

DISSERTATION

GRATITUDE AND HEALTH: A BRIEF INTERVENTION TO REDUCE
UNDERGRADUATE STRESS

Submitted by

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In partial fulfillment of the requirements

For the Degree of Doctor of Philosophy

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Summer 2015

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ABSTRACT

GRATITUDE AND HEALTH: A BRIEF INTERVENTION TO REDUCE UNDERGRADUATE STRESS

Undergraduate students experience a significant amount of stress that negatively impacts their physical and mental health as well as their academic performance. Attempts to reduce stress and its detrimental effects on the lives of college students have either fallen short, require considerable effort, are not utilized, or have not been sufficiently evaluated. Instead, undergraduate students often turn to unhealthy ways of dealing with their stress such as excessive alcohol use. This study aimed to address the lack of efficient and efficacious stress management resources available to undergraduate students. Three-hundred and sixteen undergraduate students were assigned to a gratitude-list, objects-list, or no-treatment control condition. The gratitude intervention did not have a significant impact on perceived stress. However, results provided further evidence that there is a relationship between gratitude and perceived stress. The impact of gender-role identity and trait gratitude was also explored. Implications for future research on gratitude and stress as well as gratitude in general are discussed and suggestions for clinical practice are offered.

TABLE OF CONTENTS

ABSTRACT.....	ii
Introduction.....	1
The Current Study.....	16
Method.....	21
Results.....	25
Discussion.....	47
Conclusion.....	62
References.....	63
Appendix.....	77

Introduction

College marks a significant time of transition during which many young adults begin to exercise their independence from their parents, form new relationships, and adjust to a novel environment (Schulenberg, Sameroff, & Cicchetti, 2004). While exciting, these changes in identity and responsibility can also cause a great deal of stress. Recent data from a nationally representative sample of nearly 67,000 undergraduate students highlights that stress is not only a common occurrence among this population but is also taking a toll on their lives (American College Health Association [ACHA], 2014). Nearly half of respondents indicated that they experience a “more than average stress” and, of a list of 32 items, stress was most frequently endorsed as having a negative impact on academic performance. Review of previous reports indicates that these findings have been consistent across the years, demonstrating that stress is a persistent issue for undergraduate students. Data from another large nationally representative survey suggests that the effect of stress extends beyond academic performance. According to the American Psychological Association’s (APA) Stress in America Survey, compared to other generations, college-aged individuals are more likely to endorse that stress strongly impacts their physical and mental health (2015). The infectious nature of stress is more concerning given that it has the tendency to become increasingly more destructive in the absence of an appropriate intervention.

Unfortunately, the college generation struggles with responding to stress in healthy and effective ways (APA, 2015). Alcohol is a problematic, and all-too-common, way of coping with stress. College students in particular are likely to increase their consumption of alcohol in response to increased stress (Magrys & Olmstead, 2015; Park, Armeli, & Ennen, 2004). On top of the physical consequences, alcohol provides an escape mechanism that allows undergraduates

to ignore their stress rather than develop skills to manage it. Millennials are also more likely to use sedentary coping mechanisms, such as watching television or playing video games, compared to other generations (APA, 2015). The combination of high stress and unhealthy coping mechanisms exacerbates the already deleterious effects that stress can have on one's life. In addition to academic difficulties, loss of sleep, and mental health concerns, prolonged stress can lead to serious health issues such as hypertension and cardiovascular disease (Dimsdale, 2008). Facilitating college students' ability to better manage stress has the potential to improve their biological, psychological and academic functioning, and may even result in long-term health benefits.

The importance of managing undergraduate stress has not been ignored and many campuses offer resources to address this issue. However, a review of mental health programs in higher education revealed that only 34% of the programs evaluated were found to be effective (Conley, Durlak, & Dickson, 2013). The most impressive outcomes were seen with interventions using supervised practice of mindfulness, which was 84.4% effective in reducing emotional distress. Despite this promising evidence, examining the details of these interventions suggest some potential barriers to their sustainability and success. Perhaps the most significant of these barriers is that these programs were labor intensive, for the college student as well as the people putting the program into place. The majority of the programs reviewed included multiple sessions lead by at least one trained professional, with the mindfulness interventions averaging 7.7 one-hour sessions (Conley et al., 2013). The financial, as well as the time, investment could be an impediment to both the institution and the student, possibly offering a partial explanation for why 80% of students don't access such resources (ACHA, 2014). The lack of utilization and efficacy of stress management services, along with the persistent detrimental effects of stress

among undergraduates, suggests that new approaches are necessary. It is also important to note that, of the programs that have been implemented, very few have been evaluated (Conley et al., 2013) leaving stakeholders to speculate as to whether or not these programs are worth such an investment. Thus, research within this area would benefit from drawing on empirically supported interventions and considering issues of efficacy and sustainability of a program prior to its implementation.

The development of an intervention should begin with clear identification of the issue being addressed and the source of that issue. Stress is a natural physiological response that motivates the body to react to external threats, by preparing for fight or flight. As humans evolved and moved up the food chain this mechanism continued to be activated, frequently in response to events that were not life threatening. For undergraduate students such stress-triggering events include an increase in academic demands and responsibilities. Such events cannot be physically fought or fled from and eliminating or avoiding these events would likely only make matters worse. Thus, despite triggering the stress, attacking the events themselves is not a viable intervention point. Instead, changing the internal process triggered by these events may be much more practical and beneficial. Lazarus and Folkman's (1984) early work on stress, led them to propose that stress is caused by events that are perceived to be threatening and to exceed coping capacity. Thus the impact of a stressful event depends, to a certain extent, on how the event is interpreted. It may be perceived as insurmountable and thus create a great deal of stress. Conversely, if the event is perceived as something that can be overcome it likely will not cause significant stress. This relationship between the way a stressful event is perceived and the impact it has can be seen amongst undergraduate students. For example, when presented with the same stressor (an upcoming exam) the more undergraduates perceived that stressor as a

challenge, rather than a threat, the better they performed on the exam and the less they experienced emotional exhaustion as a result (Strack & Esteves, 2015). In sum, stress is triggered by certain events but the way the events are perceived largely dictates how much stress is experienced, as well as the outcome of that experience.

Gratitude

Emerging research on gratitude suggests that it plays a significant role in how people perceive events, thus it may be a viable target for stress reduction. Gratitude is defined as the appreciation for the good things in the world and a recognition that the sources of those good things lie, at least in part, outside of the self (Emmons & Stern, 2013; Wood, Froh, & Geraghty, 2010). Viewing experiences from a grateful lens sharpens their positive aspects while leaving the negative elements blurry. Those who are dispositionally grateful have the tendency to notice and appreciate the positive. Gratitude can also be elicited temporarily, such that those who aren't characterized by trait gratitude can still experience state gratitude (Wood et al., 2010). The majority of research has focused on the benefits of trait gratitude and there is robust evidence that trait gratitude is related to mood (e.g. depression, anxiety) and life satisfaction (Wood et al., 2010). Furthermore, the having a grateful disposition may facilitate autonomy, environmental mastery, and personal growth (Wood et al., 2010), all of which are developmental indicators salient to the undergraduate college student.

