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Sense of Belonging, Emotion Regulation, Perceived Social Support and Mental Health among College Students

Sara Bock Davis

Old Dominion University, sarabockdavis@gmail.com

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**SENSE OF BELONGING, EMOTION REGULATION,
PERCEIVED SOCIAL SUPPORT AND MENTAL HEALTH AMONG
COLLEGE STUDENTS**

by

Sara Bock Davis
B.A. May 2009, Wheaton College (IL)
M.S. December 2014, Old Dominion University

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Approved by:

Robin J. Lewis (Director)
Old Dominion University

Desideria S. Hacker (Member)
Norfolk State University

Skye Ochsner Margolies (Member)
Eastern Virginia Medical School

James F. Paulson (Member)
Old Dominion University

Barbara A. Winstead (Member)
Old Dominion University

ABSTRACT

SENSE OF BELONGING, EMOTION REGULATION, PERCEIVED SOCIAL SUPPORT AND MENTAL HEALTH AMONG COLLEGE STUDENTS

Sara Bock Davis
Virginia Consortium Program in Clinical Psychology, 2017
Director: Dr. Robin J. Lewis

Perceived social support (PSS) is linked to a range of beneficial effects, but the factors that influence the effectiveness of PSS are less well understood. In their Relational Regulation Theory (RRT), Lakey and Orehek (2011) emphasize the importance of distinguishing the role of individual factors from relational influences on PSS. This study tested the RRT by examining whether the association of PSS to three mental health outcomes (i.e., aggression, binge eating, depressive symptoms) varies by two individual factors: sense of belonging and emotion regulation. With a non-clinical college sample, a series of hierarchical regressions tested whether sense of belonging and adaptive emotion regulation (i.e., cognitive reappraisal) enhanced the association between PSS and mental health symptoms. Maladaptive emotion regulation (i.e., expressive suppression) was also examined, with the expectation of a weakened association between PSS and mental health.

Results found few moderation effects as hypothesized, but trends indicated sense of belonging, cognitive reappraisal, and expressive suppression primarily function independently of perceived social support, with PSS becoming a relevant buffer of low internal resources in the presence of greater mental health symptoms. Unexpected support for the RRT was indicated by the consistently detected beneficial effects of sense of belonging, which likely reflects relation influences as well as individual characteristics. Differences in the relations among these variables between European American and African American students were also explored.

Greater PSS and sense of belonging were more strongly linked to lower binge eating for European American students, while lower suppression was linked to lower binge eating for African American students. Future research would benefit from a larger sample size of non-clinical college students, including symptom level as a moderator, and examining the effects of these variables in mediation models.

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CHAPTER I

INTRODUCTION

Social support has been widely studied in relation to mental health symptoms, stress, physical health, and other outcomes (Cohen, 2004). In these studies, the effects of social support vary by a number of factors, including those associated with the support (e.g., type or provider of support) and the outcome variable assessed (e.g., depression, anxiety, physical health; Wills & Shinar, 2000). Recent publications explored internal, individual factors that are related to social support, including neuroticism (Campos et al., 2014), individualistic cultural beliefs (Frías, Shaver, & Díaz-Loving, 2014), and spirituality (Mimms, 2004). While these studies reveal important findings, many other factors associated with social support remain to be explored. Accordingly, the purpose of this study was to examine the role of two possible moderators of the relation between perceived social support (PSS) and mental health: sense of belonging and emotion regulation. Sense of belonging, which refers to the sense of personal integration within an environment or system (Hagerty Lynch-Sauer, Patusky, Bouwsema, & Collier, 1992), is associated with the efficacy of social support (Hale, Hannum, & Espelage, 2005). Relatedly, models of emotion regulation increasingly highlight the important veridical relationship between interpersonal functioning, including social support, and emotion regulation (Marroquín, 2011). Yet, neither sense of belonging nor emotion regulation have been fully studied as moderators of perceived social support.

Conversely, the link between social support and depression is among the most extensively studied areas of social support (Lakey & Cronin, 2008), but there remains a significant gap in the literature regarding the association of social support with other mental health symptoms. Two of these under researched areas are aggression and binge eating.

Whereas both constructs have demonstrated important associations with sense of belonging (Bushman, 2010; Sandy, 2007) and emotion regulation (Anestis, Anestis, Selby, & Joiner, 2009; Svaldi, Tuschen-Caffier, Trentowska, Caffier, & Naumann, 2014), they have infrequently been examined in tandem with social support. Likewise, the roles of emotion regulation (Aldao, Nolen-Hoeksema, & Schweizer, 2010) and sense of belonging (Williams, Hagerty, Yousha, Hoyle, & Oe, 2002) have been identified as important predictors of depression, but have not been widely studied in conjunction with social support. The current study expands existing research by examining the potential moderating effects of emotion regulation and sense of belonging on the relation between perceived social support and three mental health outcomes (i.e., aggression, binge eating, and depressive symptoms).

Relational Regulation Theory

Historically, models of perceived social support examine main or buffering effects of support given general or specific stressors (Wills & Shinar, 2000). When PSS exhibits a direct effect on outcomes, individuals report benefitting from support regardless of stress levels. The buffering (i.e., protective) effect of PSS is detected when individuals with high stress benefit more from perceived social support than individuals with low stress. The stress buffering model of social support is arguably the most researched, yet it produces highly inconsistent results, with many studies failing to find a buffering effect (Cohen & Wills, 1985). For example, Lakey and Cronin (2008) reviewed an extensive number of perceived social support studies with depression as the outcome, and reported that nearly all studies detected significant main effects for social support, but only one found an interaction, which indicates buffering. Other studies have also detected direct, but not stress buffering effects, with outcomes including well-being (Beeble,

Bybee, Sullivan, & Adams, 2009), anxiety, anger, post-traumatic stress, (Procidano, 1992) and bereavement (Stroebe, Zech, Stroebe, & Abakoumkin, 2005).

Lakey and Orehek (2011) developed the Relational Regulation Theory (RRT) to explain the reliably detected direct effects between perceived social support and mental health. The core tenant of RRT is that perceived social support has beneficial effects on mental health “when people regulate their affect, thought, and action through ordinary yet affectively consequential conversations and shared activities” (Lakey & Orehek, 2011, p. 482). Several studies provided preliminary support for this theory, in which relational influences account for a majority (62%) of the variance in perceived social support ratings (for a review, see Lakey, 2010). The second-highest explanation of the support ratings was the raters’ individual characteristics, which accounted for 27% of the variance in the support ratings. Together, relational influences and individual characteristics explained nearly 90% of the variance in perceived social support, whereas provider characteristics accounted for only 7%. This suggests that characteristics of the relationship and individual characteristics of the support recipient are vital components in a nuanced understanding of PSS.

Lakey and Orehek (2011) argue that the role of individual characteristics in the function of perceived social support should be explored and distinguished from relational influences. The present study tested the influence of the individual characteristics component of RRT by examining the influence of two individual factors (i.e., emotion regulation and sense of belonging) distinct from individuals’ overall perception of social support. RRT suggests that individuals benefit (i.e., report fewer mental health symptoms) from PSS because social interaction regulates affect, action, and thought. The current study hypothesizes that this effect is contingent on the individual’s internal factors (i.e., emotion regulation skills and sense of

belonging), and expects that PSS is more effective (i.e., has a greater effect on mental health outcomes) when the individual has more adaptive internal capacities in the form of adaptive emotion regulation skills and greater sense of belonging.

In the current study, the potential moderating effects of emotion regulation and sense of belonging on the relation between PSS and three mental health outcomes (i.e., aggression, binge eating, and depressive symptoms) were examined. In addition to developing our understanding of the function of perceived social support and testing the RRT, the findings of the present study may inform clinical intervention. Namely, more targeted and effective interventions aimed at increasing the perception of social support can be developed if it is understood who has the potential to most benefit from improving PSS. This is particularly important in light of the difficulty of generalizing social support findings, evidenced in the failure of intervention studies to replicate the effect sizes observed in other social support research (Cohen, 2004). As such, mental health outcomes were selected for this study given the documented effects of perceived social support on these symptoms, which are reviewed below.

Social Support

Social support is a broad construct that encompasses the belief that others are supportive and the associated behaviors that individuals give and receive to express support (Cohen, 2004). Given the heterogeneity of the construct, it is not surprising that the associations of social support appear to vary considerably depending on the type of social support assessed (Wills & Shinar, 2000). Consistent differences are observed between perceived and received social support. Perceived social support refers to the expectation that family, friends, or others would be available to assist when needed, while received social support refers to the amounts and types of support actually received (e.g., material assistance, advice, validation) (Wills & Shinar, 2000).

Perceived social support is typically associated with buffering the effects of stress or lower overall symptoms, whereas received social support is sometimes associated with higher symptoms (Wills & Shinar, 2000), which is believed to reflect the active support seeking of individuals with higher stress. Interestingly, perceived and received support are not related (Sarason, Shearin, Pierce, & Sarason, 1987). The present study focused on the benefits of perceived social support and the individual difference characteristics that moderate the impact of one's beliefs about social support.

Perceived social support (PSS) has been examined from both a general perspective and by assessing individuals' perceptions of support from specific others. Global PSS measures assess individuals' general perceptions that others are available for support in one's life, without specifying individuals' roles (Cohen & Hoberman, 1983). Alternatively, role-specific PSS can be assessed such that participants report their perception of support from individuals that fill specific interpersonal roles (i.e., friends, family, spouse; Zimet, Dahlem, Zimet, & Farley, 1988). Both general and role-specific measures are widely used and have demonstrated important effects. Wills and Shinar (2000) recommend that measures should be selected based on the research questions of interest. In the present study, general perceived social support will be assessed, as the primary interest is whether individual-specific characteristics moderate the effects of perceived social support, rather than differences in support by provider role.

Aggression

Aggression (alternatively termed hostility) constitutes a wide range of interrelated emotional, cognitive, and behavioral factors; for example, feelings of anger combined with a hostile processing bias culminate in expressed aggression in the form of physical or verbal aggression (Smith, Glazer, Ruiz, & Gallo, 2004). The present study focuses on trait aggression,

which assesses the frequency of the associated emotions, cognitions, and behaviors (e.g., argumentativeness, short tempered, resentful, bitter), as well as the underlying beliefs (e.g., “At times I feel I have gotten a raw deal out of life”; Buss & Perry, 1992). Trait aggression is associated with several adverse outcomes, including heightened risk for lower physical activity and greater body mass (Maier & James, 2014), cardiovascular morbidity and mortality, and overall premature mortality (Miller, Smith, Turner, Guijarro, & Hallet, 1996; Smith et al., 2004).

Perceived social support is negatively related to aggression in a number of studies (e.g., Landeta & Calvete, 2002) and PSS also moderated the links between aggression and several adverse outcomes, including binge drinking (Hussong, Hicks, Levy, & Curran, 2001), lower physical activity (Maier & James, 2004), and coronary heart disease among college women (Keltikangas-Järvinen & Ravaja, 2002). The associations between aggression and adverse outcomes are believed to be explained by decreased social functioning (Smith, 1992), as aggression has been linked to increased social stress and interpersonal conflict, and decreased social support (Gallo & Smith, 1998; Houston & Kelly, 1989; O’Neil & Emery, 2002). However, the relation between aggression and social functioning remains unclear. Within RRT, internal factors should inform the beneficial effect of PSS on aggression. For instance, perceiving relational support is likely to decrease aggression, and this effect is expected to be even stronger when in conjunction with reappraising a distressing situation. Thus, the present study explores whether two internal factors (emotion regulation and sense of belonging) moderate the impact of perceived social support on aggression.

Binge Eating

Binge eating is defined as the consumption of abnormally large amounts of food within a discrete period of time, accompanied by a perceived lack of control during the eating period

(American Psychiatric Association [APA], 2013). Binge eating disorder (BED) is also characterized by eating more rapidly, eating until overly full, eating when not physically hungry, eating alone out of embarrassment by the amount of food consumed, and feeling guilty, depressed, or disgusted after the binge eating episode (APA, 2013). BED is distinct from bulimia nervosa (BN), primarily by the presence of purging or other compensatory behavior (e.g., laxatives, compulsive exercise) in BN only, although research also suggests that BED and BN differ in etiologies and trajectories. The present study assesses binge eating symptoms, including perceived lack of control, overeating, weight fluctuation, attempts to diet, difficulty adhering to weight loss programs, and obsessive thoughts about food (Gormally, Black, Daston, & Bardin, 1982). Binge eating is associated with overweight and obesity but not exclusively; many normal-weight individuals also report high rates of binge eating (APA, 2013).

Social support is consistently negatively related to binge eating (Ghaderi, 2003). Low perceived social support was associated with higher binge eating among adolescent girls (Hunter, 2003; Stice, Presnell, & Spangler, 2002) and among pregnant Norwegian mothers (Berg et al., 2011). Using daily measures, Freeman and Gil (2004) found that increases in perceived social support were linked to decreased risk of same-day binge eating. When examining binge eating among college students, lack of perceived social support was associated with binge eating symptoms, though the transition to college was not (Johnson, 2006). Perceived social support was also associated with lower binge eating in African American college females at predominately European American colleges (Mimms, 2004). Distinguishing between sources of support, Mason and Lewis (2016) found that greater social support from friends was linked to a lower likelihood of binge eating among Caucasian college women, while greater social support from family was linked to a lower likelihood of binge eating among African American college

women. In a non-clinical, longitudinal study spanning nine years, women with binge eating symptoms but higher perceived social support at baseline reported the same quality of life and general mental health symptoms as women without disordered eating but who had low perceived social support at baseline (Wade, Wilksch, & Lee, 2012). Thus, perceived social support appears to buffer the link between binge eating and lower quality of life and mental health (Wade et al., 2012). Although perceived social support is consistently associated with lower binge eating symptoms, many of the factors that may moderate that association have yet to be fully explored.

Depressive Symptoms

Depression is consistently associated with perceived social support across a wide range of studies with samples including adult men and women, adolescents, populations from the U.S., Canada, Australia and other countries, in large and nationally representative samples as well as small samples, and using interview and self-report measures (for a review, see Lakey & Cronin, 2008). Even when controlling for coping and negative life events, low levels of perceived social support were still related to depression (Billings, Cronkite, & Moos, 1983). In an extensive literature review (Lakey & Cronin, 2008), only two studies failed to find a cross-sectional, main effect between perceived social support and depression. Both of these studies involved the caregivers of elders (Redinbaugh, MacCallum, & Kiecolt-Glaser, 1995; Rivera, Rose, Futterman, Lovett, & Gallagher-Thompson, 1991) and the reviewers attributed the lack of effects in these two studies to the particularly high risk for depression among caregivers, for which perceived social support may not provide a strong enough effect. Several longitudinal studies have explored whether low perceived social support is associated with depression over time, with conflicting results (e.g., Lakey & Cronin, 2008; Stice, Ragan, & Randall, 2004; Wade &

Kendler, 2000). As with aggression and binge eating, factors moderating the link between PSS and depression are an area of emerging research, and are reviewed below.

Sense of Belonging

Sense of belonging is theorized to encompass the sense of being valued by or important to others, and of fitting in with others based on shared characteristics (Hagerty, Williams, Coyne, & Early, 1996). Among a college student sample, greater sense of belonging was associated with greater total perceived social support and specific perceived support from one's spouse, family, friends and coworkers for both men and women, as well as greater community involvement for women (Hagerty et al., 1996). For both genders, sense of belonging was also associated with less interpersonal conflict, loneliness, anxiety and depression. Individuals who reported a history of psychiatric treatment, suicidal ideation or suicidal attempts all reported lower sense of belonging. Sense of belonging was not related to age, religious attendance, marital status, education, or ethnicity, which suggests that the construct (as assessed with the Sense of Belonging Instrument [SOBI]; Hagerty & Patusky, 1995) reflects an individual's personal sense of belonging to important groups or identities.

Sense of belonging is associated with, but distinct from perceived social support. Whereas sense of belonging captures one's sense of involvement and fit in an environment (Hagerty et al., 1992), perceived social support refers to one's sense that others will be available to help if needed. For instance, an individual with a high perception that others will be available may not necessarily perceive him or herself to be involved in or fit with a broader social group. Although he or she may report high perceived social support, this may not translate to a benefit in terms of reducing mental health symptoms because the individual has internal barriers (i.e., low sense of belonging) that prevent him or her from internally "using" the social support.

In preliminary support of the present study's hypothesis, research has consistently detected that sense of belonging is moderately positively associated with perceived social support (Bozak, 2014), suggesting that they are related but distinct constructs (Lee & Williams, 2013). Some studies have found that sense of belonging is a better predictor of mental and physical health than perceived social support (Choenarom, Williams, & Hagerty, 2005; Hagerty & Williams, 1999). For instance, in a longitudinal study of chronically depressed adults, sense of belonging exhibited a consistent effect on depressive symptoms, whereas overall and spousal perceived social support affected symptoms only indirectly and inconsistently over a nine-month period (Choenarom et al., 2005).

Among college students, sense of belonging was associated with better physical health in women and fewer physical symptoms in men (Hale et al., 2005). Sense of belonging and perceived social support were also positively correlated with each other and with resilience in a college student sample (Bozak, 2014). One mechanism by which sense of belonging is related to such diverse outcomes may be that sense of belonging is related to one's sense of how meaningful life is (Lambert et al., 2013). Lambert and colleagues (2013) demonstrated that college students experimentally primed with belongingness perceive greater meaning in life. Furthermore, the effects remained significant after a three-week delay following priming. Thus, sense of belonging may house the sense that life is meaningful and/or that one's self matters, two constructs that are likely to moderate the effects of perceived social support.

Lee and Williams (2013) found sense of belonging moderated the beneficial effects of perceived social support on depressive symptoms among Korean Americans with a history of parental alcoholism. Although their study used a highly specific population, the other studies finding important associations between sense of belonging and perceived social support suggest

that the moderating effect of sense of belonging on perceived social support and mental health outcomes may occur in a broader population. The current study tests this hypothesis by evaluating how sense of belonging and perceived social support function in a college population.

Aggression, sense of belonging and perceived social support. The studies that have explored sense of belonging with aggression suggest that sense of belonging is negatively correlated with trait aggression. For instance, greater sense of belonging to campus was associated with lower trait aggression college freshmen, for both European American and African American adolescents (Mounts, 2004). In a seven-day study in which participants completed daily diaries for social interactions lasting longer than five minutes, sense of belonging was significantly negatively related to aggression (Bushman, 2010). Further, path modeling identified aggression as an important mediator of the relation between sense of belonging and stress. This suggests that trait hostility partially explains why individuals who report low sense of belonging also report high stress. Given extant findings on the relation between each of the pairs of variables, it is expected that sense of belonging will moderate the beneficial effects of social support.

Binge eating, sense of belonging and perceived social support. Existing studies suggest that sense of belonging is an important component in the development and maintenance of binge eating behavior. For instance, in a qualitative study on women's experiences with BED, participants identified that thoughts or emotions related to low belonging often preceded a binge episode (Sandy, 2007). Participants also identified that they experienced an overall lack of social support, though no conclusions were drawn regarding the relation between social support and sense of belonging. Eating disorder symptoms were also associated with low sense of belonging in a non-clinical, general college student population (Belangee, Sherman, & Kern, 2003). In a

comparison of patients with current and former eating disorder diagnoses, 93% of both current and past patients named sense of belonging when asked to identify “the most important aspects of their life” (De La Rie, Noordenbos, Donker, & Van Furth, 2007, p. 13). Given that this was the most frequently named aspect, and that that nearly all patients identified it, sense of belonging appears to be a highly relevant, but understudied concept in relation to eating disordered behavior.

Sense of belonging to one’s self-reported ethnic identity or culture has been associated with less severe bulimia nervosa symptoms and fewer thinness expectancies among both ethnic minority and non-minority women (Stojek, Fischer, & Collins, 2010). Although this study examined purging as well as binge eating behaviors, it suggests that the same relation may occur when binge eating symptoms are examined independently. The current study will build on the study by Stojek and colleagues by examining if general sense of belonging, rather than a sense of belonging to one’s racial or ethnic identity, is an important factor in binge eating behavior.

Depressive symptoms, sense of belonging and perceived social support. Sense of belonging has been associated with lower overall depressive symptoms (e.g., Sargent, Williams, Hagerty, Lynch-Sauer, & Hoyle, 2002). In addition, sense of belonging buffered the link between stress and depressive symptoms among Navy recruits of college age (mean age of 19.8 years) who had a family history of alcohol abuse, such that recruits with a higher sense of belonging were less likely to develop depressive symptoms relative to recruits with a lower sense of belonging (Sargent et al., 2002). Another study using the same sample found that lower sense of belonging was an overall risk factor for developing depressive symptoms (Williams et al., 2002). Choenarom and colleagues (2005) found that sense of belonging and perceived social

support mediated the relation between stress and depression in the group of depressed adults, but not the group of non-depressed adults.

In a similar study, both perceived social support and sense of belonging were independent buffers of the relation between depressive symptoms and suicidal ideation (McLaren & Challis, 2009). In contrast, Hatcher and Stubbersfield (2013) reviewed 16 studies that explored the links between sense of belonging to suicidality. Their review concluded that while significant negative associations were detected between the two variables, most of the populations sampled were non-clinical and the size of the associations were nominal. Despite the apparently limited effects of sense of belonging on suicidality, findings of the other studies reviewed here indicate that sense of belonging is an important factor when examining depressive symptoms. The present study will further clarify the association between sense of belonging and depressive symptoms, as well as test the relation between perceived social support, sense of belonging and depressive symptoms.

Emotion Regulation

In the current study, emotion regulation is hypothesized to moderate the relation between perceived social support and mental health symptoms. Emotion regulation refers to the processes or strategies that individuals use to moderate their emotional responses to stimuli (Aldao et al., 2010). These processes may or may not be intentional or conscious, and they include internal strategies such as rumination, cognitive reappraisal, and emotional suppression, as well as external behaviors like consuming mood-altering substances, watching television, or seeking support from others (Aldao & Dixon-Gordon, 2014). While it is difficult to assess the utility of an emotion regulation strategy outside of the context in which it occurs (Joormann & D'Avanzato, 2010), efforts to regulate emotion are considered more and less adaptive in regards

to the consequences they tend to produce (Kring & Sloan, 2010). For instance, rumination is associated with heightened anxiety and depressive symptoms and substance use, and is thus considered a maladaptive emotion regulation strategy (Aldao et al., 2010). Adaptive emotion regulation strategies include acceptance and problem solving, as these are negatively associated with symptoms (Kring & Sloan, 2010).

The current study examines two types of emotion regulation, one adaptive (cognitive reappraisal) and the other maladaptive (expressive suppression; Gross & John, 2003). Cognitive reappraisal refers to changing the interpretation or meaning of an event to alter the experience of associated emotions, and expressive suppression refers to inhibiting the display of the behavioral features of an emotion (Gross & John, 2003). The two types of emotion regulation are independent of one another (Gross & John, 2003) and of broad personality traits (e.g., Big Five personality traits; John, Naumann, & Soto, 2008). In a meta-analysis of emotion regulation strategies by psychopathology symptoms, reappraisal demonstrated small to medium effects and was associated with a decrease in psychopathology symptoms, while suppression demonstrated medium to large effects and was associated with an increase in symptoms (Aldao et al., 2010). Marginally stronger effects were detected among adults and in clinical samples, relative to child and adolescent and non-clinical samples, respectively (Aldao et al., 2010).

An emerging body of research explores the interpersonal components of emotion regulation (Marroquín, 2011; Niven, Totterdell, & Holman, 2009). Overall, adaptive emotion regulation seems to be positively related to social variables, while maladaptive emotion regulation demonstrates the opposite association. In a sample of college students, greater use of cognitive reappraisal was associated with experiencing more positive and less negative emotion, more reported close relationships, greater peer-rated likability, higher life satisfaction, and fewer

depressive symptoms (Gross & John, 2003). Frequent use of expressive suppression, on the other hand, is related to experiencing less positive and more negative emotion, fewer reported close relationships, lower life satisfaction, and more depressive symptoms (Gross & John, 2003). As expected, reappraisal was associated with more frequent sharing of one's emotions (both positive and negative) with others, while suppression was associated with less sharing (Gross & John, 2003).

In studies assessing the relation between social support and emotion regulation, it appears that reappraisal is unrelated or positively related to perceived social support while suppression is consistently negatively related to perceived social support (Gross & John, 2003). For instance, frequent use of suppression was linked to lower perceived and received social support, less social closeness, and lower satisfaction with social relationships by the end of the five-month period of transition from high school to college (Srivastava, Tamir, McGonigal, John, & Gross, 2009). In an experimental manipulation, individuals who were instructed to suppress their emotions reported less satisfaction and less desire to be friends with a conversation partner (Butler et al., 2003). While these studies provide important information about the effects of emotion regulation on subsequent social consequences, understanding how the habitual use of emotion regulation strategies may moderate the effects of perceived social support is still emerging. Given that there is likely a bidirectional influence between emotion regulation and social support (Marroquín, 2011), the present study contributes to this understanding by examining whether reappraisal or suppression facilitate or hinder the effects of perceived social support on mental health symptoms.

In the RRT, Lakey and Orehek (2011), as well as other researchers (Hofmann, 2014; Marroquín, 2011), suggest that individual differences in emotion regulation underlie the varying

effectiveness of social support. The present study tests this proposed explanation by examining whether cognitive reappraisal moderates the amount by which one can benefit from PSS. For instance, an individual with the perception that others will be available to support him (i.e., PSS) may not possess the adaptive emotion regulation skills (e.g., cognitive reappraisal) to benefit from that support. It is expected that individuals with infrequent use of cognitive reappraisal will report higher levels of mental health symptoms even if PSS levels are moderate-to-high. Similarly, individuals who report high habitual use of expressive suppression are expected to be more limited in their reported benefits from PSS, as demonstrated by higher symptoms.

Aggression, emotion regulation and perceived social support. Emotion regulation is hypothesized to function as a predictor of aggression as well as a moderator of the effects of aggression (Robertson, Daffern, & Bucks, 2012; Röll, Koglin, & Peterman, 2012). For instance, difficulty attending to emotions was associated with more extensive histories of aggression among inmates, even after controlling for trait anger and the ability to modulate the external expression of anger (Robertson, Daffern, & Bucks, 2015). In a clinical population, the association between Borderline Personality Disorder symptoms and physical aggression was fully mediated by difficulties with emotion regulation (Scott, Stepp, & Pilkonis, 2014). Similarly, strong associations between the use of maladaptive emotion regulation strategies and aggression have been detected in the general population. For instance, men were more likely to abuse their partners when they had greater difficulty with emotion regulation (Tager, Good, & Brammer, 2010). Adolescents who had difficulty regulating emotions such as sadness and anger were more likely to report aggression (Sullivan, Helms, Kliever, & Goodman, 2010). Among adolescent girls, lower overall emotion regulation was associated with subsequent relational aggression, which is behavior intended to harm others through relationships (e.g., exclusion;

Bowie, 2010). Among adolescent boys, rumination was associated with greater aggressive behavior over time and fully mediated the association between anxiety and aggression (McLaughlin, Aldao, Wisco, & Hilt, 2014).

Within the college student population, a number of studies demonstrate that emotion regulation difficulties are associated with greater aggression in the context of dating or intimate partner relationships. For instance, college students who used less cognitive reappraisal were more verbally or physically aggressive to their romantic partners (Stappenbeck & Fromme, 2014). Greater rumination has also been associated with higher intimate partner aggression (IPA) among college men (Panuzio, 2012). In an experimental task, participants behaved more aggressively towards their romantic partners if instructed to suppress their emotions rather than reappraise them (Panuzio, 2012).

Few studies have examined aggression in conjunction with emotion regulation and social support. Dollar and Stifter (2012) found that emotion regulation moderated the relation between frequent experiences of anger and sadness and aggression in children, and that children high in anger who actively sought social support displayed less aggression than their low social support seeking peers. Another recent study identified maternal criticism indirectly linked emotion dysregulation and aggression among adolescents (Skripkauskaite et al., 2015). Although these studies did not examine whether emotion regulation moderated the effects of perceived social support, the evidence suggests there may be important moderating relations among these variables, at least for children and adolescents. The present study extends this research by testing whether emotion regulation moderates the relation between perceived social support and aggression in a college population.

