014). The latent structure of generalized anxiety disorder in midlife adults. *Psychiatry Research, 215,* 366–371. http://dx.doi.org/10.1016/j.psychres.2013.12.011

McLaughlin, K. A., Hatzenbuehler, M. L., Mennin, D. S., & Nolen-Hoeksema, S. (2011). Emotion dysregulation and adolescent psychopathology: A prospective study. *Behaviour Research and Therapy, 49,* 544–554. http://dx.doi.org/10.1016/j.brat.2011.06.003

McRae, K. (2016). Cognitive emotion regulation: A review of theory and scientific findings. *Current Opinion in Behavioral Sciences, 10,* 119–124. http://dx.doi.org/10.1016/j.cobeha.2016.06.004

Morris, S. E., & Cuthbert, B. N. (2012). Research domain criteria: Cognitive systems, neural circuits, and dimensions of behavior. *Dialogues in Clinical Neuroscience, 14,* 29–37.

Peng, Y., & Lachman, M. E. (1994, July). *Primary and secondary control: Cross-cultural and life-span developmental perspectives*. Presented at the 13th Biennial Meeting of Institutional Society for the Study of Behavioural Development, Amsterdam, the Netherlands.

Preacher, K. J., Curran, P. J., & Bauer, D. J. (2006). Computational tools for probing interaction effects in multiple linear regression, multilevel modeling, and latent curve analysis. *Journal of Educational and Behavioral Statistics, 31,* 437–448. http://dx.doi.org/10.3102/10769986031004437

Radler, B. T., & Ryff, C. D. (2010). Who participates? Accounting for longitudinal retention in the MIDUS national study of health and well-being. *Journal of Aging and Health, 22,* 307–331. http://dx.doi.org/10.1177/0898264309358617

Reardon, S. F. (2011). The widening academic achievement gap between rich and poor: New evidence andpossible explanations. In G. J. Duncan, & R. J. Murnane (Eds.), *Whither opportunity? Rising inequality, schools, and children's life chances* (pp. 91–115). New York, NY: Russell Sage Foundation.

Robert, S., & House, J. S. (1996). SES differentials in health by age and alternative indicators of SES. *Journal of Aging and Health, 8,* 359–388. http://dx.doi.org/10.1177/089826439600800304

Rothbaum, F., Weisz, J. R., & Snyder, S. S. (1982). Changing the world and changing the self: A two-process model of perceived control. *Journal of Personality and Social Psychology, 42,* 5–37. http://dx.doi.org/10.1037/0022-3514.42.1.5

Rottenberg, J. E., & Johnson, S. L. (2007). *Emotion and psychopathology: Bridging affective and clinical science*. Washington, DC: American Psychological Association. http://dx.doi.org/10.1037/11562-000

Schetter, C. D., & Dolbier, C. (2011). Resilience in the context of chronic stress and health in adults. *Social and Personality Psychology Compass, 5,* 634–652. http://dx.doi.org/10.1111/j.1751-9004.2011.00379.x

Shiota, M. N., & Levenson, R. W. (2009). Effects of aging on experimentally instructed detached reappraisal, positive reappraisal, and emotional behavior suppression. *Psychology and Aging, 24,* 890–900. http://dx.doi.org/10.1037/a0017896

Silk, J. S., Steinberg, L., & Morris, A. S. (2003). Adolescents' emotion regulation in daily life: Links to depressive symptoms and problem behavior. *Child Development, 74,* 1869–1880. http://dx.doi.org/10.1046/j.1467-8624.2003.00643.x

Troy, A. S., Ford, B. Q., McRae, K., Zarolia, P., & Mauss, I. B. (2017). Change the things you can: Emotion regulation is more beneficial for people from lower than from higher socioeconomic status. *Emotion, 17,* 141–154. http://dx.doi.org/10.1037/emo0000210

Troy, A. S., & Mauss, I. B. (2011). Resilience in the face of stress: Emotion regulation ability as a protective factor. In S. Southwick, D. Charney, M. Friedman, & B. Litz (Eds.), *Resilience to stress* (pp. 30–44). England: Cambridge University Press.

Troy, A. S., Shallcross, A. J., & Mauss, I. B. (2013). A person-by-situation approach to emotion regulation: Cognitive reappraisal can either help or hurt, depending on the context. *Psychological Science, 24,* 2505–2514. http://dx.doi.org/10.1177/0956797613496434

Van Bavel, J. J., Mende-Siedlecki, P., Brady, W. J., & Reinero, D. A. (2016). Contextual sensitivity in scientific reproducibility. *Proceedings of the National Academy of Sciences of the United States of America, 113,* 6454–6459. http://dx.doi.org/10.1073/pnas.1521897113

Weber, M. (1922). *Wirtschaft und Gesellschaft* [Economy and society]. Tübingen, Germany: Mohr.

Williams, L. E., Bargh, J. A., Nocera, C. C., & Gray, J. R. (2009). The unconscious regulation of emotion: Nonconscious reappraisal goals modulate emotional reactivity. *Emotion, 9,* 847–854. http://dx.doi.org/10.1037/a0017745

Winkleby, M. A., Jatulis, D. E., Frank, E., & Fortmann, S. P. (1992). Socioeconomic status and health: How education, income, and occupation contribute to risk factors for cardiovascular disease. *American Journal of Public Health, 82,* 816–820. http://dx.doi.org/10.2105/AJPH.82.6.816

Wirtz, C. M., Hofmann, S. G., Riper, H., & Berking, M. (2014). Emotion regulation predicts anxiety over a five-year interval: A cross-lagged panel analysis. *Depression and Anxiety, 31,* 87–95. http://dx.doi.org/10.1002/da.22198

Wolff, E. N. (2010). *Recent trends in household wealth in the United States: Rising debt and the middle-class squeeze-an update to 2007*. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1585409

Wrosch, C., Heckhausen, J., & Lachman, M. E. (2000). Primary and secondary control strategies for managing health and financial stress across adulthood. *Psychology and Aging, 15,* 387–399. http://dx.doi.org/10.1037/0882-7974.15.3.387

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