There is considerable variation in the way that gratitude is experienced, suggesting that there are many sources of gratitude. Wood and colleagues (2010; 2008) argue for eight subtypes of gratitude that include: 1) individual differences in the experience of grateful affect, 2) appreciation of other people, 3) a focus on what the person has, 4) feelings of awe, 5) behaviors to express gratitude, 6) focusing on the positive in the present moment, 7) appreciation rising

from understanding life is short, and (8) positive social comparisons. Factor analysis across two studies confirmed that these eight constructs were facets of a single higher order gratitude factor that the authors suggest can be experienced at the state or trait level (Wood et al., 2008). A multi-component gratitude has explained 10% of the variance in life satisfaction and 2.4% of the variance of positive affect over-and-above the Big Five and a unifactorial measure of gratitude. However, focusing on what one has was the only sub-type to significantly predict positive affect. Thus, helping people notice and appreciate what they have, rather than what they lack, may have emotional and psychological benefits.

Research has identified that gratitude is distinct from other constructs and thus may be a novel avenue for addressing well-being concerns such as stress. For example, it overlaps with and yet it has unique characteristics that set it apart from emotions such as happiness, vitality, and optimism (McCullough, Emmons, & Tsang, 2002; Weiner, 1985). The experience of gratitude is also distinct from the emotional experience one has when witnessing a morally virtuous act (Siegel, Thomson, & Navarro, 2014). One of the unique qualities of gratitude may be in its appraisal style. Gratitude typically involves noticing the positive things that exist either in the present or the past (Emmons & Stern, 2013), whereas hope and optimism are future oriented (Carver, Scheier, & Segerstrom, 2010; Geraghty, Wood, & Hyland, 2010a). This ability to attend to and appreciate things of the past and present has long been viewed as a crucial determinant of well-being (Bryant, 1989; Janoff-Bulman & Berger, 2000). In looking at this topic from a spiritual viewpoint, Kendler and colleagues (2003) found that gratitude was more strongly associated with lower risk of Major Depressive Disorder, Generalized Anxiety Disorder, substance abuse and dependence, and bulimia, compared to other dimensions of religiosity. Additional support for the unique qualities of gratitude is demonstrated by evidence that the its

positive effects remain after controlling for the Big Five Personality Traits, which includes characteristics commonly associated with well-being such as agreeableness and openness to experience (Wood, Joseph, Lloyd, & Atkins, 2009). Furthermore, Emmons and McCullough (2003) found that gratitude mediated the relationship between positive affect and well-being. Thus gratitude may be a unique mechanism in achieving and maintaining health and well-being.

Gratitude and Stress. Although relatively few studies have been conducted on gratitude and physical health factors (Wood et al., 2010), those that have been published show promise. These studies have linked gratitude with fewer symptoms of physical illness, decreased illness related absences from work, more hours and better quality of sleep, and an increase in exercise (Digdon & Koble, 2011; Emmons & McCullough, 2003; Kaplan et al., 2013). Given what is known about the relationship between stress, physical illness, and sleep (see Segerstrom & Miller, 2004 for a review), it is possible that stress mediated the relationship between gratitude and the positive outcomes in these studies.

In terms of stress specifically, individuals higher in gratitude tend to cope with stress better in general and exhibit more positive psychological and physical functioning after a trauma (Emmons & Crumpler, 2000; Kahneman, Diener, & Schwarz, 1999). For example, trait gratitude was positively associated with post traumatic growth and negatively associated with anxiety and depression among breast cancer patients (Ruini & Vescovelli, 2012). Conversely, individuals with stress-related disorders such as Post-Traumatic Stress, Generalized Anxiety, and specific phobias endorse lower levels of gratitude than those who do not have the disorder (Wood et al., 2010). In a sample of Vietnam War veterans, Kashdan, Uswatte, and Julian (2006) found that those who had been diagnosed with PTSD were 1.38 standard deviations lower in gratitude than those who did not meet diagnostic criteria for PTSD. Using daily diary study methodology, the

researchers found that the experience of gratitude was linked to a daily increase in positive affect and self esteem for both groups, even when PTSD symptomology was taken into account. This suggests that even people exhibiting a high level of stress-related symptoms may benefit from experiencing more gratitude (Wood et al., 2008). The negative relationship between PTSD and gratitude has also been found in non-veteran populations. Israeli adolescents who lived through missile attacks on their city endorsed a negative relationship between PTSD symptoms and gratitude (Israel-Cohen, Uzefovsky, Kashy-Rosenbaum, & Kaplan, 2014). The same was found with police officers in New Orleans post Hurricane Katrina, even after adjusting for age, sex, education, and alcohol use (McCanlies, Mnatsakanova, Andrew, Burchfiel, & Violanti, 2014). In a series of studies on Chinese school teachers, a population prone to burnout, Chan (2010, 2011, 2013) found that gratitude had a positive impact on several outcomes, such as increased life satisfaction and decreased emotional exhaustion. Together, this evidence suggests that gratitude may diminish the impact that stressful events and circumstances have on people's lives.

Given the link between gratitude and stress, it is possible that gratitude may facilitate a more positive and strengths-based interpretation of events such that they do not evoke as much stress (Wood, Joseph, & Linley, 2007). In support of this, several studies have directly connected gratitude with lower stress (Deutsch, 1984; Kerr, O'Donovan, & Pepping, 2014; Krause, 2006; Wood et al., 2008) as well as to increased activity in the hypothalamus, which plays a significant role in the body's response to stress (Zahn et al., 2009). In one study, Wood and colleagues (2008) collected data from undergraduate students at the beginning and end of their first semester. Although the study was not experimental, they tested competing models and found that the only supported model was one in which gratitude predicted lower levels of stress and depression. This may be because grateful college students tend to employ active rather than

passive coping mechanisms, such as problem solving and emotional processing (Lin & Yeh, 2013). Such evidence has led some researchers in the field to speculate that gratitude may be an important target for reducing stress and thus decreasing significant health issues (Robert A Emmons & Stern, 2013; Geraghty et al., 2010a).

Gratitude Interventions. With the emergence of gratitude in the theoretical and empirical literature on well-being come questions concerning its malleability and thus its viability in having a positive impact on health. A review of the literature identified over 40 published studies that, with the exception of one, demonstrated the efficacy of using gratitude interventions to impact a variety of physical and mental health outcomes. The predominant intervention modality across these studies is a written component designed to focus the participants' thoughts on gratitude, often through writing a gratitude letter or listing things for which the participant was grateful. Participants who have engaged in grateful writing tasks have reported increases in overall life satisfaction (e.g. Chan, 2013; Emmons & McCullough, 2003; Froh, Kashdan, Ozimkowski, & Miller, 2009; Kerr et al., 2014) and happiness (e.g. Gander, Proyer, Ruch, & Wyss, 2012; Seligman, Steen, Park, & Peterson; Senf & Liau, 2012) for up to one-month post-intervention (Seligman et al., 2005). Conversely, gratitude interventions have successfully decreased anxiety and depression (e.g. Harbaugh & Vasey, 2014; Huffman et al., 2014; Kerr et al., 2014). In looking at health-related outcomes, inducing gratitude has led to longer and higher quality sleep, more frequent exercise, and fewer days of work lost due to illness (Emmons & McCullough, 2003; Kaplan et al., 2013). In a sample of adults with neuromuscular disorder, those in the gratitude condition experienced, among other benefits, an increase in functional status (e.g., bathing, walking across the room) and time spent exercising, as well as a decrease in physical pain (Emmons & McCullough, 2003). Together, these studies

provide strong indication that enhancing gratitude could lead to significant improvements in mental and physical health.