Binge eating, emotion regulation and perceived social support. In a meta-analysis of emotion regulation strategies by psychopathology symptoms, eating disorders were negatively associated with problem solving and reappraisal and positively associated with avoidance, rumination, and suppression (Aldao et al., 2010). While individuals across eating disorder diagnoses tend to use more suppression and less reappraisal than their peers, there have been reported differences between diagnoses (Danner, Sternheim, & Evers, 2014). Individuals diagnosed with BED used less cognitive reappraisal than individuals diagnosed with anorexia (Danner et al., 2014). BED is a new addition to *The Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM-5*; APA, 2013), and unsurprisingly has been least researched among eating disorders. However, several theories include emotion regulation as an important component in understanding binge eating, positing that the use of maladaptive emotion regulation strategies increases the likelihood of binge eating for instance (Selby & Joiner, 2009). Consistent with this theory, rumination, self-criticism, drinking alcohol, and thought avoidance have been associated with more binge eating symptoms (Aldao & Dixon-Gordon, 2014). Among college students specifically, the relation between stress and binge eating behavior was partially mediated by maladaptive emotion regulation strategies (i.e., emotion-focused coping; Sulkowski, Dempsey, & Dempsey, 2011).

There is also evidence that the use of adaptive emotion regulation strategies (i.e., problem solving) reduces the likelihood of binge eating (Aldao & Dixon-Gordon, 2014). In an experimental study on the effects of emotion regulation on subsequent caloric intake, both individuals diagnosed with BED and overweight individuals without a BED diagnosis consumed more calories after instructions to suppress their emotions, as compared to the group instructed to use cognitive reappraisal (Svaldi, Tuschen-Caffier, Trentowska, Caffier, & Naumann, 2014).

Yet on reports of habitual emotion regulation strategies, individuals diagnosed with BED reported lower reappraisal and higher suppression than the group that did not meet BED criteria. A pilot study that taught adaptive emotion regulation strategies to individuals diagnosed with BED also reported clinically significant improvements in number of binge eating episodes, body dissatisfaction and depressive symptoms (Svaldi, Trentowska, Bender, Naumann, & Tuschen-Caffier, 2014). These studies indicate that emotion regulation strategies can have both a beneficial and exacerbating effect on binge eating, depending on the type of strategy employed. Thus, in the present study, reappraisal is expected to enhance the effect of perceived social support by being associated with decreased binge eating, while suppression is hypothesized to diminish the effect of perceived social support on binge eating symptoms by being associated with increased binge eating.

Depressive symptoms, emotion regulation and perceived social support. Much evidence has established the importance of emotion regulation in the etiology, maintenance, and improvement of depressive symptoms (Berking & Wupperman, 2012; Joormann & D'Avanzato, 2010). Results of a meta-analysis of studies with mostly non-clinical samples indicated that depressive symptoms are negatively associated with acceptance and problem solving and positively associated with avoidance, rumination, and suppression (Aldao et al., 2010). Specific to college students, suppression (Flynn, Hollenstein & Mackey, 2010; Gross & John, 2003) was associated with greater depressive symptoms, while acceptance (Flynn et al., 2010) and reappraisal (Gross & John, 2003) were associated with fewer depressive symptoms. Compared to non-clinical controls, individuals diagnosed with Major Depressive Disorder reported more rumination, catastrophizing, and blaming self and others, and less positive reappraisal and putting things in perspective strategies (Lei et al., 2014). Increases in the use of cognitive

reappraisal are associated with greater reduction in depressive symptoms among inpatients undergoing Cognitive Behavioral Therapy (Forkmann et al., 2014). Improvements in cognitive reappraisal and reductions in emotional suppression have also been reported by depressed patients who clinically improved following an eight-week course of antidepressant medication (McRae, Rekshan, Williams, Cooper, & Gross, 2014). While it cannot be concluded that these changes in emotion regulation strategies caused the improvements in depressive symptoms within these studies, the consistently detected changes between emotion regulation strategy and depressive symptoms suggest there is a strong relation between these variables.

Given the established beneficial effects of perceived social support on depression, the present study will test whether emotion regulation will enhance or detract from the effects of perceived social support on depressive symptoms. Existing studies found that use of cognitive reappraisal moderated the relation between stress and depression in a community sample of women (Troy, Wilhelm, Shallcross, & Mauss, 2010). In another community sample of women, perceived social support moderated the relation between rumination and depressive symptoms (Turner & McLaren, 2011). As evidence indicates that reappraisal is associated with decreased depressive symptoms and suppression is associated with increased depressive symptoms, it is expected in the present study that individuals with high use of reappraisal will benefit more from perceived social support in terms of lower reported depressive symptoms. On the other hand, it is expected that individuals with high use of suppression will report attenuated effects of perceived social support, in terms of higher reported depressive symptoms.

Differences by Race/Ethnicity

An additional research question in the current study concerns differences in the aforementioned variables among African American and European American college students.

Differences in social support have sometimes, but not always, varied by race. For instance, a community sample of women indicated no differences between the amount and satisfaction with social support from family and friends among African American and European American women (Griffin, Amodeo, Clay, Fassler, & Ellis, 2006), and rumination was associated with a higher likelihood of binge eating among both African American and Caucasian college women (Mason & Lewis, 2016). However, the function of social support may differ for African American and European American students. After controlling for socioeconomic status, African American youths reported more depressive symptoms than European American youths, but only among European American youths were depressive symptoms buffered by greater perceived family emotional support (Miller & Taylor, 2012). A similar relation was detected in a community sample in which European American young adults reported a stronger stress-buffering relation between depressive symptoms and perceived social support than African American young adults (Gayman, Cislo, Goidel, & Ueno, 2014).

The inverse relation was detected in a longitudinal study of depressive symptoms among caregivers for Alzheimer's patients, in which increases in perceived social support buffered the effects of stress for both African American and European American caregivers, while decreases in perceived social support were associated with greater depressive symptoms for European American but not African American caregivers (Brummett, Siegler, Williams, Hilliard, & Dilworth-Anderson, 2012). Path modeling suggested that the differences between effects of perceived social support and stress may be mediated by personal control for European American but not African American adults (Lincoln, Chatters, & Taylor, 2003). Also, Mason and Lewis (2016) found differences in binge eating and social support among African American and Caucasian college women; family support was associated with a lower likelihood of binge eating

for African American women, but a higher likelihood of binge eating for Caucasian women, while support from friends was linked to lower likelihood of binge eating among Caucasian women but not African American women.

The present study examines differences in perceived social support among African American and European American college students, and tests whether the relations between perceived social support, sense of belonging, and the three study outcomes differ by race. Although many studies have examined the importance of sense of belonging in relation to racial, ethnic, and cultural identities (e.g., Thomas, Wolters, Horn, & Kennedy, 2013), few have examined differences in sense of belonging between racial groups. Among retained STEM majors, sense of belonging did not differ by student's race (i.e., European American, Asian American, African American, or Latino American; Chang, Sharkness, Hurtado, & Newman, 2014). However, sense of belonging appears to fluctuate more among racial minority students compared to European American students, and is more adversely impacted by experiences with discrimination among racial minority students (Mallett et al., 2011). Given the limited extant information on racial differences in sense of belonging, the present study will test whether the relations between social support, sense of belonging, and the three mental health outcomes differ by race among African American and European American college students.

Clinical research documents differences in beliefs about emotions and responses to emotions by race and ethnicity (van Loon, van Schaik, Dekker, & Beekman, 2013), but studies that examine differences in emotion regulation by race are limited. Existing research indicates European American individuals tend to express more emotion (i.e., use less suppression) than other racial or ethnic groups (English & John, 2013). For instance, European American women displayed and reported more anger than Asian-American women in a laboratory task, though the

two groups of women did not differ on physiological measures of anger (Mauss, Butler, Roberts, & Chu, 2010). Beliefs about emotion control partially mediated the differences in reported and displayed anger between these two groups, which suggests that emotion regulation strategies may vary by cultural values. European American college students also reported less expressive suppression than African American, Hispanic-American, and Asian-American students, although African American students constituted between only 2-5% of participants in the four samples used (Gross & John, 2003). In a community sample, use of suppression accounted for differences in trait anger and eliminated racial discrepancies in reported anger among European American and African American women (Consedine, Magai, Horton, & Brown, 2012).

Differences in reappraisal have been less studied than differences in suppression. In one study, there were no differences in reported reappraisal among African American, Hispanic-American, Asian-American, and European American college students (Gross & John, 2003). Differences were identified between non-depressed Turkish women residing in Germany, who reported frequent use of both suppression and reappraisal, and non-depressed German women, who reported high use of reappraisal only (Arens, Balkir, & Barnow, 2013). However, depressed German women and depressed Turkish women both reported low use of reappraisal and high use of suppression. The present study expands this area of research by testing whether the relations between perceived social support, emotion regulation, and the three mental health outcomes differ for European American and African American students.

The Current Study and Hypotheses

The purpose of the present study is to expand the existing understanding of perceived social support in relation to aggression, binge eating, and depressive symptoms. Based on the Relational Regulation Theory, the benefits of PSS vary with individual characteristics. This

study tests whether three internal factors (i.e., sense of belonging, cognitive reappraisal and expressive suppression) moderate the relation between PSS and three types of mental health symptoms in order to better understand what makes perceived social support effective and for whom. Based on this rationale and the extant findings outlined above, a conceptual model was developed that anticipates the moderating effects of sense of belonging and emotion regulation on the relation between perceived social support and mental health outcomes (see Figure 1). The present study tested the model, which predicted that the relation of perceived social support to mental health outcomes depends on the level of moderating factors (i.e., sense of belonging, emotion regulation) as depicted in Figure 2. Analyses tested the following hypotheses:

- H1. Perceived social support will be negatively related to mental health symptoms. Sense of belonging (H1.a.) and adaptive emotion regulation (i.e., cognitive reappraisal; H1.b.) will be negatively related to mental health symptoms. Maladaptive emotion regulation (i.e., expressive suppression; H1.c.) will be positively related to mental health symptoms.
- H2. Sense of belonging will moderate the relation between perceived social support and mental health symptoms, such that greater sense of belonging will be associated with a stronger negative relation between perceived social support and mental health symptoms.
- H3. Adaptive emotion regulation (i.e., cognitive reappraisal) will moderate the relation between perceived social support and mental health symptoms, such that more frequent reappraisal will be associated with a stronger negative relation between perceived social support and mental health symptoms.

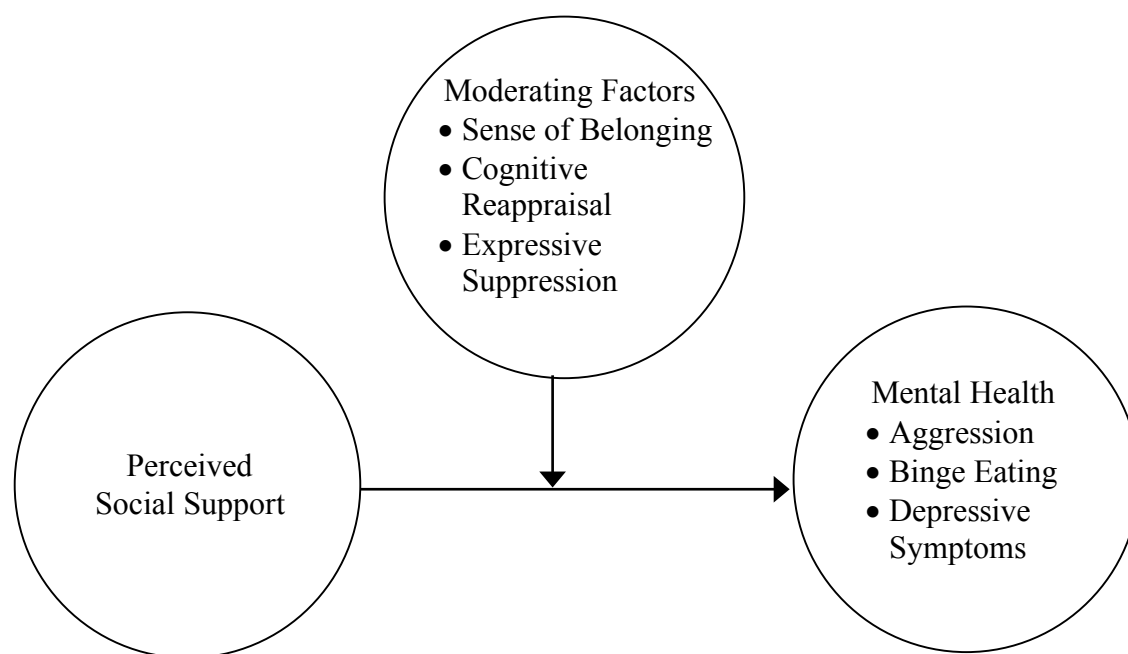


Figure 1. Conceptual Model of the Moderating Effects of Sense of Belonging and Emotion Regulation on the Relation between Perceived Social Support and Mental Health Outcomes

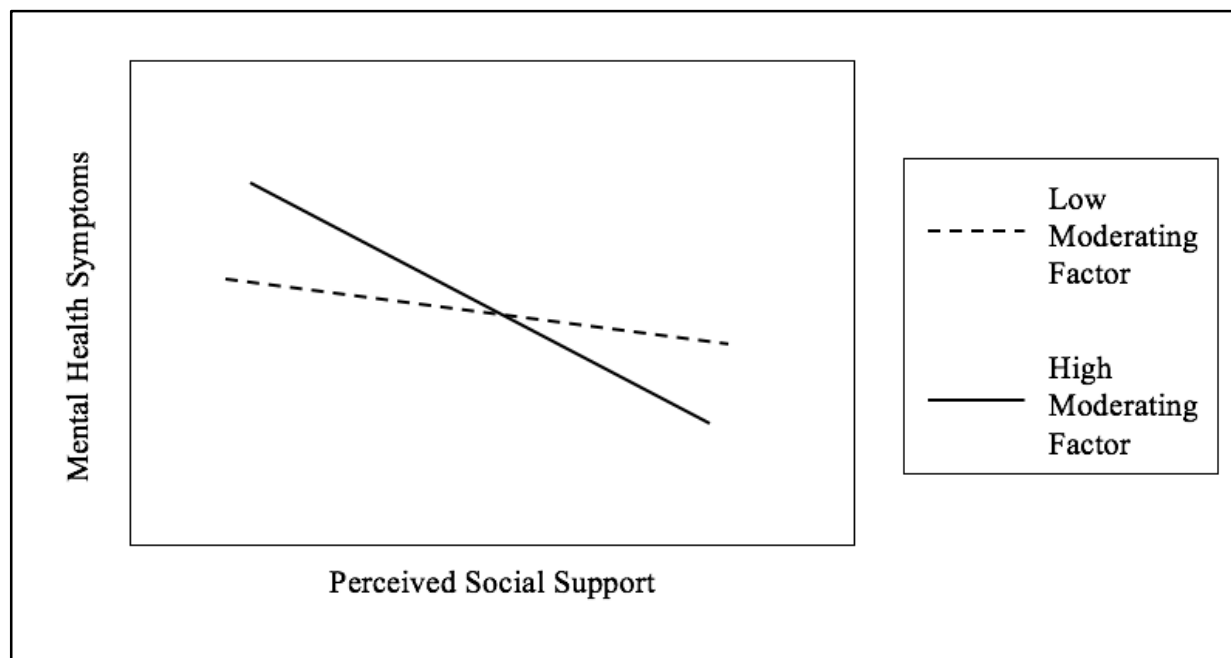


Figure 2. Hypothesized Interaction of the Moderating Effect of Sense of Belonging and Emotion Regulation on the Relation between Perceived Social Support and Mental Health Outcomes

H4. Maladaptive emotion regulation (i.e., expressive suppression) will moderate the relation between perceived social support and mental health symptoms, such that less frequent suppression will be associated with a stronger negative relation between perceived social support and mental health symptoms.

The following research question was also tested:

RQ1: Are there different relations among the variables by race (i.e., between European American students and African American students)? Given the limited extant literature, no directions were hypothesized.

CHAPTER II

METHOD

Participants

Participants in this study were undergraduate students completing psychology courses at a large university in the mid-Atlantic United States. Because sense of belonging and perceived social support are likely to differ over the lifespan (Friedman, 2007), the present study was restricted to a young adult, college population and only students between the ages of 18 and 25 were eligible to participate. To determine the minimum sample size required for the present study, a power analysis for the anticipated multiple regression models was conducted using Power Analysis and Sample Size software (PASS 13; Hintze, 2014). Although there is disagreement regarding the necessity of using an alpha correction when performing multiple analyses simultaneously (Garamszegi, 2006), a Bonferroni correction was used to conservatively set the alpha level for each individual analysis at $\alpha = .05/9 = .006$ (Rice, 1989). With an α of .006, a sample size of 374 participants achieved a power of .80 (Cohen, 1992) to detect an R^2 of 0.05 with seven independent variables and four covariates. This was a conservative estimate of effect size based on reported effect sizes of the study variables in previous studies.

A total of 549 participants completed the study. Given incorrect responses to one or more of the four embedded validity items, 111 (20.22%) participants were identified and removed from the dataset. Data were then examined for missing values. Three participants were dropped from the study sample for missing more than 25% of the data for any individual scale. As only two students indicated their relationship status as divorced, these participants were also dropped from analyses as the interpretation of their results would be unclear, resulting in a final sample size of 433 students. For participants missing less than 25% of item responses ($n = 11$), the

missing scores were imputed following confirmation that data were missing at random (X^2 (715, $N = 438$) = 719.00, $p = .451$).

The demographic characteristics of the sample are displayed in Table 1. Participants' ages ranged from 18 to 25 years old, with a mean age of 20.3 years. The sample was predominantly European American (44.6%) and African American (35.3%), which reflects the approximate racial composition of the university. The sample represented roughly equal proportions of students from each academic year. Over twice as many female students (70.4%) than male students participated, and most students (80.4%) reported their relationship status as single. The marital status of participants' biological parents was mostly married (54.3%) and separated or divorced (28.9%), though parental marriage rates differed by race, as 62.7% of European American students reported their biological parents as married, while 41.8% of African American students reported the same. Mean Body Mass Index (BMI) was within the normal weight range for the European-American sample, and slightly within the overweight range for the African-American sample.

Measures

Demographic questionnaire. Participants were asked to report demographic information which was used to control for demographic differences that could potentially affect the variables of interest. Demographic questions inquired about age, gender, year in school, race, ethnicity, relationship status, parents' marital status, family's income, and highest educational level attained by parents (see Appendix B). Items also assessed participants' self-reported height and weight to permit the calculation of BMI.

Perceived social support. The Interpersonal Support Evaluation List (ISEL; Cohen & Hoberman, 1983; see Appendix C) is a 40-item self-report measure that evaluates overall

Table 1

Demographic Information for the Total Sample and African-American and European-American Subsamples

Variable	African American (<i>n</i> = 153)	European American (<i>n</i> = 193)	Total (<i>N</i> = 433)
Gender			
Male	40 (26.1%)	57 (29.5%)	128 (29.6%)
Female	113 (73.9%)	136 (70.5%)	305 (70.4%)
Academic Year			
Freshman	45 (29.4%)	47 (24.4%)	120 (27.7%)
Sophomore	37 (24.2%)	42 (21.8%)	97 (22.4%)
Junior	35 (22.9%)	42 (21.8%)	99 (22.9%)
Senior	36 (23.5%)	62 (32.1%)	117 (27.0%)
Mean Age (Years)	20.09 (1.98)	20.53 (2.15)	20.26 (2.03)
Relationship Status			
Single	128 (83.7%)	145 (75.1%)	348 (80.4%)
In A Relationship	25 (16.3%)	48 (24.9%)	85 (19.6%)
Body Mass Index (BMI)			
Underweight	5 (3.3%)	9 (4.7%)	19 (4.4%)
Normal weight	80 (52.3%)	117 (60.6%)	248 (57.3%)
Overweight	48 (31.4%)	39 (20.2%)	106 (24.5%)
Obesity	20 (13.1%)	28 (14.5%)	60 (13.9%)

Table 1 Continued

Variable	African American (<i>n</i> = 153)	European American (<i>n</i> = 193)	Total (<i>N</i> = 433)
Parent Marital Status			
Single/Never Married	31 (20.3%)	3 (1.6%)	47 (10.9%)
Cohabiting or in a Committed Relationship	3 (2.0%)	1 (0.5%)	6 (1.4%)
Married	64 (41.8%)	121 (62.7%)	235 (54.3%)
Separated or Divorced	48 (31.4%)	59 (30.6%)	125 (28.9%)
Widowed	6 (3.9%)	9 (4.7%)	18 (4.2%)
Other	1 (0.7%)	0 (0.0%)	2 (0.5%)
Highest Parent Educational Attainment			
Did not Graduate from High School	4 (2.6%)	0 (0.0%)	9 (2.1%)
High School Graduate or GED	24 (15.7%)	19 (9.8%)	56 (12.9%)
Some College	39 (25.5%)	42 (21.8%)	102 (23.6%)
Associate's Degree	18 (11.8%)	19 (9.8%)	44 (10.2%)
Bachelor's Degree	39 (25.5%)	62 (32.1%)	124 (28.6%)
Graduate Degree	29 (19.0%)	51 (26.4%)	98 (22.6%)

Table 1 Continued

Variable	African American (<i>n</i> = 153)	European American (<i>n</i> = 193)	Total (<i>N</i> = 433)
Annual Family Income			
Less than \$20,000	13 (8.5%)	9 (4.7%)	30 (6.9%)
\$20,000 to \$40,000	33 (21.6%)	17 (8.8%)	68 (15.7%)
\$40,000 to \$60,000	49 (32.0%)	55 (28.5%)	128 (29.6%)
\$60,000 to \$100,000	44 (28.8%)	63 (32.6%)	135 (30.9%)
More than \$100,000	14 (9.2%)	49 (25.4%)	73 (16.9%)
Race			
European American			193 (44.57%)
African American			153 (35.33%)
Latino/a			17 (3.93%)
Asian American, Native Hawaiian, or Pacific Islander			30 (6.93%)
American Indian or Alaska Native			2 (0.46%)
Multiracial			32 (7.39%)
Other			6 (1.39%)

perceived social support. Sample items include: “I feel that there is no one I can share my most private worries and fears with” and “If I wanted to have lunch with someone, I could easily find someone to join me.” Responses are on a four-point Likert-style scale, ranging from 0 (*definitely false*) to 3 (*definitely true*). Half of the items are negative statements counterbalanced for social desirability; these items are reverse scored. The overall support score is calculated by summing all items. Possible scores range from 0 to 120, with higher scores indicating greater perceived social support. Items assess four subtypes of perceived social support, which are summed to produce a global measure of perceived social support: appraisal (i.e., emotional) support, belonging (i.e., companionship) support, tangible (i.e., instrumental) support, and self-esteem (i.e., validation) support.

The ISEL was developed by generating items based on hypothesized supportive social functions for college students (Cohen & Hoberman, 1983). Initial evaluation of the measure was tested with two independent samples totaling 352 college students. Adequate test-retest reliability was reported ($r = .70$) over a four-week time period (Cohen, Mermelstein, Kamarck, & Hoberman, 1985). The total ISEL score demonstrated excellent internal consistency in other college student samples (Cronbach’s $\alpha = .91, .92$; Bauman, Haaga, Kaltman, & Dutton, 2012; Rogers, Anthony, & Lyass, 2004). The Cronbach’s alpha for the ISEL was .95 in the current study.

Perceived social support measured with the ISEL total score buffered the relation between life stress and depressive symptoms in another college student sample (Cohen & Hoberman, 1983). Evidence for convergent validity was observed in that study, in that higher ISEL scores were positively correlated with past frequency of support. ISEL scores were negatively correlated with social anxiety, depressive symptoms, and physical symptoms.

Sense of belonging. The Sense of Belonging Instrument – Psychological State (SOBI-P; see Appendix D) is an 18-item subscale of the Sense of Belonging Instrument (SOBI; Hagerty & Patusky, 1995). The SOBI-P measures the psychological perception and experience of belonging, while the other subscale, Antecedents (SOBI-A), measures the desire for and ability to develop a sense of belonging. Given psychometric concerns with the SOBI-A, and the focus of the present study, only the SOBI-P was used, consistent with other studies (Turner & McLaren, 2011). Sample items of the SOBI-P include: “I am uncomfortable that my background and experiences are so different from those who are usually around me” and “I generally feel that people accept me.” Responses are on a four-point Likert-style scale, ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). The overall score is calculated by summing the items after reverse scoring all items except item 4, so that higher scores indicate greater sense of belonging. Possible SOBI-P scores range from 18 to 72.

The SOBI was developed by administering an initial measure of 49 items to 379 community college students (Hagerty & Patusky, 1995). Items were initially selected by a panel of seven experts on sense of belonging, which was operationally defined as comprising two components: feeling involved, valued, needed, or accepted, and sense that one’s characteristics fit within a system or environment. Using the college sample, items with low correlation to other items were removed and factor analysis by the authors identified a two-factor solution consistent with a priori hypotheses that explained 37% of the variance. This narrowed the measure into the two scales, SOBI-P and SOBI-A with a total of 27 items. The correlation between the two subscales was $r = .45$, suggesting that each reflect distinct dimensions of one general construct. The SOBI-P demonstrated excellent internal consistency, with Cronbach’s alphas of .91 to .93 for samples of nuns, depressed individuals, and college students. The Cronbach’s alpha for the

SOBI was .95 in the current study. Test-retest reliability of the SOBI-P was good (.84) over an 8-week period with a college student sample (Hagerty & Patusky, 1995).

Construct validity was established by contrasting scores on groups hypothesized to have higher and lower sense of belonging. Consistent with hypotheses, SOBI-P scores were higher for nuns, who were theorized to experience high sense of belonging given their involvement in a close-knit religious vocation, and lower for depressed individuals, who were theorized to feel less connected to their social environment, while college students reporting moderate ranges (Hagerty & Patusky, 1995). To evaluate convergent validity, the authors compared SOBI-P scores to loneliness, social reciprocity, and perceived social support measures for the college sample. As expected, scores were significantly negatively correlated with the loneliness measure, and significantly positively correlated with perceived social support and social reciprocity measures. The correlation coefficients for the relation between perceived social support and SOBI-P ranged from $r = .42$ to $.58$, indicating that sense of belonging and perceived social support are related but separate constructs. Among college students, sense of belonging as measured by the SOBI is positively related to perceived social support and resilience (Bozak, 2014). SOBI-P scores were also associated with higher quality of life and lower overall mental health symptoms (measured by the Symptom Checklist-90 Revised [SCL-90]; Derogatis, Lipman, Rickels, Uhlenhuth, & Covi, 1974), for college students (Jones, 2010). Sense of belonging measured by the SOBI is also associated with more secure attachment (Yael, 2004) and mediated the relation between stress and depressive symptoms (Choenarom et al., 2005) among adult populations.

Emotion regulation. The Emotion Regulation Questionnaire is a 10-item measure that assesses routine use of two emotion regulation strategies, cognitive reappraisal and expressive

suppression (ERQ; Gross & John, 2003; see Appendix E). Sample items of the ERQ include: “I control my emotions by not expressing them” (expressive suppression) and “When I want to feel less negative emotion, I change the way I’m thinking about the situation” (cognitive reappraisal). Responses are on a seven-point Likert-style scale, ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Each subscale is calculated by summing the respective items for cognitive reappraisal and expressive suppression. The reappraisal subscale has 6 items, with possible scores ranging from 6 to 42. The suppression subscale has four items, with possible scores ranging from 4 to 28. Higher scores indicate more frequent use of each respective strategy.

Items for the ERQ were developed rationally, to ensure that the intended emotion regulation constructs were not confounded with other emotion regulation strategies (Gross & John, 2003). The constructs of each strategy were previously developed and documented in laboratory research that experimentally manipulated the use of each strategy and assessed the short-term effects of their use. The purpose of the ERQ was to develop a measure that assesses the longer-term and real-life consequences of the routine use of each of these emotion regulation approaches. The correlation between the two subscales ranged from $r = -.06$ to $.06$, suggesting that each reflect distinct emotion regulation strategies, as intended. This was confirmed by exploratory and confirmatory factor analyses using four independent samples of college students that totaled 1,483 respondents. Items loaded on to the intended scale and a scree test consistently indicated two separate factors. Individuals frequently using one type of emotion regulation were no more or less likely to use the other type. Together, the factors accounted for over 50% of the variance. Factor structures did not differ for men and women, although men did report higher use of suppression, consistent with male gender norms regarding emotional expression. Across a three-month time span, test-retest reliability was $.69$. Reappraisal has previously demonstrated

acceptable to good internal consistency (Cronbach's $\alpha = .77$ to $.82$) and suppression has demonstrated acceptable internal consistency ($.68$ to $.76$). In the current study, the Cronbach's alpha was $.86$ for the reappraisal scale and $.78$ for the suppression scale.