In addition to resulting in significant outcomes, the gratitude interventions that have demonstrated success are also relatively simple to carry out. Several of the interventions reviewed thus far have been conducted online and with little time investment for the researchers and participants (e.g. Harbaugh & Vasey, 2014; Proyer, Gander, Wellenzohn, & Ruch, 2014; Seligman et al., 2005). Among gratitude interventions, journaling/lists appear to have an especially high output to input ratio. For example, gratitude journaling is seen as easier compared to other positive psychology interventions, including writing a gratitude letter (Huffman et al., 2014). Perhaps because of this, participants were five times more likely to keep a gratitude journal than to express gratitude to someone in an email, phone, or text (Parks, Della Porta, Pierce, Zilca, & Lyubomirsky, 2012).

Gaps in Gratitude Research. Despite gratitude's promise and promotion as one of the most successful and approachable positive psychology interventions (Bono, Emmons, & McCullough, 2004; Seligman, Rashid, & Parks, 2006; Seligman et al., 2005), such interventions have not undergone the rigorous testing necessary to be considered an empirically supported treatment. A criticism of many gratitude studies is their lack of an adequate control condition (Wood et al., 2010). For example, the well-cited Emmons and McCullough (2003) studies compared outcomes of the gratitude condition to a hassles condition in which participants recorded daily hassles. They also included a no-treatment control condition. The problem with the latter is that it does not elicit an expectation effect that may have been influential in the gratitude condition. Conversely, the hassles condition is problematic due to the likely possibility that it negatively impacted the outcome measures, thus overinflating the significant impact of the

gratitude intervention. Other studies have offered dubious interpretations of their results as well. One study in particular, concluded that the gratitude intervention had been successful when in fact the outcomes for that group remained the same while those in the comparison condition, which had participants list daily events, experienced a decline in positive affect (Harbaugh & Vasey, 2014). Despite these issues, a few studies have implemented a more rigorous control condition and thus have provided more substantial evidence for the efficacy of gratitude interventions. In the groundbreaking study, Seligman and colleagues (2005) had participants write and deliver a gratitude letter or write about early memories. Participants in the gratitude condition reported increases in happiness and decreases depression at the one and six-month follow ups over those who wrote about early memories. This study was recently replicated and produced similar results using a German sample (Gander et al., 2013). Such evidence suggests that gratitude's influence may not only be better than a condition that worsens outcomes but also that it may extend beyond a placebo effect.

Another gap in the research lies in the operational definition of gratitude and the distinction between state and trait gratitude. Rather than being conflicting conceptualizations, the general consensus in the gratitude literature is that it can be a stable characteristic as well as a temporary affective state (McCullough, Tsang, & Emmons, 2004). In other words, a person could be characterized as generally grateful and also experience an increased sense of gratitude on an episodic basis. However, research has typically focused on one without consideration of the other. Emmons and Stern (2013) asserted that gratitude is more strongly linked to mental health and life satisfaction than any other personality trait. Grateful individuals report a greater sense of belonging and stronger social bonds (Kashdan et al., 2006; Lambert, Fincham, Stillman, & Dean, 2009; Wood et al., 2008). Furthermore, grateful people tend to view help as more

beneficial (Wood et al., 2008). Considering these differences seen in those characterized by trait gratitude, it is important to account for this trait when examining state gratitude. However, many studies do not measure gratitude or do not make a distinction between state and trait gratitude, leaving little known about the interaction between the two (Wood et al., 2010). It could be that, since grateful people are predisposed to feeling gratitude, they benefit more from gratitude-eliciting activities. According to McCullough, Tsang, and Emmons' (2004) resistance hypothesis the opposite is more likely. The authors suggest that individuals with high trait gratitude will be resistant to the effects of gratitude-relevant events because their experience of gratitude has been largely predetermined by aspects of their personality. Conversely, the level of gratitude experienced by those who are otherwise dispositionally low is dependent upon gratitude eliciting events. In support of the resistance hypothesis, the authors found that participants high in trait gratitude were less responsive to gratitude-relevant events (2004). Extending the hypothesis beyond fluctuations in gratitude, Chan (2013) found that participants characterized by low-gratitude experienced higher increases in life satisfaction and positive affect after participating in a gratitude intervention compared to those who were characterized by high-gratitude. This preliminary evidence suggests that trait gratitude may moderate the effect of state gratitude. As with any treatment, research is needed to determine if its effects differ as a function of individual characteristics. Given the blurred line between state and trait gratitude, it is particularly important to know whether gratitude interventions differ in their effects as a function of trait gratitude

Whether temporary or a dispositional tendency, feelings of gratitude emerge from the recognition of the good things in life. How much gratitude is felt may be, at least in part, determined by how much a person feels they deserve those good things. In some instances, a lack

of deservedness may dampen the response to gratitude. Research has suggested that the positive experience of gratitude can be diminished by feelings of burden and guilt (O'Brien, Donaghue, Walker, & Wood, 2014). When people feel as though they need to do something in return, or are not worthy in the first place, having things bestowed upon them will likely elicit more discomfort than gratitude. For example, heart transplant patients' guilt often overshadows their gratitude when they felt they did not deserve the donated heart (O'Brien et al., 2014). This study suggests that there is a negative relationship between deservedness and gratitude, mediated by feelings of guilt and burden. However this is based on a single study of rather extreme circumstances. In terms of more day-to-day experiences, it could also be that feeling as though one deserves good things in life limits how much those things are appreciated. Gratitude interventions have yet to take deservedness into account and thus may be missing an important piece to understanding why interventions work better for some than others.

Gratitude and sex-role identity. There is also some evidence for gender differences in gratitude. Based on gender role expectations, researchers have hypothesized that men are less apt to express or benefit from gratitude because of its association with indebtedness and dependency (Solomon, 1995). Men may perceive the act of expressing gratitude as admitting to vulnerability and threatening their masculinity (Levant & Kopecky, 1995). In one study, several men explicitly identified a preference for concealing gratitude whereas none of the women in the study did (Sommers & Kosmitzki, 1988). One of the reasons that women may be more comfortable with expressing gratitude could be their tendency to place more emphasis on interpersonal relationships, for which gratitude plays a functional and even advantageous role (Schwartz & Rubel, 2005; Timmers, Fischer, & Manstead, 1998). It has been argued that this difference in expression of gratitude may explain why women tend to report greater social

support (Eagley & Crowley, 1986), as expressing appreciation towards others for their acts of kindness likely reinforces such behavior. In addition to being more prone to expressing gratitude, women are more likely to identify feeling grateful for their social relationships (Gordon, Musher-Eizenman, Holub, & Dalrymple, 2004). Given this, it is not surprising that women perceive gratitude journaling as a more natural activity (Thompson, Peura, & Gayton, 2014). Earlier evidence led Kashdan and colleagues (2009) to hypothesize that women may derive more benefit from experiences of gratitude than men. In a series of studies, the authors found that women tended to be higher on measures of trait gratitude, thought of gratitude as being more beneficial, and were more likely to express gratitude compared to the men in the studies. In contrast, men were more likely to feel burdened or a sense of obligation in response to grateful experience (2009). Perhaps because of this, men are less likely to believe that gratitude interventions will be useful and socially acceptable and thus are less likely to engage in grateful behavior (Misiak et al., 2015).