Convergent validity was initially established for each of the scales by testing hypothesized relations with other variables, based on findings from experimental studies (Gross & John, 2003). As expected, more use of reappraisal was associated with greater experience and expression of positive emotion, lesser experience and expression of negative emotion, and better interpersonal functioning and greater well-being. The suppression scale also performed as hypothesized, as more use of suppression was associated with lesser experience and expression of positive emotion and greater experience (but not expression) of negative emotion, and poorer interpersonal functioning and poorer well-being. Reappraisal was also positively related to reinterpretation and improved mood, and negative related to rumination. Suppression was negatively related to venting, reinterpretation, and negative mood regulation, and positively related to rumination. Neither scale was related to social desirability or unrelated constructs, such as cognitive ability.

Others have replicated the ERQ's strong fit using a two-factor model and found comparable rates of reliability and validity with an independent U. S. college student sample (Melka, Lancaster, Bryant, & Rodriguez, 2011). With an international sample of 3,018 college students from 23 countries, confirmatory factor analyses replicated the original findings from Gross and John (2003) regarding the stability of the two-factor structure (Matsumoto, Yoo, & Nakagawa, 2008). Internal consistency rates for each scale were acceptable (Cronbach's α for reappraisal = $.75$, suppression = $.68$; Matsumoto et al., 2008). Dropping item three ("When I want to feel less *negative emotion* (such as sadness or anger), I change what I'm thinking about")

meaningfully improved fit for the two intended factors in a community sample (Spaapen, Waters, Brummer, Stopa, & Bucks, 2014). However, since the current study focused on a college student population, and multiple studies have confirmed the use of the full ERQ with the college population, all 10 items were used.

Aggression. The 12-item short form of the Buss-Perry Aggression Questionnaire (BPAQ-SF; Bryant & Smith, 2001; see Appendix F) is a derivative of the original 29-item self-report Aggression Questionnaire (AQ; Buss & Perry, 1992) that evaluates dispositional aggression. Sample items of the BPAQ-SF include: “I have trouble controlling my temper” and “At times I feel I have gotten a raw deal out of life.” Responses are on a six-point Likert-style scale, ranging from 1 (*extremely uncharacteristic of me*) to 6 (*extremely characteristic of me*). Items are summed so that higher scores indicate greater aggression. Possible scores range from 12 to 72.

To develop the BPAQ-SF, Bryant and Smith (2001) tested four existing alternative measurement models of the AQ using confirmatory factor analysis and found poor fit across three independent samples of data. The authors dropped items with low or multiple loadings and reverse-scored wording. The new 12-item measure was administered to a sample of 1,154 college-aged respondents; this model had acceptable goodness-of-fit ($GFI = .94$) with the college sample and across two additional samples of British ($GFI = .93$) and Canadian ($GFI = .94$) respondents. Furthermore, this model better reflected Buss and Perry’s (1992) original four-factor structure of physical and verbal aggression, anger, and hostility. Factor structures were equivalent for males and females in all three samples. Internal consistency for each of the factors of the BPAQ-SF were acceptable to good, and in the same range as the original AQ: Physical Aggression (Cronbach’s $\alpha = .79$ and $.80$), Verbal Aggression ($.83$ and $.80$), Anger ($.76$

and .76), and Hostility (.75 and .70). Construct validity was established for each of the four factors by demonstrating strong positive relations with other measures of each of the four factors (e.g., the items loading on Anger were positively associated with scores on the Anger Arousal subscale of the Multidimensional Anger Inventory [MAI; Siegel, 1986]). The authors conclude that the BPAQ-SF is not only shorter, but demonstrates greater reliability and validity when assessing the four subcomponents of aggression than the AQ.

Comparable rates of reliability and validity were detected in an inmate population (Diamond & Magaletta, 2006), a nationally representative sample of the U.S. population, and a college sample (Kalmoe, 2015). As further evidence for convergent validity, the BPAQ-SF was associated with violent political attitudes among the general US population (Kalmoe, 2015). Among the inmate population, the Aggression subscales of the Personality Assessment Inventory ([PAI]; Morey, 1991) were associated with higher BPAQ-SF scores (Diamond & Magaletta, 2006). Evidence for concurrent validity was also observed; higher scores on the BPAQ-SF were also associated with a history of violence, head injury, abuse in childhood, and living in foster care as a child, as expected among the inmate population (Diamond & Magaletta, 2006). The Cronbach's alpha for the BPAQ-SF was .90 in the current study.

Binge eating. The Binge Eating Scale is a 16-item measure that assesses the behavioral, affective and cognitive components of binge eating (BES; Gormally et al., 1982; see Appendix G). Sample items of the BES include: "I feel utterly helpless when it comes to feeling in control of my eating urges" and "At times, I tend to eat quickly and then, I feel uncomfortably full afterwards." Each item consists of three to four possible responses that describe behaviors, feelings, and thoughts associated with binge eating. Each response has an assigned score ranging from 0 (*indicates no binge eating problem*) to 3 (*reflects severe binge eating problems*). For

example, responses for item six range from “I don’t feel any guilt or self-hate after I overeat” to “Almost all the time I experience strong guilt or self-hate after I overeat”. Each response is given a score of 0, 1, 2 or 3 based on severity of symptoms, and responses are summed so that higher scores indicate more frequent and severe binge eating. Possible scores range from 0 to 46.

The BES was developed by determining the characteristics of binge eating and creating statements that reflected varying levels of severity of binge eating characteristics (Gormally et al., 1982). The authors developed external criteria by comparing ratings of binge eating severity by trained interviewers to self-reports. As anticipated, groupings using the BES scores were consistent with interviewer ratings and were significantly different across three categories: none, moderate, and severe. The BES has previously demonstrated good internal consistency (Cronbach’s $\alpha = .89$; Freitas, Lopes, Appolinario, & Coutinho, 2006). In the current study, the Cronbach’s alpha for the BES was .87.

Convergent validity has been demonstrated by associations between the BES and unrealistically strict diets and expectations that one cannot adhere to the diet, two features that have been associated with binge eating (Gormally et al., 1982). Among college students, scores on the BES were associated with greater cognitive restraint of eating and body dissatisfaction (Napolitano & Himes, 2011). Further, being overweight or obese was associated with, but distinct from, high BES scores, consistent with Binge-Eating Disorder criteria (APA, 2013). Compared with data from food journals, the BES was an accurate indicator of uncontrolled eating, separate from consuming a high number of calories (Timmerman, 1999).

Depressive symptoms. The Center for Epidemiologic Studies Depression Scale is a 20-item measure that assesses affective, but also behavioral and cognitive symptoms of depression

over the past week (CES-D; Radloff, 1977; see Appendix H). Symptoms assessed include depression, irritability, loss of pleasure, low self-worth, decreased concentration, fatigue, sadness, and feeling rejected by others. Sample items of the CES-D include: “I felt sad” and “I had trouble keeping my mind on what I was doing.” Responses are on a four-point Likert-style scale, ranging from 0 (*rarely or none of the time [less than 1 day]*) to 3 (*most or all of the time [5-7 days]*). The overall score is calculated by summing all items after reverse scoring items 4, 8, 12, and 16, so that higher scores indicate more depressive symptoms. Possible scores range from 0 to 60.

The CES-D was developed by selecting items from other previously validated measures of depressive symptoms (Radloff, 1977). The CES-D has been extensively used with a variety of populations and has evidence of good construct validity. For instance, the CES-D demonstrates high correlations with related constructs, including negative affect, experiencing negative events in the past year, and other measures of mental health symptoms, while it does not correlate highly with unrelated constructs, such as positive affect and aggression (Radloff, 1977). Among college students, the CES-D correlates highly ($r = .86$) with the Beck Depression Inventory (BDI [Beck, Ward, Mendelson, Mock, & Erbaugh, 1961]; Santor, Zuroff, Ramsay, Cervantes, & Palacios, 1995). The CES-D has good internal consistency in the general population, ($\alpha = .85$), and excellent internal consistency in an inpatient psychiatric population ($\alpha = .90$; Radloff, 1977). Internal consistency remained good with adolescents and young adults ($\alpha = .79$ to $.87$; Radloff, 1991). In the present study, the Cronbach’s alpha for the CES-D was .91.

As evidence for the concurrent validity of this measure, the CES-D accurately identified depressed and non-depressed adolescents and young adults at rates consistent with population prevalence rates (Radloff, 1991). In addition, decreases in CES-D scores after four weeks of

treatment discriminated between “recovered” and “still ill” groups of adults (Radloff, 1977). As expected for a state-based measure of depressive symptoms, test-retest reliability was modest ($r = .54$), with lower correlations over time (Radloff, 1977). Olino et al. (2012) recommend using the CES-D over the BDI to measure depression severity in a nonclinical sample, given that the CES-D detects a wider range of depressive symptoms.

Procedure

Study participation was offered to undergraduate psychology students via a web-based research participation system from October to November 2014. Students were provided with research credit or extra credit in their psychology course in exchange for their participation in the study, using research identification numbers not connected to the students’ identifying information.

All measures were administered to participants using the Qualtrics Online Survey Platform. After reading a notification form providing information about the study and informed consent (see Appendix A), participating students responded to the previously described series of self-report measures inquiring about their demographic information, perception of social support, sense of belonging, emotion regulation, aggression, binge eating behaviors, and depressive symptoms. To prevent effects of fatigue, measures were presented in a random order with demographic information always presented at the beginning. The present study was approved by the college committee on human subjects’ research at the participating university prior to data collection.

CHAPTER III

RESULTS

Prior to the analyses for the main hypotheses, descriptive statistics for primary variables were calculated and distribution shape, extreme outliers, and floor and ceiling effects examined. Extreme outliers were defined as points with z-scores greater than 3.29. A total of 12 participants were identified as having extreme outlier values on one or more variables, and these values were Winsorized (Wilcox, 2005) to the next highest value on each respective scale. All variables demonstrated approximately normal univariate distributions, though the BES and CES-D values were slightly positively skewed but within the acceptable range of ± 2 (Trochim & Donnelly, 2006). Tests of assumptions for the hierarchical multiple regression models in which binge eating and depressive symptoms were outcome variables indicated skewed distributions of the residuals, and thus, that the model predictors were not linearly related to these two outcome variables. Where noted below, a square root transformation of these variables was used, which addressed the skewed distribution of residuals in these models. The transformed BES had a skew value of -0.02 and kurtosis of -0.32, and the transformed CES-D scale had a skew value of 0.13 and kurtosis of 0.15. Cronbach's alpha values ranged from acceptable to excellent, and were equal to or above the expected values (see Table 2). No measurement or data entry errors were detected.

Preliminary Analyses

The descriptive statistics of the variables are displayed in Table 2 for the total sample and for the European-American and African-American subsamples. Participants reported moderate to high levels of protective factors. Seventy percent of participants reported an item mean of “*probably true*” or “*definitely true*” to questions about perceived social support and slightly

Table 2

Descriptive Statistics of Variables for the Total Sample and African-American and European-American Subsamples

Variable	African American <i>M (SE)</i>	European American <i>M (SE)</i>	Total <i>M (SE)</i>	Range		α	Skew	Kurtosis
				Potential	Actual			
Perceived Social Support	89.24 (1.39)	90.29 (1.34)	88.70 (0.88)	0 - 120	36 - 120	.95	-0.47	-0.35
Sense of Belonging	56.28 (0.77)	57.17 (0.76)	56.38 (0.49)	18 - 72	26 - 72	.95	-0.29	-0.35
Reappraisal	30.92 (0.55)	29.03 (0.42)	29.65 (0.32)	6 - 42	9 - 42	.86	-0.13	0.06
Suppression	15.20 (0.41)	14.36 (0.34)	14.98 (0.24)	4 - 28	4 - 28	.78	-0.01	-0.44
Aggression	32.95 (1.00)	31.55 (0.81)	32.29 (0.55)	12 - 72	12 - 69	.90	0.42	-0.21
Binge Eating	6.69 (0.46)	9.07 (0.52)	8.01 (0.32)	0 - 46	0 - 29	.87	1.10	0.72
Depressive Symptoms	14.07 (0.76)	13.97 (0.75)	14.44 (0.50)	0 - 60	0 - 49	.91	1.19	1.18

lower sense of belonging, with 61.7% reporting “*agree*” or “*strongly agree*” in reference to sense of belonging items. Fifty percent of participants reported moderate to high use of cognitive reappraisal and 52.7% reported moderate to low use of emotional suppression. Participants reported varying levels of psychological symptoms. Aggression was generally very low, with only 11.3% of participants reporting a mean response of “*somewhat*” or “*extremely characteristic of me*” on BPAQ-SF items. Similarly, low rates of binge eating were reported, with 13.4% of participants reporting mild or greater rates of binge eating (using a cutoff score of 17; Grupski et al., 2013). Conversely, relatively high rates of depressive symptoms were evidenced, as 36.7% of participants reported possible mild or greater depressive symptoms (defined as a score of 16 or higher on the CES-D), and 10.4% reported clinical depression symptom levels (using a cutoff score of 28; Radloff, 1991).

Hypothesis One

A correlation matrix was generated to evaluate the first hypothesis regarding the direction of relations between variables. Table 3 displays the correlations between the variables of interest. As hypothesized, perceived social support was moderately negatively correlated to all three mental health variables. Also as expected, sense of belonging (H1.a.) was moderately negatively related to the mental health outcomes, as was cognitive reappraisal (H1.b.). Also consistent with hypothesis H1.c., suppression was positively related to aggression and depressive symptoms. The only relation that differed from the hypotheses was that of binge eating and suppression, which were expected to be positively related (H1.c.). The relation between these two variables was not significant in the present study, though previous studies reported a significant positive relation (Aldao et al., 2010).

Table 3

Correlations of Study Variables

	Perceived Social Support	Sense of Belonging	Reappraisal	Suppression	Aggression	Binge Eating
Sense of Belonging	.68**					
Reappraisal	.29**	.18**				
Suppression	-.37**	-.33**	.12*			
Aggression	-.35**	-.47**	-.16**	.17**		
Binge Eating	-.20**	-.23**	-.15**	.05	.18**	
Depressive Symptoms	-.51**	-.63**	-.21**	.23**	.46**	.33**

Note. $N = 433$.

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

Regression Analyses

For each outcome variable (i.e., aggression, binge eating, and depressive symptoms), hypothesis two was tested with a series of hierarchical multiple regressions where perceived social support, sense of belonging, and the interaction between social support and sense of belonging were the predictors, and each of the mental health variables were the outcomes. To test hypothesis three, another series of hierarchical multiple regressions were conducted, with perceived social support, cognitive reappraisal, and the interaction between social support and reappraisal as the predictors, and each of the mental health variables as the outcomes. Similarly, hypothesis four was evaluated with three hierarchical multiple regressions with perceived social support, expressive suppression, and the interaction between social support and suppression as the predictors, and each of the mental health variables as the outcomes. All predictors were centered prior to creating interaction terms.

In each regression with aggression as an outcome, gender and age were included as covariates to control for the previously indicated influence of those variables on aggression (Scott et al., 2014). Each regression with depressive symptoms and binge eating as outcomes included gender, age, and relationship status as covariates, given evidence from prior studies that these are influential factors for binge eating (Danner et al., 2014; le Grange, Stone, & Brownell, 1998) and depressive symptoms (Brummett et al., 2012; McLaren & Challis, 2009; Turner & McLaren, 2011). Relationship status does not seem to be related to aggression (Barefoot et al., 1991), and so relationship status was not included as a covariate in those analyses, consistent with other studies of aggression (Scott et al., 2014). Regressions with binge eating as the outcome variable additionally included body mass index (BMI) as a fourth covariate to control

for the influence of body mass, consistent with other studies on binge eating (Danner et al., 2014; le Grange et al., 1998).

Assumptions for the hierarchical multiple regression models were checked following guidelines from Cohen, Cohen, West and Aiken (2003). Linearity between the dependent and independent variables was checked using plots of residuals and predicted values. Normal distribution of residuals was identified with histograms and Q-Q plots of residuals. Plots of residuals by predicted values were used to assess the constant variance of residuals (homoscedasticity). The absence of multicollinearity was determined if no independent variable had correlation coefficients greater than 0.7, the condition index was less than 15, and the variance inflation factor (VIF) was less than 10 (Cohen et al., 2003). Independence of residuals was determined by study design and checked with the Durbin-Watson statistic. Influential cases were identified using Cook's distance values, leverage points were assessed with leverage values, and discrepant outliers were detected using studentized deleted residuals.

Hypothesis Two: Sense of Belonging

Aggression. The relation between aggression, social support, and sense of belonging was examined using a hierarchical multiple regression with aggression as the dependent variable. The covariates (i.e., gender and age) and predictors (i.e., social support and sense of belonging) were entered in step one, and the interaction between the predictors was entered in step two.

All independent variables were collectively and independently linearly related to aggression. Independence of residuals was indicated by a Durbin-Watson statistic of 2.18. Residuals were normally distributed and constantly varied across the population (homoscedastic). There was no evidence of multicollinearity. Two discrepant outliers were detected. However, regression results did not differ in a reanalysis with the outliers excluded,

suggesting that the model is robust to the impact of these outliers. All participants were included in the final analysis ($N = 433$).

The first model of gender, age, social support, and sense of belonging to predict aggression was statistically significant, $R^2 = .228$, $F(4, 428) = 31.64$, $p < .001$, adjusted $R^2 = .221$. The interaction between sense of belonging and social support was not significant, and the addition of the interaction to the model did not improve model fit as indicated by the non-significant change in R^2 of .004, $F(1, 427) = 2.20$, $p = .139$. Greater sense of belonging was significantly associated with lower aggression (Table 4).

Binge eating. The relation between binge eating, social support, and sense of belonging was examined using a hierarchical multiple regression with binge eating as the dependent variable. The covariates (i.e., gender, age, relationship status and BMI) and predictors (i.e., social support and sense of belonging) were entered in step one, and the interaction between the predictors was entered in step two.

The relation between the independent variables and binge eating was slightly parabolic. After the BES was transformed by applying the square root, all independent variables were linearly related to the transformed outcome variable and regression results did not differ between models using the untransformed and transformed BES variables. Independence of residuals was indicated by a Durbin-Watson statistic of 1.96. Residuals were normally distributed and constantly varied across the population (homoscedastic). There was no evidence of multicollinearity. One discrepant outlier was detected. However, regression results did not differ in a reanalysis with the outlier excluded, suggesting that the model is robust to the impact of this outlier. All participants were included in the final analysis ($N = 433$).

The first model of gender, age, relationship status, BMI, social support and sense of

Table 4

Hierarchical Multiple Regression Predicting Aggression from Sense of Belonging and Social Support

Variable	Aggression								
	Model 1				Model 2				
	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>B</i>	<i>SE</i>	β	<i>t</i>	95% CI
Constant	44.48*	4.92		9.04	44.21*	4.92		9.00	[34.55, 53.88]
Gender ^a	0.07	1.08	0.003	0.06	0.12	1.08	0.01	0.11	[-2.01, 2.25]
Age	-0.60	0.24	-0.11	-2.50	-0.57	0.24	-0.10	-2.36	[-1.05, -0.10]
Social Support	-0.02	0.04	-0.03	-0.51	-0.03	0.04	-0.04	-0.71	[-0.10, 0.05]
Sense of Belonging	-0.50*	0.07	-0.44	-7.24	-0.51*	0.07	-0.45	-7.35	[-0.64, -0.37]
Social Support x Sense of Belonging					-0.003	0.002	-0.07	-1.48	[-0.01, 0.001]
<i>R</i> ²	.228				.232				
<i>F</i>	31.64*				25.82*				
ΔR^2					.004				
ΔF					2.20				

Note. *N* = 433. CI = confidence interval.

^aMale was the reference group.

**p* < .006.

belonging to predict binge eating was statistically significant, $R^2 = .151$, $F(6, 426) = 12.58$, $p < .001$, adjusted $R^2 = .139$. The interaction between sense of belonging and social support was not significant, and the addition of the interaction to the model did not improve model fit as indicated by the non-significant change in R^2 of .0004, $F(1, 425) = 0.21$, $p = .651$. Higher sense of belonging, lower BMI, and male gender were significantly associated with lower binge eating (Table 5).

Depressive symptoms. The relation between depressive symptoms, social support, and sense of belonging was examined using a hierarchical multiple regression with depressive symptoms as the dependent variable. The covariates (i.e., gender, age, and relationship status) and predictors (i.e., social support and sense of belonging) were entered in step one, and the interaction between the predictors was entered in step two.

The relation between the independent variables and depressive symptoms was slightly parabolic. After the CES-D was transformed by applying the square root, all independent variables were linearly related to the transformed outcome variable and regression results did not differ between models using the untransformed and transformed CES-D variables. Independence of residuals was indicated by a Durbin-Watson statistic of 2.00. Residuals were normally distributed and constantly varied across the population (homoscedastic). There was no evidence of multicollinearity. Five discrepant outliers were detected. However, regression results did not differ in a reanalysis with the outliers excluded, suggesting that the model is robust to the impact of these outliers. All participants were included in the final analysis ($N = 433$).

The first model of gender, age, relationship status, social support and sense of belonging to predict depressive symptoms was statistically significant, $R^2 = .443$, $F(5, 427) = 68.02$, $p < .001$, adjusted $R^2 = .437$. The interaction between sense of belonging and social support was

Table 5

Hierarchical Multiple Regression Predicting Binge Eating from Sense of Belonging and Social Support

Variable	Binge Eating								
	Model 1				Model 2				
	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>B</i>	<i>SE</i>	β	<i>t</i>	95% CI
Constant	0.93	0.63		1.47	0.92	0.63		1.46	[-0.32, 2.17]
Gender ^a	0.59*	0.13	0.21	4.64	0.59*	0.13	0.21	4.64	[0.34, 0.84]
Age	-0.01	0.03	-0.02	-0.38	-0.01	0.03	-0.02	-0.34	[-0.07, 0.05]
Relationship Status ^b	0.18	0.15	0.06	1.20	0.18	0.15	0.06	1.22	[-0.11, 0.48]
BMI	0.06*	0.01	0.23	5.19	0.06*	0.01	0.23	5.19	[0.03, 0.08]
Social Support	-0.001	0.004	-0.01	-0.12	-0.001	0.005	-0.01	-0.18	[-0.01, 0.01]
Sense of Belonging	-0.03*	0.01	-0.24	-3.75	-0.03*	0.01	-0.24	-3.77	[-0.05, -0.02]
Social Support x Sense of Belonging					-0.0001	0.0003	-0.02	-0.45	[-0.001, 0.0004]
R^2	.151				.151				
F	12.58*				10.80*				
ΔR^2					.0004				
ΔF					0.65				

Note. $N = 433$. CI = confidence interval; BMI = Body Mass Index.

^aMale was the reference group. ^bSingle was the reference group.

* $p < .006$.

not significant, and the addition of the interaction to the model did not improve model fit as indicated by the non-significant change in R^2 of .0004, $F(1, 426) = 0.03, p = .857$. Greater sense of belonging and male gender were significantly associated with lower depressive symptoms (Table 6).

Hypothesis Three: Cognitive Reappraisal

Aggression. The relation between aggression, social support, and cognitive reappraisal was examined using a hierarchical multiple regression with aggression as the dependent variable. The covariates (i.e., gender and age) and predictors (i.e., social support and reappraisal) were entered in step one, and the interaction between the predictors was entered in step two.

All independent variables were collectively and independently linearly related to aggression. Independence of residuals was indicated by a Durbin-Watson statistic of 1.91. Residuals were normally distributed and constantly varied across the population (homoscedastic). There was no evidence of multicollinearity. No outliers were identified. All participants were included in the final analysis ($N = 433$).

The first model of gender, age, social support, and reappraisal to predict aggression was statistically significant, $R^2 = .137, F(4, 428) = 16.93, p < .001$, adjusted $R^2 = .129$. The interaction between reappraisal and social support was not significant, and the addition of the interaction to the model did not improve model fit as indicated by the non-significant change in R^2 of .004, $F(1, 427) = 2.21, p = .138$. Greater social support was significantly associated with lower aggression (Table 7).

Binge eating. The relation between binge eating, social support, and cognitive reappraisal was examined using a hierarchical multiple regression with binge eating as the dependent variable. The covariates (i.e., gender, age, relationship status and BMI) and predictors

Table 6

Hierarchical Multiple Regression Predicting Depressive Symptoms from Sense of Belonging and Social Support

Variable	Depressive Symptoms								
	Model 1				Model 2				
	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>B</i>	<i>SE</i>	β	<i>t</i>	95% CI
Constant	3.37*	0.52		6.53	3.37*	0.52		6.53	[2.36, 4.39]
Gender ^a	0.48*	0.11	0.16	4.33	0.48*	0.11	0.16	4.32	[0.26, 0.70]
Age	-0.01	0.03	-0.01	-0.21	-0.01	0.03	-0.01	-0.22	[-0.06, 0.05]
Relationship Status ^b	-0.30	0.13	-0.09	-2.27	-0.30	0.13	-0.09	-2.27	[-0.56, -0.04]
Social Support	-0.01	0.004	-0.14	-2.63	-0.01	0.004	-0.14	-2.57	[-0.02, -0.002]
Sense of Belonging	-0.08*	0.01	-0.56	-10.75	-0.08*	0.01	-0.55	-10.69	[-0.09, -0.06]
Social Support x Sense of Belonging					0.00004	0.0002	0.01	0.18	[-0.0004, 0.0005]
R^2	.443				.443				
F	68.02*				56.56*				
ΔR^2					.00004				
ΔF					0.03				

Note. $N = 433$. CI = confidence interval.

^aMale was the reference group. ^bSingle was the reference group.

* $p < .006$.

Table 7

Hierarchical Multiple Regression Predicting Aggression from Reappraisal and Social Support

Variable	Aggression								
	Model 1				Model 2				
	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>B</i>	<i>SE</i>	β	<i>t</i>	95% CI
Constant	44.96*	5.22		8.62	44.38*	5.22		8.50	[34.11, 54.64]
Gender ^a	-0.21	1.15	-0.01	-0.19	-0.10	1.15	0.004	-0.09	[-2.36, 2.15]
Age	-0.62	0.26	-0.11	-2.41	-0.58	0.26	-0.10	-2.27	[-1.09, -0.08]
Social Support	-0.20*	0.03	-0.33	-6.88	-0.20*	0.03	-0.33	-6.87	[-0.26, -0.15]
Reappraisal	-0.10	0.08	-0.06	-1.21	-0.11	0.08	-0.06	-1.32	[-0.27, 0.05]
Social Support x Reappraisal					-0.01	0.004	-0.07	-1.49	[-0.01, 0.002]
R^2	.137				.141				
F	16.93*				14.02*				
ΔR^2					.004				
ΔF					2.21				

Note. $N = 433$. CI = confidence interval.

^aMale was the reference group.

* $p < .006$.

(i.e., social support and reappraisal) were entered in step one, and the interaction between the predictors was entered in step two.

The relation between the independent variables and binge eating was slightly parabolic. After the BES was transformed by applying the square root, all independent variables were linearly related to the transformed outcome variable and regression results did not differ between models using the untransformed and transformed BES variables. Independence of residuals was indicated by a Durbin-Watson statistic of 1.96. Residuals were normally distributed and constantly varied across the population (homoscedastic). There was no evidence of multicollinearity. No outliers were identified. All participants were included in the final analysis ($N = 433$).

The first model of gender, age, relationship status, BMI, social support and reappraisal to predict binge eating was statistically significant, $R^2 = .126$, $F(6, 426) = 10.27$, $p < .001$, adjusted $R^2 = .114$. The interaction between reappraisal and social support was not significant, and the addition of the interaction to the model did not improve model fit as indicated by the non-significant change in R^2 of 0.00002, $F(1, 425) = 0.10$, $p = .920$. Greater social support, lower BMI, and male gender were significantly associated with lower binge eating (Table 8).

Depressive symptoms. The relation between depressive symptoms, social support, and cognitive reappraisal was examined using a hierarchical multiple regression with depressive symptoms as the dependent variable. The covariates (i.e., gender, age, and relationship status) and predictors (i.e., social support and reappraisal) were entered in step one, and the interaction between the predictors was entered in step two.

The relation between the independent variables and depressive symptoms was slightly parabolic. After the CES-D was transformed by applying the square root, all independent

Table 8

Hierarchical Multiple Regression Predicting Binge Eating from Reappraisal and Social Support

Variable	Binge Eating								
	Model 1				Model 2				
	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>B</i>	<i>SE</i>	β	<i>t</i>	95% CI
Constant	0.97	0.64		1.51	0.97	0.64		1.51	[-0.29, 2.24]
Gender ^a	0.57*	0.13	0.20	4.44	0.57*	0.13	0.20	4.42	[0.32, 0.82]
Age	-0.01	0.03	-0.02	-0.38	-0.01	0.03	-0.02	-0.39	[-0.07, 0.05]
Relationship Status ^b	0.20	0.15	0.06	1.33	0.20	0.15	0.06	1.33	[-0.10, 0.50]
BMI	0.05*	0.01	0.23	5.03	0.05*	0.01	0.23	5.02	[0.03, 0.08]
Social Support	-0.01*	0.003	-0.16	-3.31	-0.01*	0.003	-0.16	-3.31	[-0.02, -0.004]
Reappraisal	-0.01	0.01	-0.07	-1.37	-0.01	0.01	-0.07	-1.36	[-0.03, 0.01]
Social Support x Reappraisal					0.00005	0.0005	0.01	0.45	[-0.001, 0.001]
R^2	.126				.126				
F	10.27*				8.79*				
ΔR^2					.00002				
ΔF					0.01				

Note. $N = 433$. CI = confidence interval; BMI = Body Mass Index.

^aMale was the reference group. ^bSingle was the reference group.

* $p < .006$.

variables were linearly related to the transformed outcome variable and regression results did not differ between models using the untransformed and transformed CES-D variables. Independence of residuals was indicated by a Durbin-Watson statistic of 1.98. Residuals were normally distributed and constantly varied across the population (homoscedastic). There was no evidence of multicollinearity. Four discrepant outliers were detected. However, regression results did not differ in a reanalysis with the outliers excluded, suggesting that the model is robust to the impact of these outliers. All participants were included in the final analysis ($N = 433$).

The first model of gender, age, relationship status, social support and reappraisal to predict depressive symptoms was statistically significant, $R^2 = .297$, $F(5, 427) = 36.10$, $p < .001$, adjusted $R^2 = .289$. The interaction between reappraisal and social support was not significant, and the addition of the interaction to the model did not improve model fit as indicated by the non-significant change in R^2 of .002, $F(1, 426) = 1.10$, $p = .294$. Greater social support and male gender were significantly associated with lower depressive symptoms (Table 9).

Hypothesis Four: Expressive Suppression

Aggression. The relation between aggression, social support, and expressive suppression was examined using a hierarchical multiple regression with aggression as the dependent variable. The covariates (i.e., gender and age) and predictors (i.e., social support and suppression) were entered in step one, and the interaction between the predictors was entered in step two.

All independent variables were collectively and independently linearly related to aggression. Independence of residuals was indicated by a Durbin-Watson statistic of 1.92. Residuals were normally distributed and constantly varied across the population (homoscedastic). There was no evidence of multicollinearity. No outliers were identified. All participants were included in the final analysis ($N = 433$).

Table 9

Hierarchical Multiple Regression Predicting Depressive Symptoms from Reappraisal and Social Support

Variable	Depressive Symptoms								
	Model 1				Model 2				
	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>B</i>	<i>SE</i>	β	<i>t</i>	95% CI
Constant	3.49*	0.58		6.01	3.54*	0.58		6.07	[2.39, 4.68]
Gender ^a	0.44*	0.13	0.15	3.50	0.43*	0.13	0.14	3.43	[0.18, 0.67]
Age	-0.01	0.03	-0.02	-0.36	-0.01	0.03	-0.02	-0.45	[-0.07, 0.04]
Relationship Status ^b	-0.24	0.15	-0.07	-1.65	-0.24	0.15	-0.07	-1.64	[-0.53, 0.05]
Social Support	-0.04*	0.003	-0.51	-11.89	-0.04*	0.003	-0.51	-11.91	[-0.05, -0.03]
Reappraisal	-0.02	0.01	-0.07	-1.65	-0.01	0.01	-0.07	-1.57	[-0.03, 0.004]
Social Support x Reappraisal					0.0005	0.0005	0.04	1.05	[-0.0004, 0.001]
R^2	.297				.299				
F	36.10*				30.28*				
ΔR^2					.002				
ΔF					1.10				

Note. $N = 433$. CI = confidence interval.

^aMale was the reference group. ^bSingle was the reference group.

* $p < .006$.

The first model of gender, age, social support, and suppression to predict aggression was statistically significant, $R^2 = .134$, $F(4, 428) = 16.62$, $p < .001$, adjusted $R^2 = .126$. The interaction between suppression and social support was not significant, and the addition of the interaction to the model did not improve model fit as indicated by the non-significant change in R^2 of .001, $F(1, 427) = 0.53$, $p = .468$. Greater social support was significantly associated with lower aggression (Table 10).

Binge eating. The relation between binge eating, social support, and expressive suppression was examined using a hierarchical multiple regression with binge eating as the dependent variable. The covariates (i.e., gender, age, relationship status and BMI) and predictors (i.e., social support and suppression) were entered in step one, and the interaction between the predictors was entered in step two.

The relation between the independent variables and binge eating was slightly parabolic. After the BES was transformed by applying the square root, all independent variables were linearly related to the transformed outcome variable and regression results did not differ between models using the untransformed and transformed BES variables. Independence of residuals was indicated by a Durbin-Watson statistic of 1.98. Residuals were normally distributed and constantly varied across the population (homoscedastic). There was no evidence of multicollinearity. No outliers were identified. All participants were included in the final analysis ($N = 433$).

The first model of gender, age, relationship status, BMI, social support and suppression to predict binge eating was statistically significant, $R^2 = .126$, $F(6, 426) = 10.26$, $p < .001$, adjusted $R^2 = .114$. The interaction between suppression and social support was not significant, and the addition of the interaction to the model did not improve model fit as indicated by the

Table 10

Hierarchical Multiple Regression Predicting Aggression from Suppression and Social Support

Variable	Aggression								
	Model 1				Model 2				
	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>B</i>	<i>SE</i>	β	<i>t</i>	95% CI
Constant	45.14*	5.23		8.63	45.15*	5.23		8.63	[34.87, 55.44]
Gender ^a	-0.07	1.17	-0.003	-0.06	-0.08	1.17	-0.003	-0.07	[-2.39, 2.22]
Age	-0.63	0.26	-0.11	-2.47	-0.64	0.26	-0.11	-2.49	[-1.14, -0.14]
Social Support	-0.21*	0.03	-0.33	-6.83	-0.21*	0.03	-0.33	-6.69	[-0.26, -0.15]
Suppression	0.07	0.11	0.03	0.62	0.08	0.11	0.04	0.70	[-0.15, 0.31]
Social Support x Suppression					-0.004	0.01	-0.03	-0.73	[-0.02, 0.01]
R^2	.134				.136				
F	16.62*				13.39*				
ΔR^2					.001				
ΔF					0.53				

Note. $N = 433$. CI = confidence interval.

^aMale was the reference group.

* $p < .006$.

non-significant change in R^2 of 0.002, $F(1, 425) = 0.73, p = .393$. Greater social support, lower BMI, and male gender were associated with lower binge eating (Table 11).

Depressive symptoms. The relation between depressive symptoms, social support, and expressive suppression was examined using a hierarchical multiple regression with depressive symptoms as the dependent variable. The covariates (i.e., gender, age, and relationship status) and predictors (i.e., social support and suppression) were entered in step one, and the interaction between the predictors was entered in step two.

The relation between the independent variables and depressive symptoms was slightly parabolic. After the CES-D was transformed by applying the square root, all independent variables were linearly related to the transformed outcome variable and regression results did not differ between models using the untransformed and transformed CES-D variables. Independence of residuals was indicated by a Durbin-Watson statistic of 1.94. Residuals were normally distributed and constantly varied across the population (homoscedastic). There was no evidence of multicollinearity. Three discrepant outliers were detected. However, regression results did not differ in a reanalysis with the outliers excluded, suggesting that the model is robust to the impact of these outliers. All participants were included in the final analysis ($N = 433$).

The first model of gender, age, relationship status, social support and suppression to predict depressive symptoms was statistically significant, $R^2 = .301, F(5, 427) = 36.69, p < .001$, adjusted $R^2 = .292$. The interaction between suppression and social support was not significant, and the addition of the interaction to the model did not improve model fit as indicated by the non-significant change in R^2 of .003, $F(1, 426) = 1.59, p = .208$. Greater social support and male gender were significantly associated with lower depressive symptoms (Table 12).

Table 11

Hierarchical Multiple Regression Predicting Binge Eating from Suppression and Social Support

Variable	Binge Eating								
	Model 1				Model 2				
	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>B</i>	<i>SE</i>	β	<i>t</i>	95% CI
Constant	0.92	0.64		1.43	0.94	0.65		1.46	[-0.33, 2.21]
Gender ^a	0.60*	0.13	0.22	4.62	0.61*	0.13	0.22	4.62	[0.35, 0.86]
Age	-0.01	0.03	-0.02	-0.43	-0.01	0.03	-0.02	-0.41	[-0.07, 0.05]
Relationship Status ^b	0.21	0.15	0.07	1.39	0.22	0.15	0.07	1.44	[-0.08, 0.52]
BMI	0.06*	0.01	0.24	5.19	0.06*	0.01	0.24	5.14	[0.03, 0.08]
Social Support	-0.01*	0.003	-0.16	-3.14	-0.01*	0.003	-0.16	-3.22	[-0.02, -0.004]
Suppression	0.02	0.01	0.07	1.34	0.02	0.01	0.06	1.22	[-0.01, 0.04]
Social Support x Suppression					0.001	0.001	0.04	0.86	[-0.001, 0.002]
R^2	.126				.128				
F	10.26*				8.89*				
ΔR^2					.002				
ΔF					0.73				

Note. $N = 433$. CI = confidence interval; BMI = Body Mass Index.

^aMale was the reference group. ^bSingle was the reference group.

* $p < .006$.

Exploratory Analyses

To further explore the hypothesized interaction effects, exploratory analyses were conducted using data from participants with higher reported values on the mental health measures, selected using a median split of the mental health measures (see Appendix I for descriptive statistics). Hereafter, these groups will be referred to as the higher aggressive, binge eating, and depressive symptom subsamples. Nine hierarchical regressions were computed, entering the same covariates and predictors, and following the same procedure as above. As in the above hierarchical regressions, tests of assumptions with the subsample outcome variables indicated skewed distributions of the residuals, and therefore, non-linear relations between the model predictors and the binge eating and depressive symptom outcomes. Where noted below, a square root transformation of these variables was used, which addressed the skewed distribution of residuals in these models. The transformed BES had a skew value of 0.65 and kurtosis value of -0.34, and the transformed CES-D scale had a skew value of 0.81 and kurtosis value of -0.07. As these analyses are exploratory and the consequences of type I errors (false positive) are minimal, no alpha correction was used for the following analyses.

Sense of belonging.

Aggression. The relation between aggression, social support, and sense of belonging among participants reporting higher aggression values (median-split) was examined using a hierarchical multiple regression with aggression as the dependent variable. The covariates (i.e., gender and age) and predictors (i.e., social support and sense of belonging) were entered in step one, and the interaction between the predictors was entered in step two.

All independent variables were collectively and independently linearly related to aggression. Independence of residuals was indicated by a Durbin-Watson statistic of 2.29.

Table 12

Hierarchical Multiple Regression Predicting Depressive Symptoms from Suppression and Social Support

Variable	Depressive Symptoms								
	Model 1				Model 2				
	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>B</i>	<i>SE</i>	β	<i>t</i>	95% CI
Constant	3.46*	0.58		5.97	3.47*	0.58		5.99	[2.33, 4.61]
Gender ^a	0.49*	0.13	0.16	3.88	0.49*	0.13	0.16	3.90	[0.25, 0.74]
Age	-0.01	0.03	-0.02	-0.38	-0.01	0.03	-0.02	-0.35	[-0.07, 0.05]
Relationship Status ^b	-0.23	0.15	-0.07	-1.56	-0.22	0.15	-0.06	-1.47	[-0.51, -0.07]
Social Support	-0.04*	0.003	-0.50	-11.37	-0.04*	0.003	-0.51	-11.45	[-0.05, -0.03]
Suppression	0.03	0.01	0.10	2.19	0.03	0.01	0.09	2.03	[0.001, 0.05]
Social Support x Suppression					0.001	0.001	0.05	1.26	[-0.0004, 0.002]
R^2	.301				.303				
F	36.69*				30.88*				
ΔR^2					.003				
ΔF					1.59				

Note. $N = 433$. CI = confidence interval.

^aMale was the reference group. ^bSingle was the reference group.

* $p < .006$.

Residuals were normally distributed and constantly varied across the population (homoscedastic). There was no evidence of multicollinearity. Four discrepant outliers were detected. However, regression results did not differ in a reanalysis with the outliers excluded, suggesting that the model is robust to the impact of these outliers. All subsample participants were included in the final analysis ($n = 215$).

The first model of gender, age, social support, and sense of belonging to predict aggression was statistically significant, $R^2 = .070$, $F(4, 210) = 3.93$, $p = .004$, adjusted $R^2 = .052$. The interaction between sense of belonging and social support was not significant, and the addition of the interaction to the model did not improve model fit as indicated by the non-significant change in R^2 of .001, $F(1, 209) = 0.25$, $p = .617$. None of the covariates or predictors significantly predicted aggression (Table 13).

Binge eating. The relation between binge eating, social support, and sense of belonging among participants reporting higher binge eating values identified via a median-split was examined using a hierarchical multiple regression with binge eating as the dependent variable. The covariates (i.e., gender, age, relationship status and BMI) and predictors (i.e., social support and sense of belonging) were entered in step one, and the interaction between the predictors was entered in step two.

The relation between the independent variables and binge eating was slightly parabolic. After the BES was transformed by applying the square root, all independent variables were linearly related to the transformed outcome variable and regression results did not differ between models using the untransformed and transformed BES variables. Independence of residuals was indicated by a Durbin-Watson statistic of 1.98. Residuals were normally distributed and constantly varied across the population (homoscedastic). There was no evidence of

Table 13

Hierarchical Multiple Regression Predicting Aggression from Sense of Belonging and Social Support among Participants with Higher Aggression

Variable	Aggression								
	Model 1				Model 2				
	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>B</i>	<i>SE</i>	β	<i>t</i>	95% CI
Constant	40.29*	5.45		7.40	40.49*	5.47		7.40	[29.70, 51.27]
Gender ^a	0.28	1.12	0.02	0.25	0.27	1.12	0.02	0.24	[-1.94, 2.48]
Age	0.06	0.27	0.01	0.21	0.04	0.27	0.01	0.15	[-0.50, 0.58]
Social Support	-0.07	0.04	-0.17	-1.86	-0.07	0.04	-0.16	-1.71	[-0.15, 0.10]
Sense of Belonging	-0.10	0.08	-0.12	-1.30	-0.10	0.08	-0.12	-1.29	[-0.25, 0.05]
Social Support x Sense of Belonging					0.001	0.003	0.04	0.50	[-0.004, 0.006]
R^2	.070				.071				
F	3.93*				3.19*				
ΔR^2					.001				
ΔF					0.25				

Note. $n = 215$. CI = confidence interval.

^aMale was the reference group.

* $p < .05$.

multicollinearity. No outliers were identified. All subsample participants were included in the final analysis ($n = 209$).

The first model of gender, age, relationship status, BMI, social support and sense of belonging to predict binge eating was statistically significant, $R^2 = .076$, $F(6, 202) = 2.77$, $p = .013$, adjusted $R^2 = .049$. The interaction between sense of belonging and social support was not significant, and the addition of the interaction to the model did not improve model fit as indicated by the non-significant change in R^2 of .0002, $F(1, 201) = 0.04$, $p = .834$. Greater social support was significantly associated with lower binge eating (Table 14).

Depressive symptoms. The relation between depressive symptoms, social support, and sense of belonging among participants reporting higher depressive symptoms identified via a median-split was examined using a hierarchical multiple regression with depressive symptoms as the dependent variable. The covariates (i.e., gender, age, and relationship status) and predictors (i.e., social support and sense of belonging) were entered in step one, and the interaction between the predictors was entered in step two.

The relation between the independent variables and depressive symptoms was slightly parabolic. After the CES-D was transformed by applying the square root, all independent variables were linearly related to the transformed outcome variable and regression results did not differ between models using the untransformed and transformed CES-D variables. Independence of residuals was indicated by a Durbin-Watson statistic of 2.02. Residuals were normally distributed and constantly varied across the population (homoscedastic). There was no evidence of multicollinearity. One discrepant outlier was detected. However, regression results did not differ in a reanalysis with the outlier excluded, suggesting that the model is robust to the impact of this outlier. All subsample participants were included in the final analysis ($n = 215$).

Table 14

Hierarchical Multiple Regression Predicting Binge Eating from Sense of Belonging and Social Support among Participants with Higher Binge Eating

Variable	Binge Eating								
	Model 1				Model 2				
	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>B</i>	<i>SE</i>	β	<i>t</i>	95% CI
Constant	2.83*	0.58		4.91	2.82*	0.58		4.88	[1.68, 3.96]
Gender ^a	0.24	0.12	0.14	1.97	0.24	0.12	0.13	1.93	[-0.01, 0.48]
Age	0.01	0.03	0.02	0.23	0.01	0.03	0.02	0.23	[-0.05, 0.06]
Relationship Status ^b	0.11	0.13	0.06	0.87	0.11	0.13	0.06	0.85	[-0.15, 0.37]
BMI	0.02	0.01	0.13	1.85	0.02	0.01	0.13	1.83	[-0.001, 0.03]
Social Support	-0.01*	0.004	-0.22	-2.27	-0.01*	0.004	-0.21	-2.16	[-0.02, -0.001]
Sense of Belonging	0.001	0.01	0.01	0.07	0.001	0.01	0.01	0.08	[-0.01, 0.01]
Social Support x Sense of Belonging					0.00005	0.0002	0.02	0.21	[-0.0004, 0.001]
R^2	.076				.076				
F	2.77*				2.37*				
ΔR^2					.0002				
ΔF					0.04				

Note. $n = 209$. CI = confidence interval; BMI = Body Mass Index.

^aMale was the reference group. ^bSingle was the reference group.

* $p < .05$.

The first model of gender, age, relationship status, social support and sense of belonging to predict depressive symptoms was statistically significant, $R^2 = .236$, $F(5, 209) = 12.89$, $p < .001$, adjusted $R^2 = .217$. The interaction between sense of belonging and social support was significant, though the addition of the interaction to the model only explained an additional 1.5% of the variance in depressive symptoms, $R^2 \text{ change} = .015$, $F(1, 208) = 4.19$, $p = .042$ (Table 15). Figure 3 is a plot of the interaction, depicting that for students with higher sense of belonging (tested at one standard deviation above the mean), social support was not related to depressive symptoms, as indicated by the non-significant simple slope gradient of 0.008, $t(208) = 1.56$, $p = .117$. However, for students with lower sense of belonging (one standard deviation below the mean), social support was related to lower depressive symptoms as indicated by the significant simple slope gradient of -0.010, $t(208) = -2.07$, $p = .040$.

Cognitive reappraisal.

Aggression. The relation between aggression, social support, and cognitive reappraisal among participants reporting higher aggression values (median-split) was examined using a hierarchical multiple regression with aggression as the dependent variable. The covariates (i.e., gender and age) and predictors (i.e., social support and reappraisal) were entered in step one, and the interaction between the predictors was entered in step two.

All independent variables were collectively and independently linearly related to aggression. Independence of residuals was indicated by a Durbin-Watson statistic of 1.91. Residuals were normally distributed and constantly varied across the population (homoscedastic). There was no evidence of multicollinearity. One discrepant outlier was detected. However, regression results did not differ in a reanalysis with the outlier excluded, suggesting that the model is robust to the impact of this outlier. All subsample participants were

Table 15

Hierarchical Multiple Regression Predicting Depressive Symptoms from Sense of Belonging and Social Support among Participants with Higher Depressive Symptoms

Variable	Depressive Symptoms									
	Model 1					Model 2				
	<i>B</i>	<i>SE</i>	β	<i>t</i>		<i>B</i>	<i>SE</i>	β	<i>t</i>	95% CI
Constant	4.35*	0.56		7.71		4.43*	0.56		7.89	[3.32, 5.53]
Gender ^a	0.39*	0.13	0.19	3.06		0.37*	0.13	0.18	2.96	[0.13, 0.62]
Age	0.001	0.03	0.002	0.04		-0.01	0.03	-0.01	-0.19	[-0.06, 0.05]
Relationship Status ^b	-0.07	0.16	-0.03	-0.48		-0.07	0.15	-0.03	-0.47	[-0.38, 0.23]
Social Support	-0.002	0.004	-0.04	-0.45		-0.001	0.004	-0.02	-0.25	[-0.01, 0.01]
Sense of Belonging	-0.05*	0.01	-0.46	-5.70		-0.04*	0.01	-0.44	-5.55	[-0.06, -0.03]
Social Support x Sense of Belonging						0.001*	0.0003	0.13	2.05	[0.00002, 0.001]
R^2	.236					.251				
F	12.89*					11.60*				
ΔR^2						.015				
ΔF						4.19*				

Note. $n = 215$. CI = confidence interval.

^aMale was the reference group. ^bSingle was the reference group.

* $p < .05$.

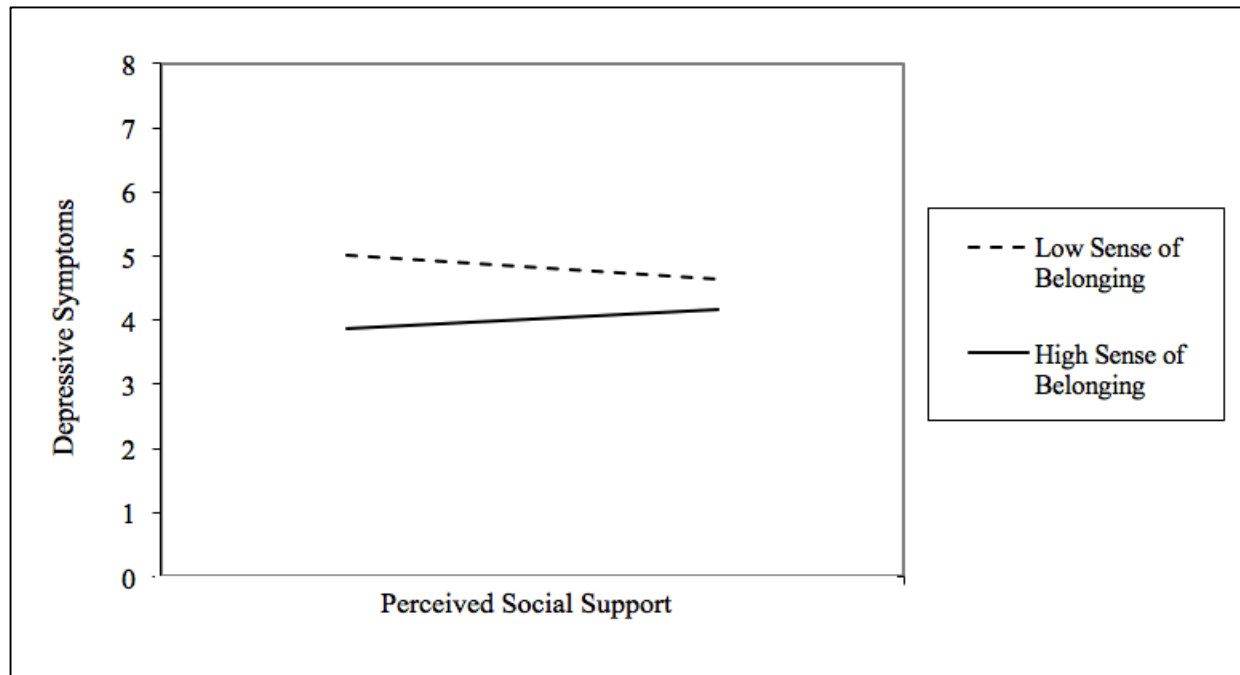


Figure 3. The Moderating Effect of Sense of Belonging on the Relation between Perceived Social Support and Depressive Symptoms among Students with Higher Levels of Depressive Symptoms

included in the final analysis ($n = 215$).

The first model of gender, age, social support, and reappraisal to predict aggression was statistically significant, $R^2 = .065$, $F(4, 210) = 3.63$, $p = .015$, adjusted $R^2 = .047$. The interaction between reappraisal and social support was not significant, and the addition of the interaction to the model did not improve model fit as indicated by the non-significant change in R^2 of .003, $F(1, 209) = 0.75$, $p = .389$. Greater social support was associated with lower aggression (Table 16).

Binge eating. The relation between binge eating, social support, and cognitive reappraisal among participants reporting higher binge eating values identified via a median-split was examined using a hierarchical multiple regression with binge eating as the dependent variable. The covariates (i.e., gender, age, relationship status and BMI) and predictors (i.e., social support and reappraisal) were entered in step one, and the interaction between the predictors was entered in step two.

The relation between the independent variables and binge eating was slightly parabolic. After the BES was transformed by applying the square root, all independent variables were linearly related to the transformed outcome variable and regression results did not differ between models using the untransformed and transformed BES variables. Independence of residuals was indicated by a Durbin-Watson statistic of 1.98. Residuals were normally distributed and constantly varied across the population (homoscedastic). There was no evidence of multicollinearity. No outliers were identified. All subsample participants were included in the final analysis ($n = 209$).

The first model of gender, age, relationship status, BMI, social support and reappraisal to predict binge eating was statistically significant, $R^2 = .091$, $F(6, 202) = 3.38$, $p = .003$,

Table 16

Hierarchical Multiple Regression Predicting Aggression from Reappraisal and Social Support among Participants with Higher Aggression

Variable	Aggression								
	Model 1				Model 2				
	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>B</i>	<i>SE</i>	β	<i>t</i>	95% CI
Constant	39.18*	5.43		7.22	39.64*	5.45		7.27	[28.89, 50.39]
Gender ^a	0.12	1.12	0.01	0.11	-0.01	1.14	-0.001	-0.01	[-2.26, 2.24]
Age	0.12	0.27	0.03	0.44	0.10	0.27	0.02	0.02	[-0.44, 0.63]
Social Support	-0.10*	0.03	-0.24	-3.48	-0.10*	0.03	-0.24	-0.24	[-0.16, -0.05]
Reappraisal	-0.06	0.09	-0.05	-0.75	-0.06	0.09	-0.05	-0.05	[-0.23, 0.11]
Social Support x Reappraisal					0.004	0.01	0.06	0.86	[-0.01, 0.01]
R^2	.065				.068				
F	3.63*				3.05*				
ΔR^2					.003				
ΔF					0.75				

Note. $n = 215$. CI = confidence interval.

^aMale was the reference group.

* $p < .05$.

adjusted $R^2 = .064$. The interaction between sense of belonging and social support was not significant, and the addition of the interaction to the model did not improve model fit as indicated by the non-significant change in R^2 of 0.00005, $F(1, 201) = 0.01, p = .921$. Greater social support was significantly associated with lower binge eating (Table 17).

Depressive symptoms. The relation between depressive symptoms, social support, and cognitive reappraisal among participants reporting higher depressive symptoms identified via a median-split was examined using a hierarchical multiple regression with depressive symptoms as the dependent variable. The covariates (i.e., gender, age, and relationship status) and predictors (i.e., social support and reappraisal) were entered in step one, and the interaction between the predictors was entered in step two.

The relation between the independent variables and depressive symptoms was slightly parabolic. After the CES-D was transformed by applying the square root, all independent variables were linearly related to the transformed outcome variable and regression results did not differ between models using the untransformed and transformed CES-D variables. Independence of residuals was indicated by a Durbin-Watson statistic of 1.95. Residuals were normally distributed and constantly varied across the population (homoscedastic). There was no evidence of multicollinearity. No outliers were identified. All subsample participants were included in the final analysis ($n = 215$).

The first model of gender, age, relationship status, social support and reappraisal to predict depressive symptoms was statistically significant, $R^2 = .119, F(5, 209) = 5.67, p < .001$, adjusted $R^2 = .098$. The interaction between reappraisal and social support was significant, and the addition of the interaction to the model explained an additional 4.8% of the variance in depressive symptoms, $R^2 \text{ change} = .048, F(1, 208) = 11.89, p = .001$ (Table 18).

Table 17

Hierarchical Multiple Regression Predicting Binge Eating from Reappraisal and Social Support among Participants with Higher Binge Eating

Variable	Binge Eating								
	Model 1				Model 2				
	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>B</i>	<i>SE</i>	β	<i>t</i>	95% CI
Constant	2.78*	0.57		4.87	2.78*	0.57		4.86	[1.66, 3.91]
Gender ^a	0.22	0.12	0.12	1.79	0.22	0.12	0.12	1.78	[-0.02, 0.46]
Age	0.01	0.03	0.02	0.33	0.01	0.03	0.02	0.33	[-0.04, 0.06]
Relationship Status ^b	0.12	0.13	0.06	0.89	0.12	0.13	0.06	0.89	[-0.14, 0.37]
BMI	0.02	0.01	0.13	1.89	0.02	0.01	0.13	1.89	[-0.001, 0.03]
Social Support	-0.01*	0.003	-0.18	-2.53	-0.01*	0.003	-0.18	-2.52	[-0.01, -0.002]
Reappraisal	-0.01	0.01	-0.13	-1.84	-0.01	0.01	-0.13	-1.79	[-0.03, 0.001]
Social Support x Reappraisal					0.00006	0.001	0.01	0.10	[-0.001, 0.001]
R^2	.091				.091				
F	3.38*				2.88*				
ΔR^2					.00005				
ΔF					0.01				

Note. $n = 209$. CI = confidence interval; BMI = Body Mass Index.