Honing in on the interpersonal aspect of gratitude as the source of contention between men and women makes a certain amount of sense but does not consider all the pieces of the puzzle. Although gratitude often includes an interpersonal component and some have even argued that gratitude is always directed towards appreciating gifts or help from others (e.g. McCullough, Emmons, Kilpatrick, & Larson, 2001) this isn't always the case. Individuals have expressed gratitude towards their own accomplishments and abilities or the environmental factors that contribute to ones success (Emmons & McCullough, 2003; Graham & Barker, 1990; Veisson, 1999; Weiner, Russell, & Lerman, 1979). Given that the extant research on gender differences in the appraisals of gratitude has focused on interpersonal acts of gratitude, it may be that this particular form of gratitude is the root of the distinction found between men and women

in their reactions to gratitude. On the other hand, being open to considering the many things one is grateful for may prove to be equally beneficial to those who want to maintain their sense of independence.

Explanations for the differences in the experience of gratitude between men and women have focused on characteristics typically ascribed to one sex or the other, rather than simply biological sex. The nature of sex and the multiple dimensions that comprise gender identity (Killermann, 2013) calls for movement away from using dichotomous sex variables towards using more complex measures. In an attempt to tease out biological versus social differences, the genetic literature has used the ratio between the length of the second and fourth finger to represent the degree of biologically determined masculinity. There is a robust relationship between this digit ratio and prenatal exposure to sex hormones, as well as certain sex-type roles and sex-typical interests (see Misiak et al., 2015). One study used this measure to look at initiation and completion of a gratitude intervention. Interestingly, when controlling for biological sex, those with a lower ratio (associated with higher masculinity) were more likely to believe that a gratitude intervention would be useful and were thus more likely to complete the intervention (Misiak et al., 2015). Rather than clarifying the matter, the study added further complication to understanding gender/sex differences in gratitude. Based on the combined evidence it may be that both biological sex and stereotypical gender-role characteristics influence use of, and benefit from, gratitude interventions.

In sum, gratitude may provide a mechanism for perceiving less stress in one's life. However, the causal relationship between gratitude and stress has only been minimally explored in the literature. Several other questions remain regarding gratitude in general, with some

evidence that the effect of gratitude may depend on how congruent the experience is with one's identity.

The Current Study

Purpose

Undergraduate students experience more stress than other generations and this stress negatively impacts their physical and mental health as well as their academic performance (ACHA, 2014; APA, 2015). The significant and persistent negative impact of stress on undergraduate students should place it at the forefront of concerns to be addressed in higher education. However, attempts to do so have either fallen short, require considerable effort (e.g. time commitment for facilitators and participants), or have not been sufficiently evaluated (Conley, Durlak, & Dickson, 2013). Even when they are available, students rarely make use of mental health and stress management resources (ACHA, 2014). Instead, undergraduates frequently turn to unhealthy ways of coping with their stress through avoidance activities such as watching television or, worse yet, alcohol use (APA, 2015; Magrys & Olmstead, 2015; Park, Armeli, & Ennen, 2004).

The primary aim of this study was to address the lack of efficient and efficacious stress management resources available to undergraduate students. To reach this aim, the present study rigorously tested the application of a brief gratitude intervention in this context. Gratitude interventions have demonstrated efficacy in reducing a range of negative health and well-being indicators (see Wood et al., 2010 for a review). Several studies have also offered evidence that there is a relationship between gratitude and stress (Deutsch, 1984; Krause, 2006; Wood et al., 2008). However, only one has tested that relationship with an experimental design and it was with a highly specialized population (Kerr, O'Donovan, & Pepping, 2014). This study is unique in its application of a gratitude list intervention to reduce perceived stress among undergraduate students. Furthermore, given that gratitude interventions have been effective in significantly

reducing symptoms of anxiety and depression (Emmons & McCullough, 2003; Froh et al., 2009), the current study measured these variables in order to isolate the effects of gratitude on stress.

The secondary aim of this study was to advance the research on gratitude interventions. Many of the extant studies contain common flaws, weakening their conclusion that this method of inducing gratitude has a causal impact on the measured outcomes. Perhaps most significant is the inclusion of an adequate comparison group. About half of the published gratitude interventions either did not have a control group or had one that likely was not innocuous (e.g., listing hassles), leading to doubt as to whether the intervention was truly effective due to gratitude, expectancy, or merely because it was more pleasant than the comparison task. For an adequate comparison group, the current study asked participants to list three objects they could see. This method is similar to those that have participants describe the layout of a living room (Watkins, Grimm, & Kolts, 2003), but better aligned with the listing activity that participants in the gratitude condition completed. Furthermore, describing a living room every day for two weeks would likely cause fatigue and potentially feel frustrating to the participants. Listing objects is also proposed to be more benign than listing early childhood memories or events of the day, which have the potential of eliciting strong emotional reactions. Studies that have used the early memories comparison group have shown that the activity leads to significant decreases in depression and increases in happiness (Gander et al., 2013; Seligman et al., 2005). Thus, the object activity is proposed to be less likely to have an effect beyond that of engaging in a daily activity as part of a research study.

This study aimed to strengthen the evidence in support of gratitude interventions in several additional ways. Although a few do include it, most tests of gratitude interventions

consider only baseline and effects immediately after the intervention (Gander et al., 2013). To add to the evidence that the effects of gratitude last longer than immediately after completing the intervention, the present study collected data six weeks following the intervention period. This study was also one of the first to explore the potentially moderating effects of trait gratitude. Lastly, this study examined the effect of sex and sex-role identification on the gratitude intervention.

Hypotheses

Those who experience more gratitude typically report a wide variety of health and well-being benefits such as lower risk of mental health diagnoses (Kendler et al., 2003), higher life satisfaction (Wood et al., 2010), and more adaptive personality traits (Wood et al., 2008). Inducing gratitude has significantly increased sleep quality (Wood et al., 2009) and decreased symptoms of physical illness (Emmons & McCullough, 2003), factors intimately related to stress. In terms of direct measures of stress, a few studies have suggested that gratitude is accompanied by lower levels of stress (Deutsch, 1984; Krause, 2006; Wood et al., 2008) and one demonstrated that a gratitude intervention reduces stress among adults seeking mental health treatment (Kerr et al., 2014).

H1: Individuals in the gratitude condition will report significantly lower levels of perceived stress compared to those in the objects and no-treatment control groups post intervention and six weeks later.

Research that has looked directly at gratitude and stress has been concerned with perceived stress, regardless of life events. However, a few cross-sectional studies suggest that individuals who experience more gratitude are better able to cope with stress, as evidenced by better functioning after a trauma (Emmons & Crumpler, 2000; Kahneman et al., 1999), lower

risk of developing PTSD (Kashdan, Uswatte, & Julian, 2006), and decreased stress among college freshman (Wood et al., 2008). The current study measured the number of stressful events that have occurred recently in the participant's life as well as their subjective ratings of perceived stress.

H2: Reported levels of gratitude will negatively moderate the relationship between stressful life events and perceived stress at each time point.

Grateful people endorse distinct qualities such as greater sense of belonging and environmental mastery (Kashdan et al., 2006; Lambert et al., 2010; Wood et al., 2008) and preliminary evidence directly suggest that trait gratitude may influence the effectiveness of gratitude interventions.

H3: Trait gratitude will moderate the effect of the gratitude intervention on perceived stress.

Traditional gender roles dictate that men are expected to be prioritize independence and status whereas women are expected to prioritize nurturing and relationships. Gratitude is often thought of as an emotional response to the kind acts of others (c.f. McCullough, Kilpatrick, Emmons, & Larson, 2001), and yet being on the receiving end of a kind act can also elicit a sense of obligation to return the favor. This might explain why there is evidence that men identify gratitude as being more burdensome and are less likely to express it themselves (Kashdan, Mishra, Breen & Froh, 2009). This sense of burden may actually create stress and thus diminish the benefits reaped by some from experiences of gratitude. However, there are other ways to experience gratitude beyond interactions with another person, such as through personal accomplishments and abilities, and there is some evidence to suggest that there is a gender difference in the things people are grateful for (Gordon, Musher-Eizenman, Holub, & Dalrymple,

2004). Although the literature has discussed these differences in terms of sex (i.e. male versus female) the theory of why these differences exist points to stereotypical sex-roles (i.e. masculine versus feminine). In other words, it may be that identification with stereotypically masculine traits, such as autonomy and dominance, make a person less likely to benefit from gratitude or to feel grateful for interpersonal experiences.

H4a: Sex-role identification will moderate the relationship between gratitude and stress such that those who identify more masculine traits will benefit less from the gratitude intervention compared to those who identify more feminine traits.

H4b: There will be a relationship between gender-role identification and interpersonally-based items in their gratitude lists, such that higher levels of traditional masculine traits will correspond with lower levels of interpersonally focused gratitude.

Method

Procedure

Participants were recruited from Colorado State University undergraduate psychology courses and received either research credit or extra course credit. Those who signed up for the study were provided with a link to access the study via a secured website. Following consent and completion of the baseline measures, participants were assigned to one of the three study conditions (gratitude, three objects, no treatment control). To ensure roughly equal sample sizes within each condition, participants were assigned based on when they completed the baseline measures (e.g. the first participant was assigned to the gratitude condition, the second to the objects, the third to the control condition, etc.). Participants in the gratitude and objects conditions were provided with a link and instructed to log in daily between 5pm and midnight for two weeks to complete the intervention. After the two week intervention period, all participants completed the outcome measures at that time as well as six weeks later.

Study Conditions

Gratitude condition. Participants responded to the following prompt, adapted from previous studies: “There are many things in our lives, both large and small, that we might be grateful about. Think back on today and type in the lines below three things you are grateful or thankful for from today.”

Three objects condition. Participants were asked to respond to the following prompt: “Please type three objects that you can see right now, it does not matter what they are so please simply list the first three things you see.”

No treatment control. Participants in this condition only completed the pre, post, and six week follow-up measures.

Instruments

Perceived stress. The Perceived Stress Scale (PSS; Cohen & Williamson, 1988) includes ten items that measure the extent to which participants have found their lives unpredictable, uncontrollable, and overwhelming. The scale was modified to reflect the previous two weeks. The 10 items (six recoded) are rated on a 0 (never) to 4 (very often) scale. Item responses will be summed to produce a total score ranging from 0-40. Scores have demonstrated good internal consistency and test-retest reliability with samples of undergraduate students as well as community and international samples (see Lee, 2012 for a review). The scale has good convergent and predictive validity with life events, depression, anxiety, use of health services, and health behaviors (Cohen, Kamarck, & Mermelstein, 1983; Cohen & Williamson, 1988; Lee, 2012). In the current study, scale scores had a moderately high internal consistency, as determined by a Cronbach's alpha of 0.79.

Stressful events. Undergraduate Stress Questionnaire (USQ; Crandall, Preisler, & Aussprung, 1992) is a checklist of events designed to measure stress among undergraduates. Events range from “death of a family member” to “went into a test unprepared.” Scores have demonstrated good internal consistency, split-half and test-retest reliability as well predictive and convergent validity with negative affect and physical symptoms (Crandall et al., 1992; Powers, Cramer, & Grubka, 2007). The number of items checked were be summed for a total score, with possible scores ranging from 0-82.

Gratitude. The Gratitude Questionnaire-6 (GQ-6; McCullough et al., 2002) consists of six items (two reverse coded), using a 1 (strongly disagree) to 7 (strongly agree) scale, ask about frequency and intensity with which gratitude is experienced. Examples of items include “I feel thankful for what I have received in life”, and “long amounts of time can go by before I feel

grateful to something or someone.” Items will be summed to produce a total score ranging from 6-42. Reliability and construct validity has been shown in studies predicting positive and negative experiences in daily life (e.g., McCullough et al., 2004) good peer-rated validity and independence from other related constructs (McCullough et al., 2002). Scores on this instrument also have good test-retest reliability (Wood et al., 2008). The scale had a high level of internal consistency in the current study, as determined by a Cronbach's alpha of 0.83.

Depression. The Patient Health Questionnaire-2 (PHQ-2; Kroenke, Spitzer, & Williams, 2003) measures the core symptoms of depression (depressed mood and anhedonia). It is designed to screen for depression and is not intended as a diagnostic tool. Items begin with “Over the past two weeks, how often have you been bothered by any of the following problems?” and include “little interest and pleasure in doing things” and “feeling down, depressed, or hopeless.” They are rated on a four-point scale from “not at all” (0) to “nearly every day” (4). Items were summed for a total score ranging from 0-8. Scores on the PHQ-2 has demonstrated good sensitivity and specificity among clinical and non-clinical populations (Arroll, Khin, & Kerse, 2003; Gilbody, Richards, Brealey, & Hewitt, 2007; Whooley, Avins, Miranda, & Browner, 1997) as well as good criterion and construct validity (Kroenke et al., 2003). The scale had a high level of internal consistency in the current study, as determined by a Cronbach's alpha of 0.85.

Anxiety. The Generalized Anxiety Disorder-7 (GAD-7; Spitzer, Kroenke, Williams, & Swinson, 2006) consists of seven items that measure symptoms of anxiety using a four-point scale ranging from “not at all” (0) to “nearly every day” (3). Example items include “feeling nervous, anxious or on edge” and “not being able to stop or control worry.” Items are summed for a total score. Scores on this scale have demonstrated good reliability and validity (Kroenke,

Spitzer, Williams, Monahan, & Löwe, 2007; Spitzer et al., 2006). Cronbach's alpha of .93 suggests a high level of internal consistency in the current study.