^aMale was the reference group. ^bSingle was the reference group.

* $p < .05$.

Table 18

Hierarchical Multiple Regression Predicting Depressive Symptoms from Reappraisal and Social Support among Participants with Higher Depressive Symptoms

Variable	Depressive Symptoms								
	Model 1				Model 2				
	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>B</i>	<i>SE</i>	β	<i>t</i>	95% CI
Constant	4.55*	0.60		7.54	4.76*	0.60		8.05	[3.60, 5.93]
Gender ^a	0.30*	0.14	0.15	2.24	0.30*	0.13	0.15	2.27	[0.04, 0.56]
Age	-0.01	0.03	-0.01	-0.21	-0.02	0.03	-0.04	-0.63	[-0.08, 0.04]
Relationship Status ^b	-0.07	0.17	-0.03	-0.39	-0.08	0.16	-0.03	-0.52	[-0.41, 0.24]
Social Support	-0.02*	0.003	-0.32	-4.75	-0.02*	0.003	-0.34	-5.20	[-0.02, -0.01]
Reappraisal	-0.01	0.01	-0.05	-0.80	-0.01	0.01	-0.03	-0.52	[-0.02, 0.01]
Social Support x Reappraisal					0.002*	0.0005	0.22	3.45	[0.001, 0.003]
R^2	.119				.167				
F	5.67*				6.95*				
ΔR^2					.048				
ΔF					11.89*				

Note. $n = 215$. CI = confidence interval.

^aMale was the reference group. ^bSingle was the reference group.

* $p < .05$.

Figure 4 is a plot of the interaction, depicting that greater perceived social support was associated with lower depressive symptoms among students reporting low reappraisal (tested at one standard deviation below the mean), as indicated by the significant simple slope gradient of -0.031 , $t(208) = -38.44$, $p < .001$. However, depressive symptoms were not associated with perceived social support among students reporting higher reappraisal (one standard deviation above the mean), as indicated by the non-significant slope gradient of -0.003 , $t(208) = -1.24$, $p = .217$.

Expressive suppression.

Aggression. The relation between aggression, social support, and expressive suppression among participants reporting higher aggression values determined with a median-split was examined using a hierarchical multiple regression with aggression as the dependent variable. The covariates (i.e., gender and age) and predictors (i.e., social support and suppression) were entered in step one, and the interaction between the predictors was entered in step two.

All independent variables were collectively and independently linearly related to aggression. Independence of residuals was indicated by a Durbin-Watson statistic of 1.88. Residuals were normally distributed and constantly varied across the population (homoscedastic). There was no evidence of multicollinearity. Three discrepant outliers were detected. However, regression results did not differ in a reanalysis with the outliers excluded, suggesting that the model is robust to the impact of these outliers. All subsample participants were included in the final analysis ($n = 215$).

The first model of gender, age, social support, and suppression to predict aggression was statistically significant, $R^2 = .070$, $F(4, 210) = 3.97$, $p = .004$, adjusted $R^2 = .053$. The interaction between suppression and social support was not significant, and the addition of the

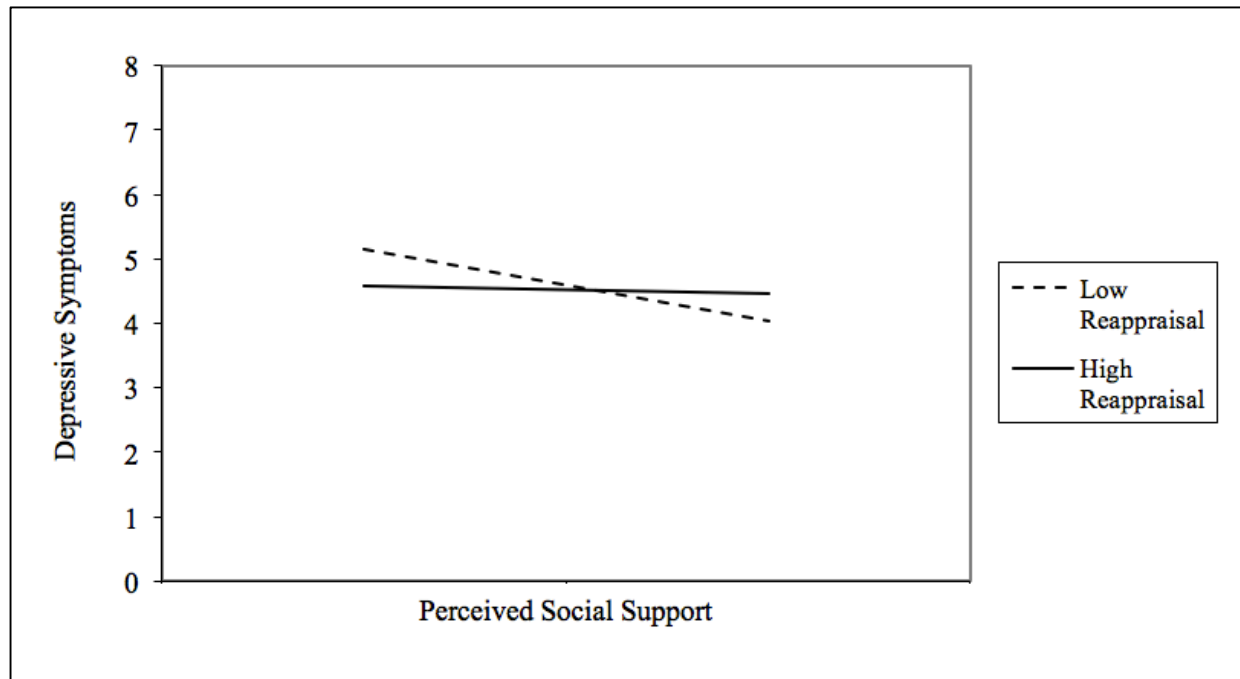


Figure 4. The Moderating Effect of Reappraisal on the Relation between Perceived Social Support and Depressive Symptoms among Students with Higher Levels of Depressive Symptoms

interaction to the model did not improve model fit as indicated by the non-significant change in R^2 of .006, $F(1, 209) = 1.39, p = .240$. Greater social support was associated with lower aggression (Table 19).

Binge eating. The relation between binge eating, social support, and expressive suppression among participants reporting higher binge eating values identified via a median-split was examined using a hierarchical multiple regression with binge eating as the dependent variable. The covariates (i.e., gender, age, relationship status and BMI) and predictors (i.e., social support and suppression) were entered in step one, and the interaction between the predictors was entered in step two.

The relation between the independent variables and binge eating was slightly parabolic. After the BES was transformed by applying the square root, all independent variables were linearly related to the transformed outcome variable and regression results did not differ between models using the untransformed and transformed BES variables. Independence of residuals was indicated by a Durbin-Watson statistic of 1.91. Residuals were normally distributed and constantly varied across the population (homoscedastic). There was no evidence of multicollinearity. No outliers were identified. All subsample participants were included in the final analysis ($n = 209$).

The first model of gender, age, relationship status, BMI, social support and suppression to predict binge eating was statistically significant, $R^2 = .079, F(6, 202) = 2.88, p = .010$, adjusted $R^2 = .051$. The interaction between suppression and social support was not significant, and the addition of the interaction to the model did not improve model fit as indicated by the non-significant change in R^2 of 0.002, $F(1, 201) = 0.35, p = .556$. Greater social support was associated with lower binge eating (Table 20).

Table 19

Hierarchical Multiple Regression Predicting Aggression from Suppression and Social Support among Participants with Higher Aggression

Variable	Aggression								
	Model 1				Model 2				
	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>B</i>	<i>SE</i>	β	<i>t</i>	95% CI
Constant	38.54*	5.44		7.09	38.53*	5.43		7.09	[27.81, 49.24]
Gender ^a	0.65	1.16	0.04	0.56	0.61	1.16	0.04	0.53	[-1.67, 2.90]
Age	0.13	0.27	0.03	0.49	0.12	0.27	0.03	0.46	[-0.41, 0.65]
Social Support	-0.09*	0.03	-0.21	-2.93	-0.09*	0.03	-0.20	-2.82	[-0.15, -0.03]
Suppression	0.16	0.12	0.10	1.34	0.16	0.12	0.11	1.42	[-0.06, 0.39]
Social Support x Suppression					-0.01	0.01	-0.08	-1.18	[-0.02, 0.01]
R^2	.070				.076				
F	3.97*				3.46*				
ΔR^2					.006				
ΔF					0.24				

Note. $n = 215$. CI = confidence interval.

^aMale was the reference group.

* $p < .05$.

Depressive symptoms. The relation between depressive symptoms, social support, and expressive suppression among participants reporting higher depressive symptoms identified via a median-split was examined using a hierarchical multiple regression with depressive symptoms as the dependent variable. The covariates (i.e., gender, age, and relationship status) and predictors (i.e., social support and suppression) were entered in step one, and the interaction between the predictors was entered in step two.

The relation between the independent variables and depressive symptoms was slightly parabolic. After the CES-D was transformed by applying the square root, all independent variables were linearly related to the transformed outcome variable and regression results did not differ between models using the untransformed and transformed CES-D variables. Independence of residuals was indicated by a Durbin-Watson statistic of 1.92. Residuals were normally distributed and constantly varied across the population (homoscedastic). There was no evidence of multicollinearity. One discrepant outlier was detected. However, regression results did not differ in a reanalysis with the outlier excluded, suggesting that the model is robust to the impact of the outlier. All subsample participants were included in the final analysis ($n = 215$).

The first model of gender, age, relationship status, social support and suppression to predict depressive symptoms was statistically significant, $R^2 = .117$, $F(5, 209) = 5.55$, $p < .001$, adjusted $R^2 = .096$. The interaction between suppression and social support was not significant, and the addition of the interaction to the model did not improve model fit as indicated by the non-significant change in R^2 of .003, $F(1, 208) = 0.60$, $p = .438$. As seen in Table 21, greater social support and male gender were associated with lower depressive symptoms.

Table 20

Hierarchical Multiple Regression Predicting Binge Eating from Suppression and Social Support among Participants with Higher Binge Eating

Variable	Binge Eating								
	Model 1				Model 2				
	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>B</i>	<i>SE</i>	β	<i>t</i>	95% CI
Constant	2.87*	0.58		4.98	2.89*	0.58		4.99	[1.74, 4.03]
Gender ^a	0.21*	0.13	0.12	1.66	0.21*	0.13	0.12	1.62	[-0.05, 0.46]
Age	0.01	0.03	0.02	0.22	0.01	0.03	0.02	0.22	[-0.05, 0.06]
Relationship Status ^b	0.10	0.13	0.06	0.77	0.10	0.13	0.06	0.79	[-0.16, 0.37]
BMI	0.02	0.01	0.12	1.78	0.02	0.01	0.12	1.76	[-0.002, 0.03]
Social Support	-0.01*	0.003	-0.23	-3.15	-0.01*	0.003	-0.23	-3.19	[-0.02, -0.004]
Suppression	-0.01	0.01	-0.06	-0.78	-0.01	0.01	-0.07	-0.88	[-0.03, 0.01]
Social Support x Suppression					0.0004	0.001	0.04	0.59	[-0.001, 0.002]
R^2	.079				.080				
F	2.88*				2.51*				
ΔR^2					.002				
ΔF					0.35				

Note. $n = 209$. CI = confidence interval; BMI = Body Mass Index.

^aMale was the reference group. ^bSingle was the reference group.

* $p < .05$.

Table 21

Hierarchical Multiple Regression Predicting Depressive Symptoms from Suppression and Social Support among Participants with Higher Depressive Symptoms

Variable	Depressive Symptoms									
	Model 1					Model 2				
	<i>B</i>	<i>SE</i>	β	<i>t</i>		<i>B</i>	<i>SE</i>	β	<i>t</i>	95% CI
Constant	4.54*	0.61		7.49		4.57*	0.61		7.52	[3.37, 5.77]
Gender ^a	0.32*	0.14	0.16	2.33		0.33*	0.14	0.16	2.38	[0.06, 0.61]
Age	-0.01	0.03	-0.01	-0.21		-0.01	0.03	-0.02	-0.25	[-0.07, 0.05]
Relationship Status ^b	-0.07	0.17	-0.03	-0.44		-0.07	0.17	-0.03	-0.43	[-0.40, 0.26]
Social Support	-0.02*	0.003	-0.32	-4.75		-0.02*	0.003	-0.33	-4.80	[-0.02, -0.01]
Suppression	0.004	0.01	0.02	0.34		0.003	0.01	0.01	0.20	[-0.02, 0.03]
Social Support x Suppression						0.001	0.001	0.05	0.78	[-0.001, 0.002]
R^2	.117					.120				
F	5.55*					4.72*				
ΔR^2						.003				
ΔF						0.60				

Note. $n = 215$. CI = confidence interval.

^aMale was the reference group. ^bSingle was the reference group.

* $p < .05$.

Research Question

Similar to the analyses for hypotheses two through four, the research question was tested with a series of nine hierarchical multiple regressions for each of the outcome variables (i.e., aggression, binge eating, and depressive symptoms) and moderators (i.e., sense of belonging, cognitive reappraisal, and expressive suppression). These analyses examined whether the relations among the predictor variables differ by race (i.e., European American and African American students) by testing the three-way interactions between social support, each of the moderators, and race. The same covariates were included as in the prior analyses and all predictors were centered prior to creating the interaction terms. Since the research question explored differences between European American and African American students, the race variable was dummy coded with European American students as the reference group. Participants who identified their race as other than European American ($n = 193$) or African American ($n = 153$) were excluded from these analyses resulting in a total subsample size of 346 students.

Assumptions were checked for each model following the same guidelines described above. As in the prior hierarchical regressions, tests of assumptions with the binge eating and depressive symptom outcome variables indicated skewed distributions of the residuals, and therefore, non-linear relations between the model predictors and the BES and CES-D. Where noted below, a square root transformation of these variables was used, which addressed the skewed distribution of residuals in these models. The transformed BES had a skew value of -0.02 and kurtosis value of -0.32, and the transformed CES-D scale had a skew value of 0.05 and kurtosis value of 0.26. Given the exploratory nature of these analyses and the minimal consequences of type I errors, no alpha correction was used for the following analyses.

Sense of belonging.

Aggression. The relation between aggression, social support, sense of belonging, and race was examined using a hierarchical multiple regression with aggression as the dependent variable. The covariates (i.e., gender and age) and predictors (i.e., social support, sense of belonging, and race) were entered in step one, the two-way interactions between the predictors were entered in step two, and the three-way interaction between social support, sense of belonging and race was entered in step three.

All independent variables were collectively and independently linearly related to aggression. Independence of residuals was indicated by a Durbin-Watson statistic of 2.12. Residuals were normally distributed and constantly varied across the population (homoscedastic). There was no evidence of multicollinearity. One discrepant outlier was detected. However, regression results did not differ in a reanalysis with the outlier excluded, suggesting that the model is robust to the impact of this outlier. All subsample participants were included in the final analysis ($n = 346$).

The first model of gender, age, social support, sense of belonging, and race to predict aggression was statistically significant, $R^2 = .209$, $F(5, 340) = 18.02$, $p < .001$, adjusted $R^2 = .198$. The three-way interaction between sense of belonging, social support, and race was not significant, and the addition of the interaction to the model did not improve model fit as indicated by the non-significant change in R^2 of .002, $F(1, 336) = 0.80$, $p = .372$. None of the two-way interactions were significant, and their collective addition to the model did not significantly improve model fit. Greater sense of belonging was associated with lower aggression (Table 22).

Table 22

Hierarchical Multiple Regression Predicting Aggression from Sense of Belonging, Social Support, and Race

Variable	Aggression						
	Model 1	Model 2	Model 3				
	<i>B</i>	<i>B</i>	<i>B</i>	<i>SE</i>	β	<i>t</i>	95% CI
Constant	42.22*	40.64*	40.53*	5.56		7.24	[29.52, 51.55]
Gender ^a	-1.03	-0.78	-0.76	1.27	-0.03	-0.60	[-3.25, 1.74]
Age	-0.46	-0.37	-0.37	0.27	-0.07	-1.34	[-0.91, 0.17]
Race ^b	0.40	0.31	0.01	0.66	0.001	0.02	[-1.29, 1.32]
Social Support	-0.01	-0.03	-0.03	0.05	-0.05	-0.71	[-0.12, 0.06]
Belonging	-0.49*	-0.52*	-0.52*	0.08	-0.45	-6.45	[-0.68, -0.36]
Social Support x Belonging		-0.003	-0.002	0.003	-0.04	-0.77	[-0.01, 0.003]
Social Support x Race		-0.02	-0.01	0.05	-0.01	-0.18	[-0.10, 0.08]
Belonging x Race		-0.11	-0.11	0.08	-0.09	-1.35	[-0.27, 0.05]
Social Support x Belonging x Race			0.002	0.003	0.06	0.89	[-0.003, 0.01]
R^2	.209	.226	.228				
F	18.02*	12.33*	11.05*				
ΔR^2		.02	.002				
ΔF		2.47	0.80				

Note. African American, $n = 153$; European American, $n = 193$; $N = 346$. CI = confidence interval; Belonging = sense of belonging.

^aMale was the reference group. ^bEuropean American was the reference group.

* $p < .05$.

Binge eating. The relation between binge eating, social support, sense of belonging, and race was examined using a hierarchical multiple regression with binge eating as the dependent variable. The covariates (i.e., gender, age, relationship status, and BMI) and predictors (i.e., social support, sense of belonging, and race) were entered in step one, the two-way interactions between the predictors were entered in step two, and the three-way interaction between social support, sense of belonging and race was entered in step three.

The relation between the independent variables and binge eating was slightly parabolic. After the BES was transformed by applying the square root, all independent variables were linearly related to the transformed outcome variable and regression results did not differ between models using the untransformed and transformed BES variables. Independence of residuals was indicated by a Durbin-Watson statistic of 2.09. Residuals were normally distributed and constantly varied across the population (homoscedastic). There was no evidence of multicollinearity. No outliers were identified. All subsample participants were included in the final analysis ($n = 346$).

The first model of gender, age, relationship status, BMI, social support, sense of belonging, and race to predict binge eating was statistically significant, $R^2 = .189$, $F(7, 338) = 11.25$, $p < .001$, adjusted $R^2 = .172$. Male gender, African American race, lower BMI, and higher sense of belonging were associated with lower binge eating (Table 23). The three-way interaction among sense of belonging, social support, and race was not significant, and the addition of the interaction to the model did not improve model fit as indicated by the non-significant change in R^2 of .0001, $F(1, 334) = 0.04$, $p = .837$. One of the three two-way interactions was significant, though the collective addition of the two-way interactions to the model in step two did not significantly improve model fit. Figure 5 is a plot of the significant

Table 23

Hierarchical Multiple Regression Predicting Binge Eating from Sense of Belonging, Social Support, and Race

Variable	Binge Eating						
	Model 1	Model 2	Model 3				95% CI
	<i>B</i>	<i>B</i>	<i>B</i>	<i>SE</i>	β	<i>t</i>	
Constant	0.70	0.90	0.91	0.69		1.31	[-0.45, 2.26]
Gender ^a	0.56*	0.56*	0.56*	0.14	0.20	3.97	[0.28, 0.83]
Age	-0.01	-0.01	-0.01	0.03	-0.02	-0.45	[-0.08, 0.05]
Relationship Status ^b	0.14	0.19	0.19	0.16	0.06	1.15	[-0.13, 0.51]
BMI	0.06*	0.06*	0.06*	0.01	0.26	5.18	[0.04, 0.08]
Race ^c	-0.25*	-0.25*	-0.25*	0.07	-0.19	-3.36	[-0.39, -0.10]
Social Support	0.001	0.001	0.001	0.01	0.01	0.08	[-0.02, 0.02]
Belonging	-0.03*	-0.03*	-0.03*	0.01	-0.23	-3.29	[-0.05, -0.01]
Social Support x Belonging		-0.0004	-0.0004	0.0003	-0.08	-1.33	[-0.001, 0.001]
Social Support x Race		-0.002	-0.002	0.01	-0.03	-0.41	[-0.01, 0.01]
Belonging x Race		0.02*	0.02*	0.01	0.14	2.00	[0.0003, 0.04]
Social Support x Belonging x Race			-0.0006	0.0003	-0.01	-0.21	[-0.001, 0.001]
R^2	.189	.206	.206				
F	11.25*	8.69*	7.88*				
ΔR^2		.02	.0001				
ΔF		2.39	0.04				

Note. African American, $n = 153$; European American, $n = 193$; $N = 346$. CI = confidence interval; BMI = Body Mass Index; Belonging = sense of belonging.

^aMale was the reference group. ^bSingle was the reference group. ^cEuropean American was the reference group.

* $p < .05$.



Figure 5. The Effect of Sense of Belonging on Binge Eating among European American vs. African American Students

two-way interaction between sense of belonging and race. The figure and simple slope tests indicate that higher sense of belonging was associated with less binge eating for European American students, as indicated by the significant simple slope gradient of -0.029 , $t(336) = -3.27$, $p = .001$. However, sense of belonging was not significantly related to binge eating for African American students, as the slope gradient of -0.011 was not significant, $t(336) = -0.71$, $p = .476$.

Depressive symptoms. The relation between depressive symptoms, social support, sense of belonging, and race was examined using a hierarchical multiple regression with depressive symptoms as the dependent variable. The covariates (i.e., gender, age, and relationship status) and predictors (i.e., social support, sense of belonging, and race) were entered in step one, the two-way interactions between the predictors were entered in step two, and the three-way interaction between social support, sense of belonging and race was entered in step three.

The relation between the independent variables and depressive symptoms was slightly parabolic. After the CES-D was transformed by applying the square root, all independent variables were linearly related to the transformed outcome variable and regression results did not differ between models using the untransformed and transformed CES-D variables. Independence of residuals was indicated by a Durbin-Watson statistic of 2.02. Residuals were normally distributed and constantly varied across the population (homoscedastic). There was no evidence of multicollinearity. Four discrepant outliers were detected. However, regression results did not differ in a reanalysis with the outliers excluded, suggesting that the model is robust to the impact of these outliers. All subsample participants were included in the final analysis ($n = 346$).

The first model of gender, age, relationship status, social support, sense of belonging and race to predict depressive symptoms was statistically significant, $R^2 = .444$, $F(6, 339) =$

45.17, $p < .001$, adjusted $R^2 = .434$. Male gender, greater social support and greater sense of belonging were associated with lower depressive symptoms (Table 24). The three-way interaction between sense of belonging, social support, and race was not significant, and the addition of the interaction to the model did not improve model fit as indicated by the non-significant change in R^2 of .0002, $F(1, 335) = 0.14$, $p = .706$. None of the two-way interactions were significant, and their collective addition to the model did not significantly improve model fit.

Cognitive reappraisal.

Aggression. The relation between aggression, social support, cognitive reappraisal, and race was examined using a hierarchical multiple regression with aggression as the dependent variable. The covariates (i.e., gender and age) and predictors (i.e., social support, reappraisal, and race) were entered in step one, the two-way interactions between the predictors were entered in step two, and the three-way interaction between social support, reappraisal and race was entered in step three.

All independent variables were collectively and independently linearly related to aggression. Independence of residuals was indicated by a Durbin-Watson statistic of 2.09. Residuals were normally distributed and constantly varied across the population (homoscedastic). There was no evidence of multicollinearity. No outliers were identified. All subsample participants were included in the final analysis ($n = 346$).

The first model of gender, age, social support, reappraisal and race to predict aggression was statistically significant, $R^2 = .127$, $F(5, 340) = 9.91$, $p < .001$, adjusted $R^2 = .114$. Greater social support was associated with lower aggression (Table 25). The three-way interaction between social support, reappraisal, and race was not significant, and the addition of the

Table 24

Hierarchical Multiple Regression Predicting Depressive Symptoms from Sense of Belonging, Social Support, and Race

Variable	Depressive Symptoms						
	Model 1	Model 2	Model 3				
	<i>B</i>	<i>B</i>	<i>B</i>	<i>SE</i>	β	<i>t</i>	95% CI
Constant	3.54*	3.53*	3.53*	0.57		6.18	[2.41, 4.65]
Gender ^a	0.34*	0.34*	0.34*	0.13	0.11	2.75	[0.10, 0.59]
Age	-0.01	-0.01	-0.01	0.03	-0.02	-0.42	[-0.07, 0.04]
Relationship Status ^b	-0.28	-0.28	-0.28	0.15	-0.08	-1.94	[-0.56, 0.004]
Race ^c	-0.03	-0.03	-0.04	0.07	-0.03	-0.60	[-0.17, 0.09]
Social Support	-0.01*	-0.01*	-0.01*	0.01	-0.18	-2.94	[-0.02, -0.004]
Belonging	-0.07*	-0.07*	-0.07*	0.01	-0.52	-8.86	[-0.09, -0.06]
Social Support x Belonging		0.0001	0.0001	0.0003	0.02	0.36	[-0.0004, 0.001]
Social Support x Race		0.01	0.01	0.01	0.07	1.11	[-0.004, 0.01]
Belonging x Race		-0.01	-0.01	0.01	-0.07	-1.12	[-0.02, 0.01]
Social Support x Belonging x Race			0.0001	0.0003	0.02	0.38	[-0.0004, 0.001]
R^2	.444	.447	.447				
F	47.27*	31.69*	28.54*				
ΔR^2		.003	.0002				
ΔF		0.51	0.14				

Note. African American, $n = 153$; European American, $n = 193$; $N = 346$. CI = confidence interval; Belonging = sense of belonging.

^aMale was the reference group. ^bSingle was the reference group. ^cEuropean American was the reference group.

* $p < .05$.

Table 25

Hierarchical Multiple Regression Predicting Aggression from Reappraisal, Social Support, and Race

Variable	Aggression						
	Model 1	Model 2	Model 3				
	<i>B</i>	<i>B</i>	<i>B</i>	<i>SE</i>	β	<i>t</i>	95% CI
Constant	41.78*	41.11*	41.11*	5.96		6.90	[29.39, 52.83]
Gender ^a	-1.49	-1.35	-1.37	1.34	-0.05	-1.02	[-4.01, 1.27]
Age	-0.42	-0.39	-0.39	0.29	-0.07	-1.33	[-0.96, 0.19]
Race ^b	0.67	0.65	0.79	0.64	0.07	1.24	[-0.47, 2.06]
Social Support	-0.19*	-0.20*	-0.19*	0.04	-0.30	-5.29	[-0.27, -0.12]
Reappraisal	-0.14	-0.16	-0.17	0.10	-0.09	-1.66	[-0.37, 0.03]
Social Support x Reappraisal		-0.004	-0.004	0.01	-0.04	-0.79	[-0.01, 0.01]
Social Support x Race		-0.05	-0.05	0.04	-0.07	-1.27	[-0.12, 0.03]
Reappraisal x Race		0.07	0.06	0.10	0.03	0.62	[-0.14, 0.27]
Social Support x Reappraisal x Race			-0.004	0.01	-0.04	0.46	[-0.01, 0.01]
R^2	.127	.135	.136				
F	9.91*	6.57*	5.89*				
ΔR^2		.01	.001				
ΔF		1.00	0.56				

Note. African American, $n = 153$; European American, $n = 193$; $N = 346$. CI = confidence interval.

^aMale was the reference group. ^bEuropean American was the reference group.

* $p < .05$.

interaction to the third model did not improve model fit as indicated by the non-significant change in R^2 of .001, $F(1, 336) = 0.56, p = .455$. None of the two-way interactions were significant, and their collective addition to the second model did not improve model fit.

Binge eating. The relation between binge eating, social support, cognitive reappraisal, and race was examined using a hierarchical multiple regression with binge eating as the dependent variable. The covariates (i.e., gender, age, relationship status and BMI) and predictors (i.e., social support, reappraisal, and race) were entered in step one, the two-way interactions between the predictors were entered in step two, and the three-way interaction between social support, reappraisal and race was entered in step three.