Sex-role identity. The Bem Sex-Role Inventory (BSRI; Bem, 1974) is widely used to measure gender role perceptions. It is a list of 60 adjectives; 20 measuring stereotypical masculine traits (e.g. independent), 20 measuring stereotypical feminine traits (e.g. sympathetic), and 20 filler adjectives (e.g. truthful). Participants are asked to rate how much each trait describes them from “never or almost never true” (1) to “always or almost always true” (7). An “androgyny score” is obtained by subtracting the total feminine score from the masculine score ranging from -20 to 20. Total BSRI of negative nine to positive nine indicate that the person has an androgynous gender-role identity while those below are more feminine and those above are more masculine. The scale has demonstrated adequate psychometric properties (Holt & Ellis, 1998). Separate masculine and feminine subscale score are obtained by computing an average score for each. The Masculine and Feminine subscales demonstrated high internal consistency with Cronbach's alphas of .86 and .83, respectively.

Deservedness. The Psychological Entitlement Scale (PES; Campbell, Bonacci, Shelton, Exline, & Bushman, 2004) was used to measure the degree to which participants feel they are deserving of good things. Nine items are rated on a 7-point scale from “strong disagreement” (1) to “strong agreement” (7). Example items include: “I honestly feel I am more deserving of others” and “things should go my way.” Total scores can range from 9-63. This scale has demonstrated strong psychometric properties (Campbell et al., 2004). The scale had a high level of internal consistency in the current study, as determined by a Cronbach's alpha of 0.82.

Results

Description of the Sample

Three-hundred and sixteen participants completed the initial survey. Participants were 78.8% female and 82.2% identified as White/Caucasian, 5.6% as Hispanic, 1.9% as African-American, 6.9% as Asian-American, and 1.9% as Other.

Description of the Gratitude Items

Compliance within the gratitude condition ranged from one to all 14 days, with participants completing the gratitude list an average of 10 days ($SD = 3.58$). Seventeen percent of participants began each item with “I am thankful/grateful.” The vast majority of participants (78%) repeated at least one item on their gratitude list with an average repetition of 18%. Of those who repeated items, percent of repeats ranged from 2.4-92.3%. Most participants (43%) entered responses of three words or less, to describe what they were grateful for. Based on electronic time-stamps, time to complete the task ranged from three minutes to just over an hour with 81.3% completed in three minutes. Typical themes of the gratitude items included interpersonal relationships with friends (e.g. “friends,” “I am thankful I have friends who care about me,”), family (e.g. “my brother called me,” “for my mom, because she is such an amazing person”) and romantic partners (e.g. “boyfriend!!,” “having a boyfriend who is there for me and loves me). Gratitude for the basic things in life such as the weather (e.g. “warm weather”), food (e.g. “pizza,” “yummy dinner”), having a place to live (e.g. “I am thankful I am not homeless,” “having a warm place to sleep”), sleep (e.g. “naps,” “got to sleep in”), and health (e.g. “being healthy,” “a healthy body”) was also frequently endorsed. Lastly, many participants listed items related to academics (e.g. “Finished homework early!” “I am grateful for being able to be at CSU for my education.”).

Preliminary Analysis

Less than 10% of the data for each variable were missing and data were determined to be missing at random via Little's test $X^2(566) = 555.49, p = .61$. Maximum likelihood estimation was used to handle data that was missing for individual scale items (Enders, 2001). One exception was made for a participant who did not complete any items on the Depression or Anxiety scales. These items were coded as missing in the data and were not included in relevant analyses. Table 4.00 displays descriptive statistics for each of the variables at baseline. Index scores with zero as a possible value (Depression, Anxiety, Stressful Events and Perceived Stress) were anchored by adding one to every score so that the lowest score possible was one (Osborne, 2002). Preliminary analysis of the variable scores pre-intervention revealed that Depression, Stressful Events, Gratitude, and Deservedness violated the assumptions of normality. Standardized skew ranged from -17.11 to 6.42 and kurtosis ranged from 1.18 to 32.76. For samples of 200 or more, skew and kurtosis violate the assumption of normality if the absolute values exceed 2.58 (Field, 2009). Per recommendations for positively skewed data, square-root transformations were applied to these variables. Based visual inspection as well as standardized skew (-.72 to 1.71) and kurtosis (-.74 to -1.94), this transformation resulted in adequately normal distributions for Depression, Stressful Events, and Deservedness (Howell, 2007; Tabachnick & Fidell, 2007). Multiple transformations were applied to Gratitude including square, square root, and log transformations. None resulted in a sufficiently normal distribution, standardized skew ranged from -30.41 to -4.17 and kurtosis from 5.06 to 98.22, thus it is not appropriate to included this variable in standard parametric tests

Table 4.00 Baseline Descriptive Statistics for Entire Sample

	Min.	Max.	Mean (SD)	Median
Anxiety	0.00	28.00	10.31 (6.00)	10.00
Gratitude*	6.00	42.00	36.73 (5.22)	37.76
Stress	0.00	37.00	17.05 (6.35)	17.00
Depression*	0.00	8.00	2.14 (1.82)	2.00
Stress Events*	0	47	17.34 (9.1)	16.00
Deservedness*	9.00	52.00	23.70 (7.58)	23.00

*Variables violate assumptions of normality, median is the recommended measure of center

Pearson correlations were calculated for original and square-root transformations, when applicable (see Table 4.01 and Table 4.02). Examination of the correlation coefficients of variables that required the square-root transformation reveals that the coefficients are very similar with and without the transformation. Furthermore, statistical significance was not affected by the transformations. In other words, significant relationships between original variables remained significant after the transformation was applied and no new significant relationships emerged. Specifically, significant correlations were between Stress and the following variables: Depression ($r = .57, p = .01$), Anxiety ($r = .66, p = .01$), and Stressful Events ($r = .47, p = .01$). Anxiety and Depression ($r = .78, p = .01$), There was a significant negative relationship between Deservedness and Depression ($r = -.17, p = .01$), well as between Deservedness and Anxiety ($r = -.17, p = .01$). Depression was also significantly correlated with Anxiety ($r = .78, p = .01$) and Stressful Events ($r = -.17, p = .01$). Due to substantial violation of normality, Spearman's Rho was used to observe the relationship between Gratitude and the other variables at baseline (see Table 4.03). A significant negative relationship was found between

Gratitude and Stress ($r = -.37, p < .01$), Depression ($r = -.25, p < .01$), and Anxiety ($r = -.15, p < .01$), Stressful Events ($r = -.13, p = .02$), and Deservedness ($a = -.13$).

Table 4.01 Pearson Correlations for Original Variables

	Stress	Dep.	Anx.	St. Ev.	Des.
Stress	1	.58**	.66**	.47**	-.04
Depression [□]	.57**	1	.77**	.31**	-.17**
Anxiety	.66**	.77**	1	.40**	-.18**
Stress Events [□]	.47**	.31**	.40**	1	-.07
Deservedness [□]	-.04	-.17**	-.18**	-.07	1

□ Violate assumptions of normality

*Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

Table 4.02 Pearson's Correlations for Transformed Variables

	Stress	Dep.	Anx.	St. Ev.	Des.
Stress	1	.57**	.66**	.47**	-.03
Depression [□]	.56**	1	.78**	.33**	-.17**
Anxiety	.66**	.78**	1	.41**	-.17**
Stress Events [□]	.47**	.33**	.41**	1	-.07
Deservedness [□]	-.03	-.17**	-.17**	-.07	1

□ Square-root transformation used

*Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

Table 4.03 Spearman's Rho

	Deservedness	Stress Events	Stress	Depression	Anxiety
Gratitude	-.13*	-.13*	-.37**	-.25**	-.15**

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

The next series of analyses requires ANOVA which assumes, among other things, that the standardized residuals of dependent variables are normally distributed. Shapiro-Wilk's tests indicated that depression ($p < .01$) and gratitude ($p < .01$) violated this assumption. Square-root transformation corrected this issue for depression, based on a Shapiro-Wilk's test ($p = .24$). As in previous analyses, violation of normality persisted despite multiple transformations of gratitude. Also unique to ANOVA is the assumption of homogeneity of variance. Levene's Test indicated that this assumption was met across all groups and time points ($p = .37$ to $.70$).

A series of one-way ANOVAs was conducted to examine differences between the Gratitude ($N = 104$), Objects ($N = 105$), and Control ($N=107$) conditions prior to the intervention. No significant difference in depression ($F(2,313) = .17, \eta^2 < .01, p = .84$), stressful events ($F(2,313) = .18, \eta^2 < .01, p = .83$), perceived stress ($F(2,313) = .59, \eta^2 < .01, p = .55$), or anxiety ($F(2,313) = 1.19, \eta^2 = .01, p = .31$), with effect sizes less than what is considered to be small (Cohen, 1988). However, there was a small but significant difference in deservedness ($F(2,313) = 5.39, \eta^2 = .04, p < .01$). A Tukey post-hoc analysis indicated that deservedness was significantly higher in the Gratitude group ($M = 4.93$) compared to the Objects ($M = 4.560, d = .40, p = .01$) and Control ($M = 4.63, d = .38, p = .02$), with a small to medium effect size There was no statistically significant difference in deservedness between the Objects and Control groups ($d = .02, p = .95$). Since deservedness is not one of the outcome variables in the present

study, this difference is not of particular concern. A Kruskal Wallis test indicated that the distribution of gratitude was the same across groups ($p = .75$).

Next, analyses were conducted to highlight differences in baseline scores between those who did not complete the post-intervention ($N = 47$) and follow-up ($N = 57$) surveys and those who did ($N = 257$ and $N = 259$, respectively). Results from independent-samples t-tests indicated that there were no significant differences in anxiety ($p = .52$), perceived stress ($p = .83$), depression ($p = .07$), or stressful events ($p = .41$). However, deservedness was significantly higher ($d = .46$, $p < .01$) for those who completed the post-intervention survey ($M = 4.77$) compared to those who did not ($M = 4.42$). For those who did not complete the follow-up survey compared to those who did, there was no significant difference between any of the variables with one exception. Participants who did not complete the survey reported higher average depression ($M = 1.85$) than those who did ($M = 1.664$, $t(314) = 2.52$, $d = .32$, $p = .01$).

Hypothesis 1

Hypothesis one stated that individuals in the gratitude condition would report significantly lower levels of perceived stress compared to those in the objects and no-treatment control groups, above and beyond depression, anxiety, deservedness, and previous perceived stress. First, separate repeated measures ANOVA were used to determine if there were any within group changes in depression, anxiety, or stress across time (one condition x three time-points). Results indicated that there was not a significant change in any of these variables across time within any of the three groups. The Friedman Test, which does not assume that variables are normally distributed, also revealed that gratitude did not significantly change within any of the groups. Results of the repeated measures ANOVAs and Friedman Test can be found in Table 4.04.

Table 4.04 Repeated Measures ANOVA and Friedman's Test

	Gratitude	Objects	Control
Stress	$F(2,154) = .59, p = .56$	$F(2,144) = 1.91, p = .16^*$	$F(2,150) = .80, p = .44^*$
Dep	$F(2,154) = .68, p = .53$	$F(2,160) = .15, p = .86$	$F(2,158) = 1.22, p = .30$
Anxiety	$F(2,154) = 1.86, p = .16$	$F(2,160) = .28, p = .76$	$F(2,158) = 1.11, p = .33$
Gratitude	$X^2(2) = .35, p = .84$	$X^2(2) = .14, p = .93$	$X^2(2) = 5.98, p = .05$

*Greenhouse-Geisser correction due to lack of sphericity

ANCOVA was used Baseline perceived stress and deservedness were included as covariates. To isolate the effects of the intervention on stress, post-intervention depression and anxiety were also entered as covariates. First, separate models of perceived stress post-intervention with each covariate and group entered as an interaction term were evaluated to ensure homogeneity of the regression slopes. Results indicated that the effect of the covariates did not vary by group. Next, the full-factorial model including all covariates was used to assess differences in perceived stress post-intervention. Results indicated that there was not a significant difference in stress post-intervention between groups, controlling for depression, anxiety, deservedness, and previous perceived stress ($F(2,249) = .23, \eta^2 < .01, p = .79$). This process was repeated for perceived stress at follow-up. Again, the effect of the covariates on perceived stress did not vary by group and there was not a significant difference in stress post-intervention between groups, controlling for depression, anxiety, deservedness, and previous perceived stress ($F(2,236) = 1.83, \eta^2 < .01, p = .16$). Since there was not a significant decrease in perceived stress for those who completed the intervention group, hypothesis one was not supported.

Hypothesis 2

The second hypothesis was that reported levels of gratitude would negatively moderate the relationship between stressful life events and perceived stress at each time point. Using variables that violate the assumption of normality as moderators in regression analyses can lead to misleading results. To avoid this, the gratitude variable was converted to a categorical variable to represent different levels of gratitude. Cut-off points were based on quartiles; scores 0-35 (25th percentile) were categorized as low, 36-39 as medium (50th percentile), and 40-42 as high (75th percentile). Responses for the gratitude items were mostly “strongly disagree” to “neutral” for the low category, “agree” for the medium category, and “strongly agree” for the high category. At baseline, 107 participants fell in the low, 103 in the medium, and 106 in the high category.. Dummy codes were then created for the categorical variable. To determine if the impact of stressful events on perceived stress was moderated by level of gratitude, interaction terms were created for stressful events and each of the gratitude categories, at each time point. Two gratitude categories were then entered at a time into regression analysis with perceived stress as the criterion variable and deservedness as a covariate. The first model of perceived stress, pre-intervention, with high and medium gratitude variables was significant $F(6, 301) = 25.06, R^2=.34, p < .01$. Holding stressful events and deservedness constant, participants who identified high ($t = -4.19, b = -.53, p < .01$) and medium ($t = -2.73, b = -.38, p = .01$) gratitude experienced less perceived stress than those who identified a low level of gratitude. Among those in the low gratitude category, stressful events accounted for a significant amount of the variance in perceived stress ($t = 4.29, b = .37, p < .01$) but deservedness did not ($t = -.72, b < -.03, p = .47$). The interactions between stressful events and high ($t = 1.62, b = .20, p = .11$) and medium ($t = .34, b = .05, p = .73$) gratitude were not significant. This process was repeated to examine whether

the impact of stressful events on perceived stress differed for those who identified medium gratitude. Again, the overall model was significant $F(6, 301) = 14.60, R^2=.34, p < .01$. Holding stressful events and deservedness constant, individuals who identified high gratitude did not significantly differ in reported perceived stress compared to those who reported a medium level of gratitude ($t = -1.30, b = -.16, p = .19$) but individuals who identified low gratitude perceived significantly more stress compared to those who reported a medium level of gratitude ($t = 2.73, b = .35, p = .01$). For individuals who reported a medium level of gratitude, stressful events accounted for a significant amount of the variance in perceived stress ($t = 4.81, b = .41, p < .01$) but deservedness did not ($t = -.72, b < -.03, p = .47$). The interactions between stressful events and high ($t = 1.27, b = .16, p = .21$) and low ($t = -.34, b = -.05, p = .73$) gratitude were not significant. See Figure 4.00 for a graphical representation of predicted values of perceived stress prior to the intervention as a function of stressful events for each of the gratitude categories, controlling for deservedness.