The relation between the independent variables and binge eating was slightly parabolic. After the BES was transformed by applying the square root, all independent variables were linearly related to the transformed outcome variable and regression results did not differ between models using the untransformed and transformed BES variables. Independence of residuals was indicated by a Durbin-Watson statistic of 2.03. Residuals were normally distributed and constantly varied across the population (homoscedastic). There was no evidence of multicollinearity. One discrepant outlier was detected. However, regression results did not differ in a reanalysis with the outlier excluded, suggesting that the model is robust to the impact of the outlier. All subsample participants were included in the final analysis ($n = 346$).

The first model of gender, age, relationship status, BMI, social support, reappraisal, and race to predict binge eating was statistically significant, $R^2 = .162, F(7, 338) = 9.33, p < .001$, adjusted $R^2 = .145$. Male gender, African American race, lower BMI, and greater social support were associated with lower binge eating (Table 26). The three-way interaction between social support, reappraisal, and race was not significant, and the addition of the interaction to the model

Table 26

Hierarchical Multiple Regression Predicting Binge Eating from Reappraisal, Social Support, and Race

Variable	Binge Eating						
	Model 1	Model 2	Model 3				
	<i>B</i>	<i>B</i>	<i>B</i>	<i>SE</i>	β	<i>t</i>	95% CI
Constant	0.73	0.88	0.85	0.71		1.20	[-0.54, 2.24]
Gender ^a	0.53*	0.52*	0.52*	0.14	0.18	3.61	[0.24, 0.80]
Age	-0.01	-0.02	-0.02	0.03	-0.03	-0.50	[-0.08, 0.05]
Relationship Status ^b	0.15	0.18	0.17	0.17	0.06	1.05	[-0.15, 0.50]
BMI	0.06*	0.06*	0.06*	0.01	0.27	5.24	[0.04, 0.09]
Race ^c	-0.23*	-0.23*	-0.21*	0.07	-0.16	-3.06	[-0.34, -0.08]
Social Support	-0.01*	-0.01*	-0.01*	0.004	-0.12	-2.16	[-0.02, -0.001]
Reappraisal	-0.03	-0.01	-0.01	0.01	-0.04	-0.68	[-0.03, 0.01]
Social Support x Reappraisal		0.0003	0.0003	0.001	0.03	0.49	[-0.001, 0.001]
Social Support x Race		0.01	0.01	0.004	0.07	1.21	[-0.003, 0.01]
Reappraisal x Race		0.004	0.004	0.01	0.02	0.33	[-0.02, 0.03]
Social Support x Reappraisal x Race			-0.001	0.001	-0.06	-1.16	[-0.002, 0.0004]
R^2	.162	.168	.172				
F	12.87*	9.37*	8.69*				
ΔR^2		.01	.003				
ΔF		0.86	1.35				

Note. African American, $n = 153$; European American, $n = 193$; $N = 346$. CI = confidence interval; BMI = Body Mass Index.

^aMale was the reference group. ^bSingle was the reference group. ^cEuropean American was the reference group.

* $p < .05$.

did not improve model fit as indicated by the non-significant change in R^2 of .003, $F(1, 334) = 1.35$, $p = .246$. None of the two-way interactions were significant, and their collective addition to the model did not significantly improve model fit.

Depressive symptoms. The relation between depressive symptoms, social support, cognitive reappraisal, and race was examined using a hierarchical multiple regression with depressive symptoms as the dependent variable. The covariates (i.e., gender, age, and relationship status) and predictors (i.e., social support, reappraisal, and race) were entered in step one, the two-way interactions between the predictors were entered in step two, and the three-way interaction between social support, reappraisal and race was entered in step three.

The relation between the independent variables and depressive symptoms was slightly parabolic. After the CES-D was transformed by applying the square root, all independent variables were linearly related to the transformed outcome variable and regression results did not differ between models using the untransformed and transformed CES-D variables. Independence of residuals was indicated by a Durbin-Watson statistic of 1.97. Residuals were normally distributed and constantly varied across the population (homoscedastic). There was no evidence of multicollinearity. Three discrepant outliers were detected. However, regression results did not differ in a reanalysis with the outliers excluded, suggesting that the model is robust to the impact of these outliers. All subsample participants were included in the final analysis ($n = 346$).

The first model of gender, age, relationship status, social support and reappraisal to predict depressive symptoms was statistically significant, $R^2 = .314$, $F(6, 339) = 25.80$, $p < .001$, adjusted $R^2 = .301$. Male gender and greater social support were associated with lower depressive symptoms (Table 27). The interaction between reappraisal and social support was not significant, and the addition of the interaction to the model did not improve model fit as

Table 27

Hierarchical Multiple Regression Predicting Depressive Symptoms from Reappraisal, Social Support, and Race

Variable	Depressive Symptoms						
	Model 1	Model 2	Model 3				
	<i>B</i>	<i>B</i>	<i>B</i>	<i>SE</i>	β	<i>t</i>	95% CI
Constant	3.57*	3.66*	3.65*	0.64		5.73	[2.40, 4.90]
Gender ^a	0.27*	0.27	0.26	0.14	0.09	1.91	[-0.10, 0.54]
Age	-0.01	-0.02	-0.02	0.03	-0.02	-0.47	[-0.08, 0.05]
Relationship Status ^b	-0.24	-0.22	-0.23	0.16	-0.07	-1.43	[-0.55, 0.09]
Race ^c	0.002	0.002	0.02	0.07	0.02	0.31	[-0.11, 0.15]
Social Support	-0.04*	-0.04*	-0.04*	0.004	-0.51	-10.25	[-0.05, -0.03]
Reappraisal	-0.01	-0.01	-0.01	0.01	-0.05	-1.06	[-0.03, 0.01]
Social Support x Reappraisal		0.0001	0.0001	0.001	0.01	0.11	[-0.001, 0.001]
Social Support x Race		0.004	0.004	0.004	0.06	1.15	[-0.003, 0.01]
Reappraisal x Race		-0.001	-0.001	0.01	-0.01	-0.14	[-0.02, 0.02]
Social Support x Reappraisal x Race			-0.0005	0.001	-0.05	-0.95	[-0.002, 0.001]
R^2	.314	.317	.318				
F	25.80*	17.30*	15.66*				
ΔR^2		.003	.002				
ΔF		0.51	0.90				

Note. African American, $n = 153$; European American, $n = 193$; $N = 346$. CI = confidence interval.

^aMale was the reference group. ^bSingle was the reference group. ^cEuropean American was the reference group.

* $p < .05$.

indicated by the non-significant change in R^2 of .002, $F(1, 335) = 0.90$, $p = .343$. None of the two-way interactions were significant, and their collective addition to the model did not significantly improve model fit.

Expressive suppression.

Aggression. The relation between aggression, social support, expressive suppression, and race was examined using a hierarchical multiple regression with aggression as the dependent variable. The covariates (i.e., gender and age) and predictors (i.e., social support, suppression, and race) were entered in step one, the two-way interactions between the predictors were entered in step two, and the three-way interaction between social support, suppression and race was entered in step three.

All independent variables were collectively and independently linearly related to aggression. Independence of residuals was indicated by a Durbin-Watson statistic of 2.11. Residuals were normally distributed and constantly varied across the population (homoscedastic). There was no evidence of multicollinearity. No outliers were identified. All subsample participants were included in the final analysis ($n = 346$).

The first model of gender, age, social support, suppression, and race to predict aggression was statistically significant, $R^2 = .122$, $F(5, 340) = 9.44$, $p < .001$, adjusted $R^2 = .109$. Higher social support was associated with lower aggression (Table 28). The three-way interaction between suppression, social support, and race was significant, though the addition of the interaction to the second model only explained an additional 1.0% of the variance in aggression, R^2 change = .01, $F(1, 336) = 4.86$, $p = .028$. None of the two-way interactions were significant when entered in model two. Figure 6 is a plot of the significant three-way interaction, depicting that for all groups, higher social support was associated with lower aggression. The figure

Table 28

Hierarchical Multiple Regression Predicting Aggression from Suppression, Social Support, and Race

Variable	Aggression						
	Model 1	Model 2	Model 3				
	<i>B</i>	<i>B</i>	<i>B</i>	<i>SE</i>	β	<i>t</i>	95% CI
Constant	42.67*	42.24*	42.70*	5.93		7.20	[31.04, 54.36]
Gender ^a	-1.54	-1.69	-2.13	1.39	-0.08	-1.54	[-4.85, 0.60]
Age	-0.46	-0.43	-0.44	0.29	-0.08	-1.51	[-1.01, 0.13]
Race ^b	0.53	0.53	0.02	0.65	0.002	0.03	[-1.25, 1.29]
Social Support	-0.21*	-0.22*	-0.22*	0.14	-0.33	-5.87	[-0.29, -0.14]
Suppression	-0.02	-0.03	-0.08	0.01	-0.04	-0.61	[-0.36, 0.19]
Social Support x Suppression		0.003	0.01	0.01	0.04	0.78	[-0.01, 0.02]
Social Support x Race		-0.03	-0.02	0.04	-0.03	-0.44	[-0.09, 0.06]
Suppression x Race		0.16	0.21	0.14	0.09	1.53	[-0.06, 0.47]
Social Support x Suppression x Race			-0.02*	0.01	-0.13	-2.21	[-0.03, -0.002]
R^2	.122	.130	.142				
F	9.45*	6.28*	6.19*				
ΔR^2		.01	.01				
ΔF		1.01	4.86*				

Note. African American, $n = 153$; European American, $n = 193$; $N = 346$. CI = confidence interval.

^aMale was the reference group. ^bEuropean American was the reference group.

* $p < .05$.

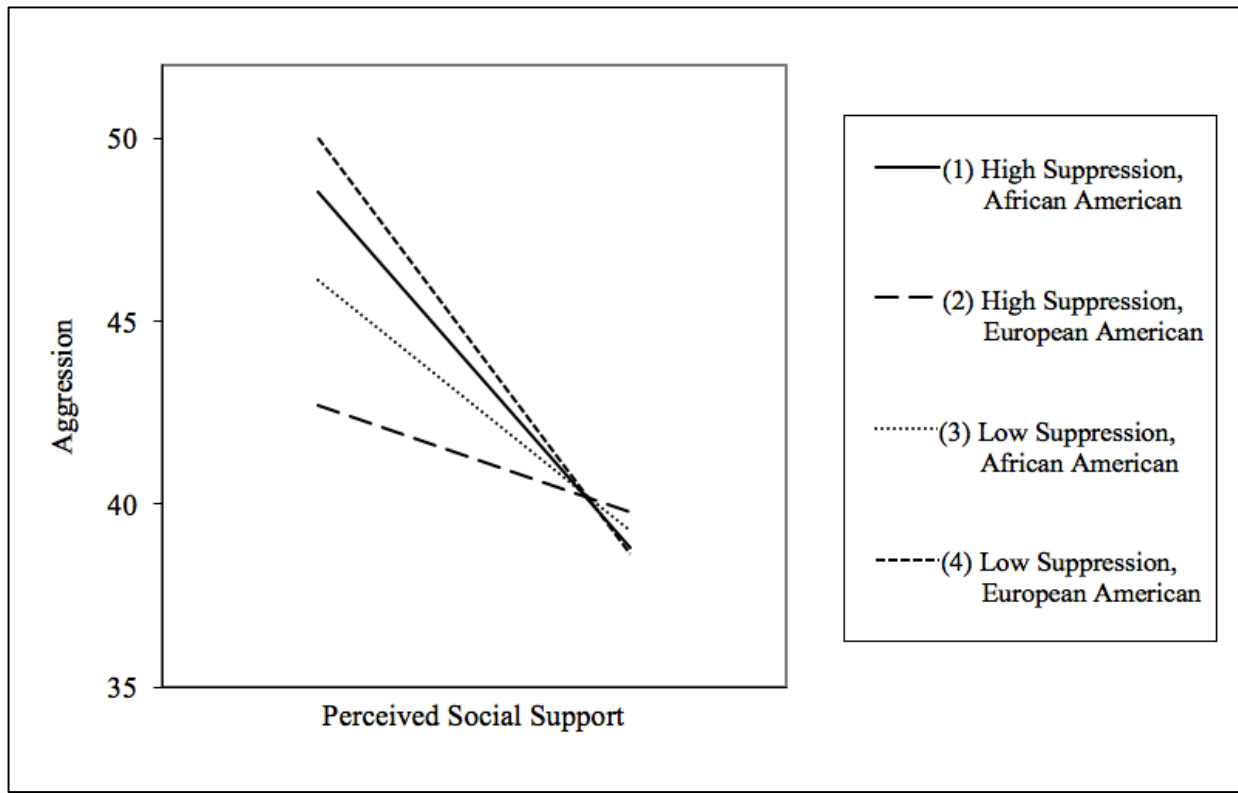


Figure 6. The Moderating Effect of Suppression on the Relation between Perceived Social Support and Aggression among European American vs. African American Students

indicates that the association between PSS and aggression was stronger for African American students than for European American students among students who reported high suppression. Conversely, the association between PSS and aggression was stronger for European American students than for African American students who reported low suppression. The only significant difference among all pairwise comparisons of slopes was between European American students with high suppression compared to European American students with low suppression (see Appendix J-1).

Binge eating. The relation between binge eating, social support, expressive suppression, and race was examined using a hierarchical multiple regression with binge eating as the dependent variable. The covariates (i.e., gender, age, relationship status and BMI) and predictors (i.e., social support, suppression, and race) were entered in step one, the two-way interactions between the predictors were entered in step two, and the three-way interaction between social support, suppression, and race was entered in step three.

The relation between the independent variables and binge eating was slightly parabolic. After the BES was transformed by applying the square root, all independent variables were linearly related to the transformed outcome variable and regression results did not differ between models using the untransformed and transformed BES variables. Independence of residuals was indicated by a Durbin-Watson statistic of 1.97. Residuals were normally distributed and constantly varied across the population (homoscedastic). There was no evidence of multicollinearity. No outliers were identified. All subsample participants were included in the final analysis ($n = 346$).

The first model of gender, age, relationship status, BMI, social support, suppression, and race to predict binge eating was statistically significant, $R^2 = .170$, $F(7, 338) = 9.88$, $p < .001$,

adjusted $R^2 = .153$. Greater social support, lower BMI, African American race and male gender were associated with lower binge eating (Table 29). The three-way interaction between suppression, social support, and race was not significant, and the addition of the interaction in the third model did not improve model fit as indicated by the non-significant change in R^2 of .001, $F(1, 334) = 0.38, p = .540$. In the second model, two of the three two-way interactions were significant, though the addition of the two-way interactions to the model only explained an additional 2.1% of the variance in binge eating, R^2 change = .021, $F(3, 335) = 2.85, p = .038$.

Figure 7 is a plot of the significant two-way interaction between perceived social support and race. Simple slope tests indicate that higher social support was associated with less binge eating for European American students, as indicated by the significant simple slope gradient of $-0.007, t(336) = -1.75, p = .041$. However, social support was not significantly related to binge eating among African American students, as the slope gradient of 0.002 was not significant, $t(336) = 0.23, p = .819$. Figure 8 is a plot of the significant two-way interaction between suppression and race. Simple slope tests indicate that higher suppression was associated with more binge eating for African American students, as indicated by the significant simple slope gradient of $0.061, t(336) = 2.02, p = .045$. However, suppression was not related to binge eating among European American students, as the slope gradient of 0.028 was not significant, $t(336) = 1.96, p = .051$.

Depressive symptoms. The relation between depressive symptoms, social support, expressive suppression, and race was examined using a hierarchical multiple regression with depressive symptoms as the dependent variable. The covariates (i.e., gender, age, and relationship status) and predictors (i.e., social support, suppression, and race) were entered in step one, the two-way interactions between the predictors were entered in step two, and the

Table 29

Hierarchical Multiple Regression Predicting Binge Eating from Suppression, Social Support, and Race

Variable	Binge Eating						
	Model 1	Model 2	Model 3				95% CI
	<i>B</i>	<i>B</i>	<i>B</i>	<i>SE</i>	β	<i>t</i>	
Constant	0.57	0.80	0.82	0.70		1.16	[-0.57, 2.20]
Gender ^a	0.59*	0.55*	0.53*	0.15	0.19	3.66	[0.25, 0.82]
Age	-0.01	-0.01	-0.01	0.03	-0.02	-0.44	[-0.08, 0.05]
Relationship Status ^b	0.15	0.18	0.18	0.16	0.06	1.11	[-0.14, 0.51]
BMI	0.07*	0.06*	0.06*	0.01	0.27	5.27	[0.04, 0.09]
Race ^c	-0.25*	-0.25*	-0.26*	0.07	-0.21	-3.85	[-0.40, -0.13]
Social Support	-0.01*	-0.01	-0.01	0.004	-0.10	-1.79	[-0.02, 0.001]
Suppression	0.03	0.03	-0.03	0.02	0.10	1.78	[-0.003, 0.06]
Social Support x Suppression		0.001	0.001	0.001	0.05	0.89	[-0.001, 0.002]
Social Support x Race		0.01*	0.01*	0.004	0.14	2.43	[0.002, 0.02]
Suppression x Race		0.03*	0.04*	0.01	0.13	2.43	[0.01, 0.06]
Social Support x Suppression x Race			-0.0004	0.001	-0.03	-0.61	[-0.002, 0.001]
R^2	.170	.190	.191				
F	9.88*	7.88*	7.19*				
ΔR^2		.02	.001				
ΔF		2.85	0.38				

Note. African American, $n = 153$; European American, $n = 193$; $N = 346$. CI = confidence interval; BMI = Body Mass Index.

^aMale was the reference group. ^bSingle was the reference group. ^cEuropean American was the reference group.

* $p < .05$.

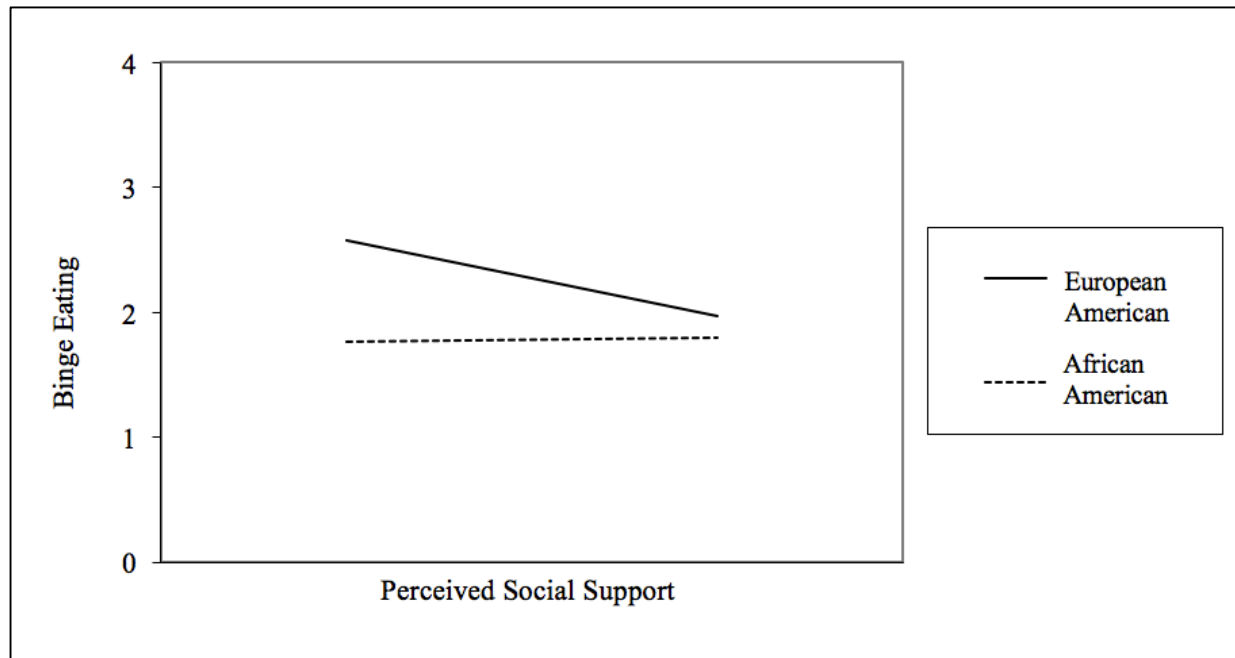


Figure 7. The Effect of Perceived Social Support on Binge Eating among European American vs. African American Students

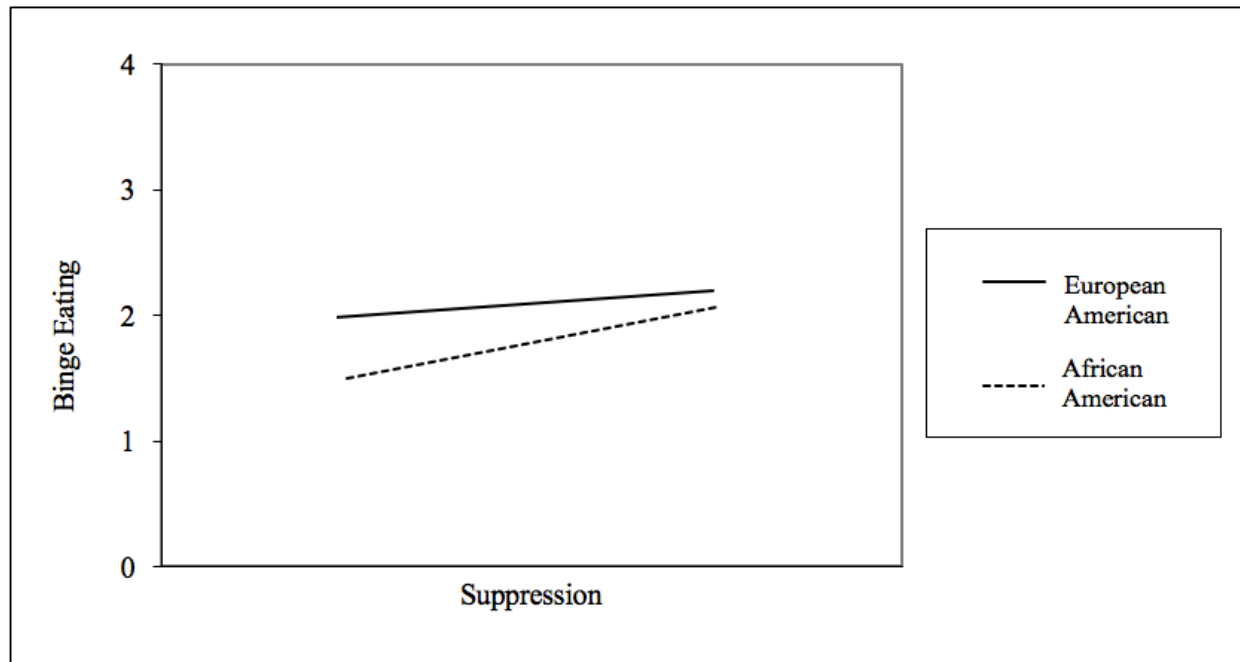


Figure 8. The Effect of Suppression on Binge Eating among European American vs. African American Students

three-way interaction between social support, suppression and race was entered in step three.

The relation between the independent variables and depressive symptoms was slightly parabolic. After the CES-D was transformed by applying the square root, all independent variables were linearly related to the transformed outcome variable and regression results did not differ between models using the untransformed and transformed CES-D variables. Independence of residuals was indicated by a Durbin-Watson statistic of 1.95. Residuals were normally distributed and constantly varied across the population (homoscedastic). There was no evidence of multicollinearity. Two discrepant outliers were detected. However, regression results did not differ in a reanalysis with the outliers excluded, suggesting that the model is robust to the impact of these outliers. All subsample participants were included in the final analysis ($n = 346$).

The first model of gender, age, relationship status, social support, suppression, and race to predict depressive symptoms was statistically significant, $R^2 = .319$, $F(6, 339) = 26.43$, $p < .001$, adjusted $R^2 = .307$. Greater social support and male gender were associated with lower depressive symptoms (Table 30). The three-way interaction between suppression, social support, and race was not significant, and the addition of the interaction to the model did not improve model fit as indicated by the non-significant change in R^2 of .002, $F(1, 335) = 0.82$, $p = .366$. None of the two-way interactions were significant, and their collective addition to the model did not significantly improve model fit.

Table 30

Hierarchical Multiple Regression Predicting Depressive Symptoms from Suppression, Social Support, and Race

Variable	Depressive Symptoms						
	Model 1	Model 2	Model 3				95% CI
	<i>B</i>	<i>B</i>	<i>B</i>	<i>SE</i>	β	<i>t</i>	
Constant	3.50*	3.64*	3.66*	0.63		5.80	[2.42, 4.90]
Gender ^a	0.33*	0.32*	0.31*	0.14	0.10	2.15	[0.03, 0.59]
Age	-0.01	-0.02	-0.02	0.03	-0.02	-0.48	[-0.08, 0.05]
Relationship Status ^b	-0.25	-0.20	-0.19	0.16	-0.06	-1.21	[-0.51, 0.12]
Race ^c	-0.02	-0.01	-0.04	0.07	-0.03	-0.53	[-0.17, 0.10]
Social Support	-0.04*	-0.04*	-0.04*	0.004	-0.51	-10.22	[-0.05, -0.03]
Suppression	0.03	0.02	0.02	0.01	0.08	1.56	[-0.01, 0.05]
Social Support x Suppression		0.001	0.001	0.001	0.08	1.78	[-0.001, 0.003]
Social Support x Race		0.01	0.01	0.004	0.07	1.36	[-0.002, 0.01]
Suppression x Race		0.004	0.01	0.01	0.02	0.47	[-0.02, 0.03]
Social Support x Suppression x Race			-0.001	0.001	-0.05	-0.91	[-0.002, 0.001]
R^2	.319	.328	.330				
F	26.43*	18.22*	16.47*				
ΔR^2		.01	.002				
ΔF		1.53	0.82				

Note. African American, $n = 153$; European American, $n = 193$; $N = 346$. CI = confidence interval.

^aMale was the reference group. ^bSingle was the reference group. ^cEuropean American was the reference group.

* $p < .05$

CHAPTER IV

DISCUSSION

This study tested the Relational Regulation Theory by examining the relation between perceived social support (PSS) and the potentially moderating effects of sense of belonging and two emotion regulation strategies (i.e., cognitive reappraisal and expressive suppression) in relation to three mental health outcomes (i.e., aggression, binge eating, and depressive symptoms). A research question also explored whether the relations between these variables differed between European American and African American students in the sample. Hypotheses predicted that sense of belonging, cognitive reappraisal and expressive suppression would moderate the relation between PSS and mental health outcomes among a non-clinical, college population; that is, a stronger negative relation was expected between PSS and mental health symptoms among individuals with greater sense of belonging and cognitive reappraisal and lower expressive suppression.

To enable comparisons with prior studies with clinical populations, exploratory analyses were conducted in addition to the main analyses, using subsamples of the participants reporting aggression ($n = 215$), binge eating ($n = 209$), and depressive symptom ($n = 215$) values above the median. Discussion of the results from the exploratory analyses are noted below when outcomes differed from the main analyses with the full sample ($N = 433$). The research question explored whether differences in the variable relations would be observed between European American and African American students ($n = 346$), without hypothesized directions. Specific findings and their implications will be presented for each of the outcome variables followed by a general discussion of overall findings, limitations of the study, and directions for future research.

Aggression

Results demonstrated PSS was significantly associated with lower aggression in most of the analyses of aggression, consistent with other studies (e.g., Landeta & Calvete, 2002). In two models, however, sense of belonging was the sole significant predictor. Social support was not significantly related to aggression in all three of the models in which both sense of belonging and PSS were included, indicating shared variance between these two variables. In contrast to other studies, the covariates of age and gender were not related to aggression in any of the models.

Sense of belonging. Inconsistent with the hypotheses, the present study provides no evidence that sense of belonging moderates the relation between PSS and aggression, though this study does support the previously detected relation between sense of belonging and aggression (e.g., Bushman, 2010; Mounts, 2004). As this is the first known study to explore sense of belonging, PSS, and aggression together, a novel contribution is the shared variance between sense of belonging and PSS, suggesting these variables may each capture aspects of a broader construct related to aggression, though not in a moderating relation.

Cognitive reappraisal. No moderation or main effects were found for cognitive reappraisal in the main or exploratory analyses, which indicates that trait aggression among college students is not related to the use of reappraisal, nor does reappraisal moderate the effect of PSS on aggression in this sample. The impact of reappraisal on aggression also did not vary by race in the research question models. Though related constructs have been linked (e.g., cognitive reappraisal is negatively related to interpersonal violence amongst college-age romantic partners, Stappenbeck & Fromme, 2014), the present study is the first known exploration of reappraisal, PSS, and trait aggression together, and the present evidence suggests the effects of PSS and reappraisal on aggression are unrelated.

Expressive suppression. Findings related to suppression similarly did not support a main or moderating effect of suppression in the main or exploratory analyses, in contrast to what was predicted. However, the research question analysis detected a significant three-way interaction, in which higher social support was associated with lower aggression for all groups, though the effect size of this interaction was quite small, explaining an additional 1.0% of the variance in aggression. The only significant difference among all pairwise comparisons of slopes was between the European American students with high suppression compared to European American students with low suppression. Thus, European American students with low suppression benefited more from social support than their European American peers with high suppression, while African American students appeared to benefit similarly from social support, regardless of their level of suppression.

In summary, higher sense of belonging and perceived social support were consistently associated with lower aggression, though no moderation effects were detected among these variables. Neither reappraisal nor suppression were associated with aggression, with the exception of slight differences among European and African American students in the association between PSS and aggression as moderated by suppression. These results suggest these two emotion regulation variables are not central to understanding the beneficial effect of PSS on aggression, and interventions increasing reappraisal or decreasing suppression are thus unlikely to produce beneficial reductions in aggression. Though the beneficial effects of PSS on aggression were not altered by sense of belonging, increasing perceived social support and sense of belonging as distinct factors may be a productive direction for interventions aimed at decreasing aggression.

Binge Eating

Consistent with previously published studies (e.g., Ghaderi, 2003), results indicated PSS was significantly associated with lower binge eating in most of the analyses of binge eating, with three exceptions. First, PSS varied by race in the research question analysis of suppression, such that greater PSS was associated with less binge eating for European American students, but was unrelated to binge eating among African American students. However, the effect size of this and the other two-way interactions in the model was quite small, explaining an additional 2.1% of the variance in binge eating. PSS was also not significantly associated with binge eating in the main and research question analyses including sense of belonging. Lower BMI and male gender were consistently associated with lower binge eating, while the other two covariates of age and relationship status were not significant. None of the covariates were significant in the analyses with the higher binge eating values subsamples. Identifying as an African American student, relative to European American students, was consistently associated with lower binge eating in the research question analyses.

Sense of belonging. In contrast to what was predicted, sense of belonging did not moderate the relation between PSS and binge eating. Similar to the findings in the aggression analyses, sense of belonging results varied in the three analyses in which both sense of belonging and perceived social support were included as predictors. In the analyses with the full sample, sense of belonging (but not social support) was associated with lower binge eating, while in the high binge eating subsample, perceived social support (but not sense of belonging) was associated with lower binge eating. This suggests, like in the aggression analyses, that sense of belonging and perceived social support share variance and may measure differing components of a broader concept. In the research question analysis, sense of belonging varied by race and was

associated with less binge eating among European American students but unrelated to binge eating among African American students, though the inclusion of this interaction in the model did not explain any additional variance in binge eating.

Cognitive reappraisal. No moderation or main effects were found for cognitive reappraisal, which contrasts with previously published studies that indicate greater use of reappraisal is related to lower rates of binge eating (e.g., Aldao et al., 2010). As the present study is the first known study to explore emotion regulation, PSS, and binge eating in tandem, the initial evidence suggests the positive effect of social support on binge eating does not vary by use of reappraisal, and that none of the relations among these variables differ for African American or European American students.

Expressive suppression. Suppression neither predicted binge eating nor moderated the relation between PSS and binge eating in the main and higher binge eating subsample analyses. These results are inconsistent with what was hypothesized, and surprising given the findings of prior studies which indicate a negative relation between suppression and binge eating (e.g., Aldao et al., 2010). A significant interaction between suppression and race detected in the research question analyses indicated greater use of suppression is related to more binge eating behavior for African American, but not European American, college students, though the effect size of this interaction was quite small, explaining an additional 2.1% of the variance in binge eating.

Overall, both greater sense of belonging and perceived social support were separately associated with lower binge eating, though sense of belonging did not increase or decrease the effectiveness of PSS. Reappraisal was not associated with binge eating, but lower suppression was linked to lower binge eating for African American students, but not European American

students. In addition, greater sense of belonging and PSS were associated with lower binge eating for European American students, but not African American students. These results do not support RRT as anticipated, since none of the internal factors of sense of belonging, reappraisal and suppression altered the effect of PSS on binge eating. However, the findings point to important differences among African American and European American students in the effects of these variables on binge eating. This is consistent with extant research indicating the need for culturally-informed understandings of eating disorder etiology as well as individualized interventions for binge eating which incorporate patients' varied cultural identities and backgrounds (e.g., Mason & Lewis, 2016).

Depressive Symptoms

Perceived social support was consistently related to depressive symptoms in all models except the main analysis of sense of belonging and depressive symptoms, in which only sense of belonging was related to depressive symptoms. This is consistent with the large body of existing research documenting the link between social support and depression (Lahey & Cronin, 2008). In all models, male gender was associated with lower depressive symptoms than female gender, as has been well-documented previously (e.g., Turner & McLaren, 2011). Neither of the other two covariates (i.e., age and relationship status) were significant in the analyses.

Sense of belonging. Sense of belonging was associated with depressive symptoms in the primary model, but did not moderate the relation between PSS and depressive symptoms. However, among the subsample of students with higher depressive symptoms, sense of belonging moderated the relation between PSS and depressive symptoms as predicted, though the effect size of this interaction was quite small, explaining an additional 1.5% of the variance in depressive symptoms. The effects were also in the opposite direction of what was

hypothesized: students reporting higher sense of belonging reported lower depressive symptoms overall, but they did not “benefit” (i.e., report lower depressive symptoms) from greater PSS. Rather, students reporting lower sense of belonging reported greater overall depressive symptoms but also exhibited a slight benefit (i.e., further reduction in depressive symptoms) from greater PSS. Thus, in contrast to the predicted, additive moderation effect, individuals with a lower sense of belonging appear to benefit from social support, while students with a higher sense of belonging do not seem to benefit from additional support. This is somewhat in line with research by Choenarom and colleagues (2005), in which sense of belonging and perceived social support mediated the relation between stress and depression among depressed adults, but not non-depressed adults. In the research question model, there was no moderation effect of sense of belonging and no differences by race, indicating the effects of social support and sense of belonging upon depressive symptoms function similarly among European American and African American college students. This is also inconsistent with previous research suggesting European American-American students benefit more from perceived social support than African American students (Gayman et al., 2014; Miller & Taylor, 2012).

Cognitive reappraisal. Cognitive reappraisal moderated the relation between PSS and depressive symptoms among the high depressive symptoms subsample model, but did not moderate the relation between these variables in the main analysis model. While a moderation effect of reappraisal was hypothesized, the variance explained by the interaction was small (4.8%) and the direction of the effect was the opposite of what was anticipated: PSS was associated with lower depressive symptoms among students with low reappraisal, but was not associated with depressive symptoms among students reporting high reappraisal. This indicates that among students with higher depressive symptoms, those who use less cognitive reappraisal

are more apt to benefit from PSS. In both the main analysis and the research question models, there were no main effects for reappraisal, which is inconsistent with a negative relation between reappraisal and depression among clinical populations in other studies (Forkmann et al., 2014; Lei et al., 2014; McRae et al., 2014). The research question model, which has not been previously tested in the literature, did not indicate any differences by race, suggesting the effect of reappraisal upon depressive symptoms functions similarly among European American and African American college students.

Expressive suppression. None of the models provided support for a main or moderating effect of suppression. These results are inconsistent with what was hypothesized, and surprising given the number of other studies documenting a negative relation between suppression and depression (e.g., Aldao et al., 2010; Flynn et al., 2010; Gross & John, 2003). Suppression also did not differ by race, which is inconsistent with previous research suggesting European American individuals report using less suppression than African American individuals (Gross & John, 2003).

In conclusion, greater sense of belonging and higher perceived social support were each associated with lower depressive symptoms. Though sense of belonging moderated the effect of PSS on depressive symptoms in the high depressive symptom subsample, the magnitude of the effect was very small. Reappraisal was only associated with depressive symptoms as a moderator; greater PSS was associated with lower depressive symptoms among students reporting low reappraisal, while PSS was not related to depressive symptoms among students reporting high reappraisal. Reappraisal has been related to depressive symptoms in a number of other studies, and the lack of a relation in this study is contradictory (e.g., Forkman et al., 2014; Lei et al., 2014). Also inconsistent with extant findings, suppression was not related to

depressive symptoms (e.g., Aldao et al., 2010), nor did suppression moderate the effect of PSS on depressive symptoms. Similar to the findings related to aggression and binge eating, these results do not support RRT as anticipated, though the number of inconsistencies between the present findings and other studies on PSS and depression constrict the implications of these results.

Relational Regulation Theory

While there was limited support for the RRT in terms of the moderating effects of the internal factors tested in this study, sense of belonging and PSS were consistently directly associated with the mental health outcomes. As reviewed in the introduction, the buffering effects of PSS in clinical samples are inconsistently detected, while the direct effects of PSS are much more consistently found (Cohen & Wills, 1985; Lakey & Cronin, 2008). The present findings indicate a similar pattern within a non-clinical sample, such that PSS demonstrated consistent direct associations with the outcomes, but buffering effects occurred in only a few models and accounted for very little variance in mental health symptoms.

Notably, the study models including both sense of belonging and PSS accounted for the greatest amount of variance in the mental health outcomes relative to the models including reappraisal or suppression. With sense of belonging as the moderator, models accounted for 22.8% of the variance in aggression, 15.1% of the variance in binge eating, and 44.3% of the variance in depressive symptoms. In contrast, with reappraisal and suppression as moderators, models accounted for only 13.7% and 13.4% of the variance in aggression, respectively; 12.6% and 12.6% of the variance in binge eating; and 29.7% and 30.1% of the variance in depressive symptoms. Conceptually, sense of belonging differs from the two types of emotion regulation evaluated, as sense of belonging reflects both relational and internal experiences such that one's

sense of belonging to a group is influenced by others' behavior as well as self-perception (Hagerty et al., 1996). Emotion regulation, on the other hand, is primarily an internal occurrence with much less direct influence by others (e.g., parental modeling; Aldao & Dixon-Gordon, 2014). Given the similar pattern of results and greater explanatory power of the combination of PSS and sense of belonging, the findings suggest that sense of belonging functions similarly to PSS and that the two constructs are highly related. It may be that having a greater sense of belonging is a benefit of PSS, which future mediation models should evaluate.

Though the present findings did not support the RRT as expected, the results are consistent with the foundational idea presented by Lakey and Orehek (2011) denoting the important role of relational influences in understanding the function of PSS. Relational influences, as measured by socially-affected variables like sense of belonging and PSS, appear to be more powerful predictors of mental health outcomes than the internal factors examined here (i.e., types of emotion regulation). This indicates that interventions to increase positive social engagement may be an effective means of decreasing the risk of mental health symptoms in a non-clinical population, and may be more effective than interventions to enhance individual, internal coping skills.

Strengths of the Current Study

This study explored perceived social support, sense of belonging, and emotion regulation to inform our understanding of whether internal factors enhance the effectiveness of perceived social support. Though a growing body of literature examines social support in a clinical population, this study was among the few to explore these variables in a non-clinical, college population to inform whether insights from clinically-based research can be translated to the population at large. Given the growing need for mental health services among the college

population, the present study is timely by developing our understanding of which psychological strengths or resiliencies are relevant for this age group. In addition, this study examined the impact that culture (measured through racial identity) might have on the relations between the internal factors, perceived social support, and mental health. Exploring the impact of culture is particularly important given the increasing diversity of the college population and the rapidly growing body of research identifying cultural differences in the etiology and maintenance of psychological ill health. In other words, the present study attempted to answer not only the question of “what” makes perceived social support effective, but also explored “for whom.”

Although this study is cross-sectional, the potential moderating effects of sense of belonging and emotion regulation were examined with three different types of mental health symptoms, of which binge eating and aggression have rarely been tested in conjunction with the study variables. In addition, measures were selected for their sound psychometric properties and prior validation with the college population. Despite the study limitations enumerated below, effect sizes for the main and research question models were small to moderate for the aggression and binge eating models, explaining 12.7% to 22.8% and 12.6% to 20.6% of the variance, respectively. Effect sizes were moderate to large in the depressive symptom models, explaining 29.7% to 44.4% of the variance. The exploratory analyses examined subsamples of participants with higher values of aggression, binge eating, and depressive symptoms to be more consistent with prior studies using clinical populations. Consequently, the range of the outcome variables was reduced and may have impacted the effect sizes in these analyses, which accounted for 6.5% to 7.0% of the variance in the aggression models, 7.6% to 9.1% in the binge eating models, and 11.7% to 25.1% in the depressive symptom models.

Limitations

A number of study limitations must be considered when interpreting the findings. Much of the prior research on the variables of interest was conducted with clinical samples, whereas the sample used in this study reported very low rates of aggression and binge eating overall: nearly 89% of students reported mean responses indicating the BPAQ-SF (aggression) items were “*uncharacteristic of me*” or “*slightly characteristic of me*,” and approximately 87% of students reported subclinical levels of binge eating. This restricted range may have limited the ability to detect smaller effect sizes, as even the covariates of gender and age, which are well-established in the aggression and binge eating literature respectively, were not significant in the study models. Given the substantial extant literature indicating the role of negative affect in binge eating in particular, the lack of significant findings in relation to the emotion regulation variables in the present study is surprising.

To partially address this issue, the primary study models were re-examined using a study subsample of participants with higher levels of symptoms using a median-split. However, this also led to a reduction in power coinciding with the smaller size of the subsample. In a meta-analysis of studies exploring the relation between various mental health outcomes and emotion regulation strategies, Aldao et al. (2010) found the effect of suppression on eating behavior was significantly moderated by population sample type (i.e., clinical vs. non-clinical samples). Thus, the lack of significant main effects in the aggression and binge eating models of this study may reflect the low levels of aggression and binge eating symptoms among this student sample relative to previous studies of clinical samples where significant associations between these study variables have been demonstrated.

Conversely, the rates of rates of depressive symptoms in this sample were substantive, with 36.7% of participants reporting mild or greater depressive symptoms (CES-D score of 16 or higher) and 10.4% reporting near-clinical depression symptom levels (score of 28 or higher; Radloff, 1991). As the preliminary power analysis indicated a sample size of 374 participants would achieve a power of .80 to detect an R^2 of 0.05 in the study models, the full sample size of 433 should have been sufficient to detect any significant effects. It may be that these variables function differently for individuals with high rates of depressive symptoms as compared to those with low rates of depressive symptoms (e.g., clinical vs. non-clinical samples). There is evidence from this study that symptom level may moderate these effects, as sense of belonging and reappraisal moderated the relation between PSS and depressive symptoms in the high depressive symptoms subsample, but the interactions were not significant in the primary analyses with the full sample.

Another limitation of this study is due to the nature of cross-sectional data, which precludes the conclusion of causality among study variables. This study was also limited by reliance upon self-reports of all variables. In addition, the inconsistency in the significance of sense of belonging and perceived social support suggests shared variance between these two variables which likely confounded results and interpretation of those models. Not only is perceived social support likely a broad construct not fully captured by existing measures (such as the ISEL), the relation between social support and mental health symptoms is probably circular, such that low social support may lead to depression and vice versa (Hatzenbuehler et al., 2012). The self-report of social support has also been shown to be influenced by mental health status (De Los Reyes & Prinstein, 2004), which further complicates the interpretation of results. While the selection of covariates in the study models was based upon prior existing studies indicating

the importance of these variables, the exclusion of other covariates may have obscured important effects. This study attempted to explore differences in the role of PSS by race/culture which was relevant given the sociological nature of the study variables (i.e., PSS and sense of belonging are likely impacted by one's race). However, the use of racial identity as an indicator of the nuances of culture is exceedingly limited for a number of reasons, most significant of which is the diversity of experiences and influences that exist both inside and outside of race. Thus, interpretation of results by racial identity should be conservative.

Implications for Intervention

Consistent with the many other studies of social support (Lakey & Orehek, 2011), this study points to the important role of PSS for depressive symptoms, binge eating, and aggression. The present study also informed the broader understanding of the role of PSS for these mental health symptoms in a non-clinical population. The main effect of PSS was consistently detected in the full sample models, while moderating effects appeared only in the subsamples with higher aggression, binge eating, and depressive symptom values. Thus, while increased PSS is likely beneficial for most people, efforts to increase PSS may lead to greater effects among individuals with higher baseline mental health symptoms.

Rather than the expected additive effect of increasing the benefits of PSS, the moderation effects in this study showed PSS was associated with reduced mental health symptoms only among individuals reporting low sense of belonging, low reappraisal and high suppression (i.e., potentially “poor coping” or “at risk” students reporting low levels of beneficial internal resources and a high level of a detrimental internal resource). Instead of acting as internal factors that enhance the benefits of PSS, these factors may actually function as alternative coping resources which PSS can offset when these resources are low, but which otherwise operate

independently of PSS. In other words, rather than the expected effect of greater benefit (i.e., lower mental health symptoms) from perceived social support when *more* frequent cognitive reappraisal is reported, greater benefit from PSS was detected when *less* frequent cognitive appraisal was reported. Thus, college students reporting infrequent use of cognitive reappraisal may be most likely to benefit from interventions increasing their sense of PSS than students reporting high use of reappraisal.

Similar to the matching hypothesis of social support (Wills & Shinar, 2000) in which certain types of support are beneficial for certain symptoms or risk factors, this study indicates the relevance of sense of belonging, cognitive reappraisal, and expressive suppression vary by mental health symptoms and race. Specifically, sense of belonging was associated with aggression, binge eating, and depressive symptoms and was also associated with lower binge eating among European American students than African American students. Reappraisal was not related to aggression or binge eating, and was only related to depressive symptoms as a moderator of the relation between PSS and depressive symptoms. Suppression was unrelated to depressive symptoms, and only associated with binge eating for African American students when compared to European American students. Suppression was only related to aggression as a moderator of the relation between race, PSS, and aggression. While the lack of relation between many of these variables may be due to study limitations given their inconsistency with previously published studies, the findings nonetheless point to the general concept that therapeutic interventions may be more and less beneficial based on an individual's cultural background and the nuanced expression of symptoms.

For instance, in this study, sense of belonging was associated with lower binge eating for European American students but not for African American students. This may be due to the

lower rate of binge eating reported by the African American students in this study, but may also indicate that interventions such as the widely-used interpersonal model of binge eating (Ivanova, Tasca, Proulx, & Bissada, 2015) may be a less effective treatment of binge eating for African American college students or other groups. This highlights the importance of examining the differential outcomes of empirically supported treatments by cultural background and further exploring the role of culture in risk factors for psychopathology.

Sense of belonging appeared to have a more complex relation with perceived social support that should be further explored. However, sense of belonging was associated with aggression, binge eating, and depressive symptoms, which suggests this may be an important component related to PSS (given the high correlation and indications of shared variance), or an alternate avenue for intervention. Given the limited success of prior efforts to improve PSS (Cohen, 2004), the present study underlines the importance of developing effective social support interventions and suggests sense of belonging may be an important factor in those interventions.

Future Directions

In addition to exploring the role of culture in the etiology of aggression, binge eating, and depressive symptoms, this study highlights the need to further investigate the overlap in the constructs of sense of belonging and perceived social support. The two variables were highly correlated ($r = .68$) in the present study, as elsewhere in studies of college students and despite using different measures of perceived social support ($r = .64$, Bozak, 2014; $r = .65$ for women, $r = .44$ for men, Haggerty et al., 1996). Previous authors have argued that sense of belonging and perceived social support are related but distinct constructs; however, the high level of shared variance in the present study suggests the two variables may not reflect distinct constructs but

different aspects of a broader, shared construct. Future studies can test whether sense of belonging mediates the relation between PSS and mental health outcomes.

This study was limited by low levels of mental health symptoms, which impacts interpretation and generalizability. However, the different outcomes in the full sample and subsample analyses indicate the merit of examining differences in these variables among high-symptom or clinical populations compared to low-symptom or non-clinical populations. Given the prior associations between the study variables, and the lack of moderation effects in this sample, future studies may find mediation models more effective at determining which factors underlie the benefits of perceived social support. Regarding the RRT, this study explored only one component of Lakey and Orehek's (2011) model, which includes a much broader approach to understanding PSS by defining relational influences quantitatively. Future studies can examine the many other relational and trait variables possibly underlying the beneficial effect of perceived social support. To fully understand the meaning of social support, measures of received support are also important to explore in addition to measures of perceived social support.

Summary

Overall, the present study did not support the Relational Regulation Theory as proposed and tested. Only three of the 27 study models detected moderation effects for perceived social support, and these interactions were in the opposite direction than what was hypothesized. Rather than the expected multiplicative effect of increasing the benefits of perceived social support, this study suggests PSS has a compensatory effect, as PSS was more beneficial for depressive symptoms when sense of belonging and cognitive reappraisal are low. In a similar manner, participants with low suppression reported a greater benefit from PSS when considering

levels of aggression. However, the latter effect was detected among European American students but not African American students. Cultural differences in PSS were also relevant in the models of binge eating; sense of belonging and PSS were associated with lower binge eating for European American but not African American students in some models, while lower suppression was associated with lower binge eating for African American but not European American students.

This study attempted to better understand the factors that make perceived social support effective. While the results were not consistent with what was expected, several trends emerged: higher PSS was associated with lower mental health symptoms for college students reporting low levels of sense of belonging and cognitive reappraisal and low levels of expressive suppression. In addition, greater PSS and sense of belonging were more strongly linked to lower binge eating for European American students, while lower suppression was linked to lower binge eating for African American students. However, the failure to detect significant moderation effects in the present study may have been influenced by low levels of aggression and binge eating within this college sample, as some of these findings conflict with the results of other studies. For instance, cognitive reappraisal did not have a significant direct effect with any of the outcome variables, but previous studies indicate reappraisal is related to less binge eating (Aldao et al., 2010) and lower depressive symptoms (Gross & John, 2003).

Perceived social support was consistently associated with the mental health outcomes examined in this study, which is consistent with the large body of social support research. The findings suggest that sense of belonging, cognitive reappraisal, and expressive suppression may primarily function independently of perceived social support in a non-clinical, low symptom sample, but PSS emerged as a relevant buffer of poorer coping in the presence of greater mental

health symptoms. As few studies have examined the effects of these variables with aggression and binge eating in a non-clinical sample, the effects detected in this study may be particularly relevant for community prevention efforts.

CHAPTER V

CONCLUSION

The present study examined the potential moderating effects of three internal factors (sense of belonging, cognitive reappraisal, and expressive suppression) on the relation between perceived social support three mental health outcomes (aggression, binge eating, and depressive symptoms) in a non-clinical, college sample. Few of the hypothesized moderation effects emerged, but support was found for the direct effects of perceived social support and sense of belonging, cognitive reappraisal, and expressive suppression. These factors may primarily function independently of perceived social support with PSS becoming a relevant buffer of low internal resources in the presence of greater mental health symptoms. Sense of belonging and perceived social support accounted for the majority of the variance in mental health, suggesting that relational influences may have a greater impact on mental health in a non-clinical population than the two types of emotion regulation examined. Differences in the relations in these variables among European American and African American students were also explored. Greater PSS and sense of belonging were more strongly linked to lower binge eating for European American students, while lower suppression was linked to lower binge eating for African American students. Future research would benefit from a larger sample size of non-clinical college students, including symptom level as a moderator, and testing the effects of these variables in mediation models.

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APPENDIX A

NOTIFICATION ABOUT THE SURVEY

Introduction

The purpose of this form is to give you information that may affect your decision whether to say YES or NO to participation in this research. If you decide to say YES, you will be able to continue with the survey after you read this document. By continuing to complete this survey, you are providing your consent. If you do not wish to participate, you may close your browser window now and not continue further with the survey.

Researchers

Robin J. Lewis, Ph.D., Professor, College of Sciences, Psychology Department, Old Dominion University; rlewis@odu.edu; (757) 683-4439

Sara Bock, B.A., Doctoral Student, Virginia Consortium Program in Clinical Psychology, sbock002@odu.edu

Description of Research Study

In this survey, you will be asked questions about your relationships with others, how you respond to emotions, and whether you have felt or behaved certain ways lately. This includes eating and dieting behaviors and questions about your mood. If you decide to participate, you will complete a computerized survey (approximately 30-45 minutes).

Exclusionary Criteria

To be eligible for the present study, you must be between the ages of 18 and 25 and enrolled as a student at ODU.

Risks And Benefits

Risks: If you decide to participate in this study, then you may face a risk of momentary distress

in completing some of the questionnaires. If you experience distress, you may stop the study at any time and resume the survey at a later time if you wish. Also, as a student you can contact ODU Counseling Services (757) 683-4401 to schedule an appointment. If you have questions about the study or if you have concerns raised from your participation, you can contact the project investigators. And, as with any research, there is some possibility that you may be subject to risks that have not yet been identified.

Benefits: There are no direct benefits for participation in this study. However, you may acquire insight about yourself and your relationships with others from answering the questionnaires. This study may also benefit others, as knowledge gained will help broaden understanding of how relationships can help reduce negative mental health outcomes and of how to develop more effective intervention programs.

Costs And Payments

If you decide to participate in this study, you will receive (1) Psychology Department SONA research credit, which may be applied to course requirements or extra credit in certain Psychology courses. Equivalent credits may be obtained in other ways. You do not have to participate in this study, or any Psychology Department study, in order to obtain this credit.

Confidentiality

All information obtained about you in this study is completely anonymous. Your name will never be associated with your responses. The results of this study may be used in reports, presentations and publications, but your responses cannot be traced back to you.

Withdrawal Privilege

It is OK for you to say NO. Even if you say YES now, you are free to say NO later, and walk away or withdraw from the study -- at any time. Your decision will not affect your relationship

with Old Dominion University, or otherwise cause a loss of benefits to which you might otherwise be entitled. The researchers reserve the right to withdraw your participation in this study, at any time, if they observe potential problems with your continued participation.

Compensation for Illness and Injury

If you say YES, then your consent in this document does not waive any of your legal rights.

However, in the event of harm arising from this study, neither Old Dominion University nor the researchers are able to give you any money, insurance coverage, free medical care, or any other compensation for such injury. In the event that you suffer injury as a result of participation in any research project, you may contact Dr. Robin J. Lewis at (757) 683-4439 or Dr. George Maihafer, the current IRB chairperson, at (757) 683-4520, or the Old Dominion University Office of Research at (757) 683-3460 who will be glad to review the matter with you.

Voluntary Consent

Because this is an online survey, continuing to the next page indicates several things. By continuing to the next page you are saying that you have read and that you are satisfied that you understand this form, the research study, and its risks and benefits. If you have any questions about participating in this study, now, or in the future, please contact the investigators. And importantly, by continuing to the next page, you are telling the researcher YES, that you agree to participate in this study.

APPENDIX B**DEMOGRAPHIC QUESTIONNAIRE**

Please tell us about yourself:

1. What is your age? _____ years

2. Please indicate your gender:

- ☐ Male
- ☐ Female
- ☐ Transgender

3. Please indicate your year in school:

- ☐ Freshman
- ☐ Sophomore
- ☐ Junior
- ☐ Senior
- ☐ Graduate
- ☐ Other

4. Are you of Hispanic origin? ☐ Yes ☐ No

5. Which racial group BEST describes you?

- ☐ African American or Black alone
- ☐ American Indian and Alaska Native alone
- ☐ Asian, Asian American, Native Hawaiian, or Pacific Islander alone
- ☐ European American, Caucasian or White alone
- ☐ Latino/a alone
- ☐ Multiracial
- ☐ Other: _____

6. What is your relationship status?

- ☐ Single/never married
- ☐ Cohabitating/in a committed relationship or civil union
- ☐ Married
- ☐ Divorced
- ☐ Widowed
- ☐ Other: _____

7. Please select the option that best describes your biological parents' marital status:

- ☐ Single/never married
- ☐ Cohabiting/in a committed relationship or civil union
- ☐ Married
- ☐ Divorced
- ☐ Separated
- ☐ Unknown
- ☐ Other: _____

6. Growing up, what was your family's approximate annual income?

- ☐ less than \$20,000
- ☐ \$20,001 to \$40,000
- ☐ \$40,001 to \$60,000
- ☐ \$60,001 to \$100,000
- ☐ More than \$100,000

7. What is the highest level of education attained by your mother?

- ☐ Did not attend high school
- ☐ Attended some high school, but did not graduate
- ☐ Graduated from high school, or equivalent (for example: earned a GED)
- ☐ Attended some 2-year college
- ☐ Graduated from 2-year college (has an Associates' degree)
- ☐ Attended some 4-year college
- ☐ Graduated from a 4-year college (has a Bachelor's degree)
- ☐ Has a Master's degree, Doctoral degree, or other professional degree beyond a Bachelor's degree (for example: MD, DDS, DVM, LLB, JD, PhD, EdD)

8. What is the highest level of education attained by your father?

- ☐ Did not attend high school
- ☐ Attended some high school, but did not graduate
- ☐ Graduated from high school, or equivalent (for example: earned a GED)
- ☐ Attended some 2-year college
- ☐ Graduated from 2-year college (has an Associates' degree)
- ☐ Attended some 4-year college
- ☐ Graduated from a 4-year college (has a Bachelor's degree)
- ☐ Has a Master's degree, Doctoral degree, or other professional degree beyond a Bachelor's degree (for example: MD, DDS, DVM, LLB, JD, PhD, EdD)

9. What is your height? _____ feet _____ inches

10. What is your weight? _____ pounds

APPENDIX C

INTERPERSONAL SUPPORT EVALUATION LIST (ISEL)

This scale is made up of a list of statements each of which may or may not be true about you. For each statement circle "definitely true" if you are sure it is true about you and "probably true" if you think it is true but are not absolutely certain. Similarly, you should circle "definitely false" if you are sure the statement is false and "probably false" if you think it is false but are not absolutely certain.

1. There are several people that I trust to help solve my problems. (Appraisal)

Definitely false		Probably false		Probably true		Definitely true
------------------	--	----------------	--	---------------	--	-----------------

2. If I needed help fixing an appliance or repairing my car, there is someone who would help me. (Tangible)

Definitely false		Probably false		Probably true		Definitely true
------------------	--	----------------	--	---------------	--	-----------------

3. My friends are more interesting than I am.* (Self-esteem)

Definitely false		Probably false		Probably true		Definitely true
------------------	--	----------------	--	---------------	--	-----------------

4. There is someone who takes pride in my accomplishments. (Self-esteem)

Definitely false		Probably false		Probably true		Definitely true
------------------	--	----------------	--	---------------	--	-----------------

5. When I feel lonely, there are several people I can talk to. (Belonging)

Definitely false		Probably false		Probably true		Definitely true
------------------	--	----------------	--	---------------	--	-----------------

6. There is no one that I feel comfortable to talking about intimate personal problems.* (Appraisal)

Definitely false		Probably false		Probably true		Definitely true
------------------	--	----------------	--	---------------	--	-----------------

7. I often meet or talk with family or friends. (Belonging)

Definitely false		Probably false		Probably true		Definitely true
------------------	--	----------------	--	---------------	--	-----------------

Note. Items marked with an asterisk (*) are reversed scored.

8. Most people I know think highly of me. (Self-esteem)

Definitely false		Probably false		Probably true		Definitely true
------------------	--	----------------	--	---------------	--	-----------------

9. If I needed a ride to the airport very early in the morning, I would have a hard time finding someone to take me.* (Tangible)

Definitely false		Probably false		Probably true		Definitely true
------------------	--	----------------	--	---------------	--	-----------------

10. I feel like I'm not always included by my circle of friends.* (Belonging)

Definitely false		Probably false		Probably true		Definitely true
------------------	--	----------------	--	---------------	--	-----------------

11. There really is no one who can give me an objective view of how I'm handling my problems.* (Appraisal)

Definitely false		Probably false		Probably true		Definitely true
------------------	--	----------------	--	---------------	--	-----------------

12. There are several different people I enjoy spending time with. (Belonging)

Definitely false		Probably false		Probably true		Definitely true
------------------	--	----------------	--	---------------	--	-----------------

13. I think that my friends feel that I'm not very good at helping them solve their problems.* (Self-esteem)

Definitely false		Probably false		Probably true		Definitely true
------------------	--	----------------	--	---------------	--	-----------------

14. If I were sick and needed someone (friend, family member, or acquaintance) to take me to the doctor, I would have trouble finding someone.* (Tangible)

Definitely false		Probably false		Probably true		Definitely true
------------------	--	----------------	--	---------------	--	-----------------

15. If I wanted to go on a trip for a day (e.g., to the mountains, beach, or country), I would have a hard time finding someone to go with me.* (Belonging)

Definitely false		Probably false		Probably true		Definitely true
------------------	--	----------------	--	---------------	--	-----------------

16. If I needed a place to stay for a week because of an emergency (for example, water or electricity out in my apartment or house), I could easily find someone who would put me up. (Tangible)

Definitely false		Probably false		Probably true		Definitely true
------------------	--	----------------	--	---------------	--	-----------------

17. I feel that there is no one I can share my most private worries and fears with.* (Appraisal)

Definitely false		Probably false		Probably true		Definitely true
------------------	--	----------------	--	---------------	--	-----------------

18. If I were sick, I could easily find someone to help me with my daily chores. (Tangible)

Definitely false		Probably false		Probably true		Definitely true
------------------	--	----------------	--	---------------	--	-----------------

19. There is someone I can turn to for advice about handling problems with my family.
(Appraisal)

Definitely false		Probably false		Probably true		Definitely true
------------------	--	----------------	--	---------------	--	-----------------

20. I am as good at doing things as most other people are. (Self-esteem)

Definitely false		Probably false		Probably true		Definitely true
------------------	--	----------------	--	---------------	--	-----------------

21. If I decide one afternoon that I would like to go to a movie that evening, I could easily find someone to go with me. (Belonging)

Definitely false		Probably false		Probably true		Definitely true
------------------	--	----------------	--	---------------	--	-----------------

22. When I need suggestions on how to deal with a personal problem, I know someone I can turn to. (Appraisal)

Definitely false		Probably false		Probably true		Definitely true
------------------	--	----------------	--	---------------	--	-----------------

23. If I needed an emergency loan of \$100, there is someone (friend, relative, or acquaintance) I could get it from. (Tangible)

Definitely false		Probably false		Probably true		Definitely true
------------------	--	----------------	--	---------------	--	-----------------

24. In general, people do not have much confidence in me.* (Self-esteem)

Definitely false		Probably false		Probably true		Definitely true
------------------	--	----------------	--	---------------	--	-----------------

25. Most people I know do not enjoy the same things that I do.* (Belonging)

Definitely false		Probably false		Probably true		Definitely true
------------------	--	----------------	--	---------------	--	-----------------

26. There is someone I could turn to for advice about making career plans or changing my job. (Appraisal)

Definitely false	Probably false	Probably true	Definitely true
------------------	----------------	---------------	-----------------

27. I don't often get invited to do things with others.* (Belonging)

Definitely false	Probably false	Probably true	Definitely true
------------------	----------------	---------------	-----------------

28. Most of my friends are more successful at making changes in their lives than I am.* (Self-esteem)

Definitely false	Probably false	Probably true	Definitely true
------------------	----------------	---------------	-----------------

29. If I had to go out of town for a few weeks, it would be difficult to find someone who would look after my house or apartment (the plants, pets, garden, etc.).* (Tangible)

Definitely false	Probably false	Probably true	Definitely true
------------------	----------------	---------------	-----------------

30. There really is no one I can trust to give me good financial advice.* (Appraisal)

Definitely false	Probably false	Probably true	Definitely true
------------------	----------------	---------------	-----------------

31. If I wanted to have lunch with someone, I could easily find someone to join me. (Belonging)

Definitely false	Probably false	Probably true	Definitely true
------------------	----------------	---------------	-----------------

32. I am more satisfied with my life than most people are with theirs. (Self-esteem)

Definitely false	Probably false	Probably true	Definitely true
------------------	----------------	---------------	-----------------

33. If I was stranded 10 miles from home, there is someone I could call who would come and get me. (Tangible)

Definitely false	Probably false	Probably true	Definitely true
------------------	----------------	---------------	-----------------

34. No one I know would throw a birthday party for me.* (Belonging)

Definitely false	Probably false	Probably true	Definitely true
------------------	----------------	---------------	-----------------

35. It would be difficult to find someone who would lend me their car for a few hours.*
(Tangible)

Definitely false		Probably false		Probably true		Definitely true
------------------	--	----------------	--	---------------	--	-----------------

36. If a family crisis arose, it would be difficult to find someone who could give me good advice about how to handle it.* (Appraisal)

Definitely false		Probably false		Probably true		Definitely true
------------------	--	----------------	--	---------------	--	-----------------

37. I am closer to my friends than most other people are to theirs. (Self-esteem)

Definitely false		Probably false		Probably true		Definitely true
------------------	--	----------------	--	---------------	--	-----------------

38. There is at least one person I know whose advice I really trust. (Appraisal)

Definitely false		Probably false		Probably true		Definitely true
------------------	--	----------------	--	---------------	--	-----------------

39. If I needed some help in moving to a new house or apartment, I would have a hard time finding someone to help me.* (Tangible)

Definitely false		Probably false		Probably true		Definitely true
------------------	--	----------------	--	---------------	--	-----------------

40. I have a hard time keeping pace with my friends.* (Self-esteem)

Definitely false		Probably false		Probably true		Definitely true
------------------	--	----------------	--	---------------	--	-----------------

APPENDIX D

SENSE OF BELONGING INSTRUMENT – PSYCHOLOGICAL STATE SUBSCALE (SOBI-P)

Here are some statements with which you may or may not agree. Using the key listed below, circle option that most closely reflects your feelings about each statement.

1. I often wonder if there is any place on earth where I really fit in.*

Strongly disagree		Disagree		Agree		Strongly agree
-------------------	--	----------	--	-------	--	----------------

2. I am just not sure if I fit in with my friends.*

Strongly disagree		Disagree		Agree		Strongly agree
-------------------	--	----------	--	-------	--	----------------

3. I would describe myself as a misfit in most social situations.*

Strongly disagree		Disagree		Agree		Strongly agree
-------------------	--	----------	--	-------	--	----------------

4. I generally feel that people accept me.

Strongly disagree		Disagree		Agree		Strongly agree
-------------------	--	----------	--	-------	--	----------------

5. I feel like a piece of a jigsaw puzzle that doesn't fit into the puzzle.*

Strongly disagree		Disagree		Agree		Strongly agree
-------------------	--	----------	--	-------	--	----------------

6. I would like to make a difference to people or things around me, but I don't feel that what I have to offer is valued.*

Strongly disagree		Disagree		Agree		Strongly agree
-------------------	--	----------	--	-------	--	----------------

7. I feel like an outsider in most situations.*

Strongly disagree		Disagree		Agree		Strongly agree
-------------------	--	----------	--	-------	--	----------------

8. I am troubled by feeling like I have no place in this world.*

Strongly disagree		Disagree		Agree		Strongly agree
-------------------	--	----------	--	-------	--	----------------

Note. Items marked with an asterisk (*) are reversed scored.

9. I could disappear for days and it wouldn't matter to my family.*

Strongly disagree		Disagree		Agree		Strongly agree
-------------------	--	----------	--	-------	--	----------------

10. In general, I don't feel a part of the mainstream society.*

Strongly disagree		Disagree		Agree		Strongly agree
-------------------	--	----------	--	-------	--	----------------

11. I feel like I observe life rather than participate in it.*

Strongly disagree		Disagree		Agree		Strongly agree
-------------------	--	----------	--	-------	--	----------------

12. If I died tomorrow, very few people would come to my funeral.*

Strongly disagree		Disagree		Agree		Strongly agree
-------------------	--	----------	--	-------	--	----------------

13. I feel like a square peg trying to fit into a round hole.*

Strongly disagree		Disagree		Agree		Strongly agree
-------------------	--	----------	--	-------	--	----------------

14. I don't feel that there is any place where I really fit into this world.*

Strongly disagree		Disagree		Agree		Strongly agree
-------------------	--	----------	--	-------	--	----------------

15. I am uncomfortable that my background and experiences are so different from those who are usually around me.*

Strongly disagree		Disagree		Agree		Strongly agree
-------------------	--	----------	--	-------	--	----------------

16. I could not see or call my friends for days and it wouldn't matter to them.*

Strongly disagree		Disagree		Agree		Strongly agree
-------------------	--	----------	--	-------	--	----------------

17. I feel left out of things.*

Strongly disagree		Disagree		Agree		Strongly agree
-------------------	--	----------	--	-------	--	----------------

18. I am not valued by or important to my friends.*

Strongly disagree		Disagree		Agree		Strongly agree
-------------------	--	----------	--	-------	--	----------------

EMOTION REGULATION QUESTIONNAIRE (ERQ)

1. _____ When I want to feel more *positive emotion* (such as joy or amusement), I change what I'm thinking about. (Reappraisal)
2. _____ I keep my emotions to myself. (Suppression)
3. _____ When I want to feel less *negative emotion* (such as sadness or anger), I change what I'm thinking about. (Reappraisal)
4. _____ When I am feeling *positive emotions*, I am careful not to express them. (Suppression)
5. _____ When I'm faced with a stressful situation, I make myself think about it in a way that helps me stay calm. (Reappraisal)
6. _____ I control my emotions by not expressing them. (Suppression)
7. _____ When I want to feel more *positive emotion*, I change the way I'm thinking about the situation. (Reappraisal)
8. _____ I control my emotions by changing the way I think about the situation I'm in. (Reappraisal)
9. _____ When I am feeling *negative emotions*, I make sure not to express them. (Suppression)
10. _____ When I want to feel less *negative emotion*, I change the way I'm thinking about the situation. (Reappraisal)

APPENDIX F

BUSS-PERRY AGGRESSION QUESTIONNAIRE – SHORT FORM (BPAQ-SF)

Using the five point scale shown below, indicate how uncharacteristic or characteristic each of the following statements is in describing you.

1	2	3	4	5	6
Extremely uncharacteristic of me	Somewhat uncharacteristic of me	Slightly uncharacteristic of me	Slightly characteristic of me	Somewhat characteristic of me	Extremely characteristic of me

1. I often find myself disagreeing with people.
2. At times I feel I have gotten a raw deal out of life.
3. I have threatened people I know.
4. I wonder why sometimes I feel so bitter about things.
5. I have trouble controlling my temper.
6. My friends say that I'm somewhat argumentative.
7. I flare up quickly but get over it quickly.
8. Given enough provocation, I may hit another person.
9. I can't help getting into arguments when people disagree with me.
10. Other people always seem to get the breaks.
11. There are people who pushed me so far that we came to blows.
12. Sometimes I fly off the handle for no good reason.

APPENDIX G**BINGE EATING SCALE (BES)**

Below are groups of numbered statements. Read all of the statements in each group and mark the one that best describes the way you feel about your eating habits.

#1

- a. I don't feel self-conscious about my weight or body size when I'm with others.
- b. I feel concerned about how I look to others, but it normally does not make me feel disappointed with myself.
- c. I do get self-conscious about my appearance and weight, which makes me feel disappointed in myself.
- d. I feel very self-conscious about my weight, and frequently I feel intense shame and disgust for myself. I try to avoid social contacts because of my self-consciousness.

#2

- a. I don't have any difficulty eating slowly in the proper manner.
- b. Although I seem to "gobble down" foods, I don't end up feeling stuffed because of eating too much.
- c. At times, I tend to eat quickly and then, I feel uncomfortably full afterwards.
- d. I have the habit of bolting down my food, without really chewing it. When this happens I usually feel uncomfortably stuffed because I've eaten too much.

#3

- a. I feel capable to control my eating urges when I want to.
- b. I feel like I have failed to control my eating more than the average person.
- c. I feel utterly helpless when it comes to feeling in control of my eating urges.
- d. Because I feel so helpless about controlling my eating I have become very desperate about trying to get in control.

#4

- a. I don't have the habit of eating when I'm bored.
- b. I sometimes eat when I'm bored, but often I'm able to "get busy" and get my mind off food.
- c. I have a regular habit of eating when I'm bored, but occasionally, I can use some other activity to get my mind off eating.
- d. I have a strong habit of eating when I'm bored. Nothing seems to help me break the habit.

#5

- a. I'm usually physically hungry when I eat something.
- b. Occasionally, I eat something on impulse even though I really am not hungry.
- c. I have the regular habit of eating foods that I might not really enjoy, to satisfy a hungry feeling even though physically, I don't need the food.
- d. Even though I'm not physically hungry, I get a hungry feeling in my mouth that only seems to be satisfied when I eat a food, like a sandwich, that fills my mouth. Sometimes, when I eat the food to satisfy my mouth hunger, I then spit the food out so I won't gain weight.

#6

- a. I don't feel any guilt or self-hate after I overeat.
- b. After I overeat, occasionally I feel guilt or self-hate.
- c. Almost all the time I experience strong guilt or self-hate after I overeat.

#7

- a. I don't lose total control of my eating when dieting even after periods when I overeat.
- b. Sometimes when I eat a "forbidden food" on a diet, I feel like I "blew it" and eat even more.
- c. Frequently, I have the habit of saying to myself, "I've blown it now, why not go all the way" when I overeat on a diet. When that happens I eat even more.
- d. I have a regular habit of starting strict diets for myself, but I break the diets by going on an eating binge. My life seems to be either a "feast" or "famine."

#8

- a. I rarely eat so much food that I feel uncomfortably stuffed afterwards.
- b. Usually about once a month, I eat such a quantity of food, I end up feeling very stuffed.
- c. I have regular periods during the month when I eat large amounts of food, either at mealtime or at snacks.
- d. I eat so much food that I regularly feel quite uncomfortable after eating and sometimes a bit nauseous.

#9

- a. My level of calorie intake does not go up very high or go down very low on a regular basis.
- b. Sometimes after I overeat, I will try to reduce my caloric intake to almost nothing to compensate for the excess calories I've eaten.
- c. I have a regular habit of overeating during the night. It seems that my routine is not to be hungry in the morning but overeat in the evening.
- d. In my adult years, I have had weeklong periods where I practically starve myself. This follows periods when I overeat. It seems I live a life of either "feast or famine."

#10

- a. I usually am able to stop eating when I want to. I know when “enough is enough.”
- b. Every so often, I experience a compulsion to eat which I can’t seem to control.
- c. Frequently, I experience strong urges to eat which I seem unable to control, but at other times I can control my eating urges.
- d. I feel incapable of controlling urges to eat. I have a fear of not being able to stop eating voluntarily.

#11

- a. I don’t have any problem stopping eating when I feel full.
- b. I usually can stop eating when I feel full but occasionally overeat leaving me feeling uncomfortably stuffed.
- c. I have a problem stopping eating once I start and usually I feel uncomfortable stuffed after I eat a meal.
- d. Because I have a problem not being able to stop eating when I want, I sometimes have to induce vomiting to relieve my stuffed feeling.

#12

- a. I seem to eat just as much when I’m with others (family, social gatherings) as when I’m by myself.
- b. Sometimes, when I’m with other persons, I don’t eat as much as I want to eat because I’m self-conscious about my eating.
- c. Frequently, I eat only a small amount of food when others are present, because I’m very embarrassed about my eating.
- d. I feel so ashamed about overeating that I pick times to overeat when I know no one will see me. I feel like a “closet eater.”

#13

- a. I eat three meals a day with only an occasional between meal snack.
- b. I eat 3 meals a day, but I also normally snack between meals.
- c. When I am snacking heavily, I get in the habit of skipping regular meals.
- d. There are regular periods when I seem to be continually eating, with no planned meals.

#14

- a. I don’t think much about trying to control unwanted eating urges.
- b. At least some of the time, I feel my thoughts are pre-occupied with trying to control my eating urges.
- c. I feel that frequently I spend much time thinking about how much I ate or about trying not to eat anymore.
- d. It seems to me that most of my waking hours are pre-occupied by thoughts about eating or not eating. I feel like I’m constantly struggling not to eat.

#15

- a. I don't think about food a great deal.
- b. I have strong cravings for food but they last only for brief periods of time.
- c. I have days when I can't seem to think about anything else but food.
- d. Most of my days seem to be pre-occupied with thoughts about food. I feel like I live to eat.

#16

- a. I usually know whether or not I'm physically hungry. I take the right portion of food to satisfy me.
- b. Occasionally, I feel uncertain about knowing whether or not I'm physically hungry. At these times it's hard to know how much food I should take to satisfy me.
- c. Even though I might know how many calories I should eat, I don't have any idea what is a "normal" amount of food for me.

APPENDIX H

CENTER FOR EPIDEMIOLOGIC STUDIES DEPRESSION SCALE (CES-D)

Below is a list of some ways you may have felt or behaved. Please indicate how often you have felt this way during the past week.

During the past week:	Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the time (5-7 days)
1. I was bothered by things that usually don't bother me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I did not feel like eating; my appetite was poor.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I felt that I could not shake off the blues even with help from my family or friends.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I felt I was just as good as other people.*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I had trouble keeping my mind on what I was doing.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I felt depressed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I felt that everything I did was an effort.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I felt hopeful about the future.*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I thought my life had been a failure.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. I felt fearful.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. My sleep was restless.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Note. Items marked with an asterisk (*) are reversed scored.

During the past week:	Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the time (5-7 days)
12. I was happy.*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. I talked less than usual.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. I felt lonely.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. People were unfriendly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. I enjoyed life.*	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. I had crying spells.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. I felt sad.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. I felt that people dislike me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. I could not get “going”.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

APPENDIX I

DESCRIPTIVE STATISTICS AND DEMOGRAPHIC INFORMATION FOR THE SUBSAMPLES WITH HIGHER AGGRESSION, BINGE EATING, AND DEPRESSIVE SYMPTOM VALUES

Table I-1

Descriptive Statistics of Variables for the Total Sample and Subsamples with Higher Aggression, Binge Eating and Depressive Symptom Values

Variable	Subsamples					Total Sample (<i>N</i> = 433)				
	<i>n</i>	<i>M</i> (<i>SE</i>)	Range	Skew	Kurtosis	<i>M</i> (<i>SE</i>)	Median	Range	Skew	Kurtosis
Aggression	215	41.62 (0.53)	32 – 69	0.96	0.71	32.29 (0.55)	31.00	12 – 69	0.42	-0.21
Binge Eating	209	13.40 (0.40)	7 - 29	0.98	0.22	8.01 (0.32)	6.00	0 - 29	1.10	0.72
Depressive Symptoms	215	22.33 (0.63)	12 - 49	1.16	0.72	14.44 (0.50)	11.00	0 - 49	1.19	1.18

Table I-2

Demographic Information for the Subsamples with Higher Aggression, Binge Eating and Depressive Symptom Values

Variable	Aggression (<i>n</i> = 215)	Binge Eating (<i>n</i> = 209)	Depressive Symptoms (<i>n</i> = 215)
Gender			
Male	68 (31.6%)	48 (23.0%)	59 (27.4%)
Female	147 (68.4%)	161 (77.0%)	156 (72.6%)
Academic Year			
Freshman	69 (32.1%)	52 (24.9%)	59 (27.4%)
Sophomore	56 (26.0%)	47 (22.5%)	52 (24.2%)
Junior	46 (21.4%)	55 (26.3%)	47 (21.9%)
Senior	44 (20.5%)	55 (26.3%)	57 (26.5%)
Mean Age (Years)	19.98 (1.95)	20.29 (1.98)	20.27 (2.09)
Relationship Status			
Single	172 (80.0%)	164 (78.5%)	180 (83.7%)
In A Relationship	43 (20.0%)	45 (21.5%)	35 (16.3%)
Body Mass Index (BMI)			
Underweight	8 (3.7%)	6 (2.9%)	13 (6.0%)
Normal weight	119 (55.3%)	101 (48.3%)	124 (57.7%)
Overweight	55 (25.6%)	59 (28.2%)	46 (21.4%)
Obesity	33 (15.3%)	43 (20.6%)	32 (14.9%)

Table I-2 Continued

Variable	Aggression (<i>n</i> = 215)	Binge Eating (<i>n</i> = 209)	Depressive Symptoms (<i>n</i> = 215)
Parent Marital Status			
Single/Never Married	21 (9.8%)	29 (13.9%)	24 (11.2%)
Cohabiting or in a Committed Relationship	4 (1.9%)	4 (1.9%)	3 (1.4%)
Married	116 (54.0%)	100 (47.8%)	107 (49.8%)
Separated or Divorced	62 (28.8%)	68 (32.5%)	69 (32.1%)
Widowed	11 (5.1%)	7 (3.3%)	10 (4.7%)
Other	1 (0.5%)	1 (0.5%)	2 (0.9%)
Highest Parent Educational Attainment			
Did not Graduate from High School	3 (1.4%)	3 (1.4%)	3 (1.4%)
High School Graduate or GED	23 (10.7%)	26 (12.4%)	31 (14.4%)
Some College	56 (26.0%)	50 (23.9%)	53 (24.7%)
Associate's Degree	23 (10.7%)	24 (11.5%)	19 (8.8%)
Bachelor's Degree	59 (27.4%)	62 (29.7%)	62 (28.8%)
Graduate Degree	51 (23.7%)	44 (21.1%)	47 (21.9%)

Table I-2 Continued

Variable	Aggression (<i>n</i> = 215)	Binge Eating (<i>n</i> = 209)	Depressive Symptoms (<i>n</i> = 215)
Annual Family Income			
Less than \$20,000	15 (7.0%)	14 (6.7%)	17 (7.9%)
\$20,000 to \$40,000	37 (17.2%)	36 (17.2%)	33 (15.3%)
\$40,000 to \$60,000	66 (30.7%)	66 (31.6%)	75 (34.9%)
\$60,000 to \$100,000	63 (29.3%)	58 (27.8%)	63 (29.3%)
More than \$100,000	34 (15.8%)	35 (16.7%)	27 (12.6%)
Race			
European American	85 (39.5%)	105 (50.2%)	93 (43.3%)
African American	83 (38.6%)	61 (29.2%)	73 (34.0%)
Latino/a	11 (5.1%)	7 (3.3%)	6 (2.8%)
Asian American, Native Hawaiian, or Pacific Islander	17 (7.9%)	19 (9.1%)	19 (8.8%)
American Indian or Alaska Native	0 (0.0%)	0 (0.0%)	1 (0.5%)
Multiracial	17 (7.9%)	13 (6.2%)	19 (8.8%)
Other	2 (0.9%)	4 (1.9%)	4 (1.9%)

APPENDIX J

PAIRWISE COMPARISONS FOR SIMPLE SLOPE TESTS

Table J-1

Pairwise Comparisons of Slope Differences for the Moderating Effect of Suppression on the Relation between Social Support and Aggression among European American vs. African American Students

Pairs of Slopes	<i>t</i>	<i>p</i>
High Suppression, (1) African American and (2) European American	-1.96	.051
Low Suppression, (3) African American and (4) European American	1.13	.260
African American, (1) High Suppression and (3) Low Suppression	-0.91	.365
European American, (2) High Suppression and (4) Low Suppression	1.98	.048
(1) High Suppression, African American and (4) Low Suppression, European American	0.43	.665
(2) High Suppression, European American and (3) Low Suppression, African American	1.04	.299

Note. (1) High Suppression, African American students; (2) High Suppression, European American students; (3) Low Suppression, African American students; (4) Low Suppression, European American students.

VITA

Sara Bock Davis
Virginia Consortium Program in Clinical Psychology
Norfolk, Virginia 23529

EDUCATION

Virginia Consortium Program in Clinical Psychology, Norfolk, VA
Doctor of Philosophy in Clinical Psychology May 2017 (expected)

Old Dominion University, Norfolk, VA
Master of Science in Experimental Psychology December 2014

Wheaton College, Wheaton, IL
Bachelor of Arts in Psychology, Summa cum Laude May 2009

RESEARCH EXPERIENCE

Graduate Research Assistant, Sexual Minority Health Lab August 2012 – May 2015
Department of Psychology, Old Dominion University, Norfolk, VA

Graduate Research Assistant August 2011 – July 2012
College of Liberal Arts Research Center
Norfolk State University, Norfolk, VA

SELECTED PUBLICATIONS

- Simms, K., Bock, S., & Hackett, L. (2014). Do the duration and frequency of physical education predict academic achievement, self-concept, social skills, food consumption, and body mass index? *Health Education Journal*, 73, 166-178. doi:10.1177/0017896912471040
- Simms, K., & Bock, S. (2013). The explanatory power of adverse relationship experiences in predicting neuroticism. *Current Research in Psychology*, 3, 43-48. doi:10.3844/crpsp.2012.43.48
- Simms, K., Hacker, D., Parker, A., Figuereo, M. & Bock, S. (2013). Do past or present adverse relationship experiences have greater impact on mental and physical health? *Advances in Mental Health*, 11, 3185-3210. doi:10.5172/jamh.2012.3185

SELECTED PRESENTATIONS

- Bock, S., Mason, T. B., & Lewis, R. J. (2014). *Risk for suicidal ideation among sexual minority youth from adolescence to young adulthood*. Poster presented at the 122nd annual convention of the American Psychological Association, Washington, DC.
- Simms, K. C., Hacker, D. S., & Bock, S. B. (2012). *The stability of neuroticism: The explanatory power of time and adverse relationship experiences*. Paper presented at the 2012 spring conference of the Virginia Psychological Association, Norfolk, Virginia.