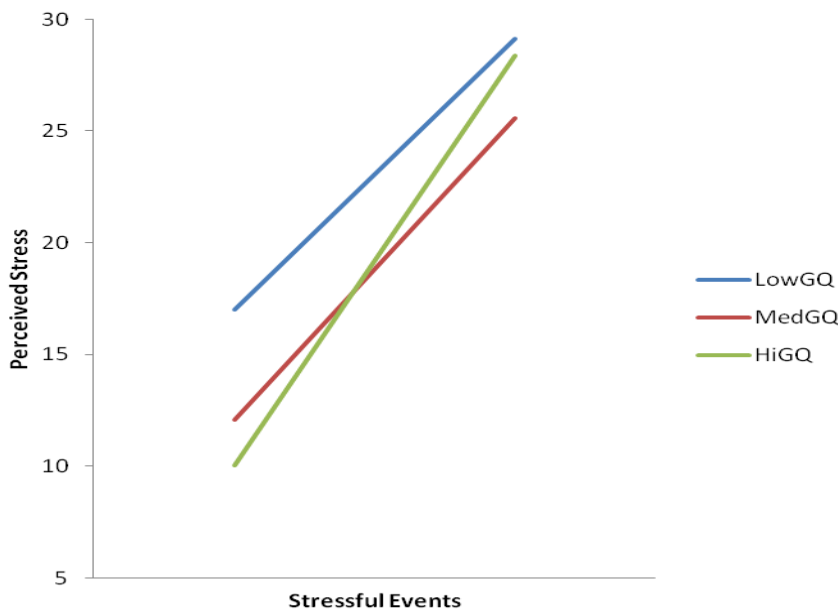


Figure 4.00 Pre-intervention Perceived Stress, Gratitude and Stressful Events

The process was repeated for post-intervention and 6 week follow-up scores. At post intervention 119 participants reported low, 108 reported medium, and 94 reported high gratitude. At this time-point, gratitude, deservedness, and stressful events accounted for 36.8% of variance in perceived stress $F(6, 245) = 14.60, p < .01$. Holding stressful events and deservedness constant, participants who identified high gratitude ($t = -3.48, b = -.55, p < .01$) experienced less perceived stress than those who identified a low level of gratitude. There was no difference between the medium and low gratitude categories ($t = -1.41, b = -.22, p = .16$). Among those in the low gratitude category, stressful events accounted for a significant amount of the variance in perceived stress ($t = 2.87, b = .31, p < .01$) but deservedness did not ($t = -.02, b < -.01, p = .98$). The interactions between stressful events and high ($t = 1.31, b = .21, p = .19$) and medium ($t = .418, b = .07, p = .68$) gratitude were not significant. This process was repeated to examine whether the impact of stressful events on perceived stress differed for those who identified medium gratitude. Again, the overall model was significant $F(6, 245) = 14.60, R^2 = .27, p < .01$. Holding stressful events and deservedness constant, individuals who identified low gratitude did not significantly differ in reported perceived stress compared to those who reported a medium level of gratitude ($t = 1.41, b = .20, p = .16$) but individuals who identified high gratitude perceived significantly less stress compared to those who reported a medium level of gratitude ($t = -2.41, b = -.34, p = .02$). For individuals who reported a medium level of gratitude, stressful events accounted for a significant amount of the variance in perceived stress ($t = 4.29, b = .37, p < .01$) but deservedness did not ($t = -.02, b < -.01, p = .98$). The interactions between stressful events and high ($t = 1.03, b = .15, p = .31$) and low ($t = -.42, b = -.06, p = .68$) gratitude were not significant. See Figure 4.01 for a graphical representation of predicted values of perceived stress

prior to the intervention as a function of stressful events for each of the gratitude categories, controlling for deservedness.

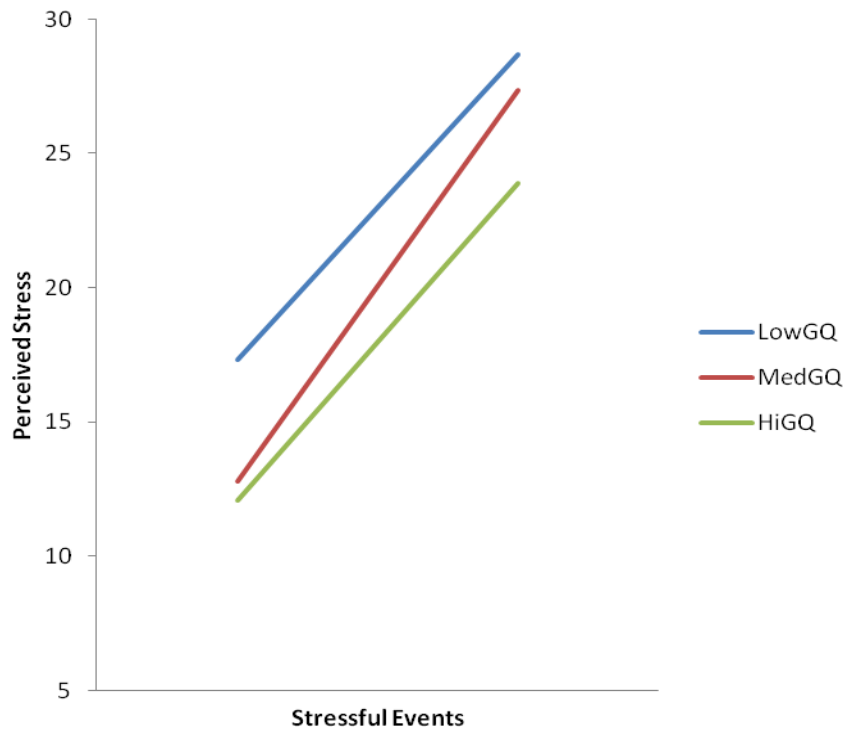


Figure 4.01 Post Perceived Stress, Gratitude and Stressful Events

At the follow-up 130 participants were in the low gratitude category, 104 in the medium, and 87 in the high category. At this time-point, gratitude, deservedness and stressful events accounted for 30.9% of variance in perceived stress $F(6, 256) = 18.67, p < .01$. Holding stressful events and deservedness constant, perceived stress was not significantly different for participants who identified high ($t = -1.68, b = -.22, p = .094$) from those who identified medium gratitude. However, those in the low gratitude category experienced significantly more stress than those in the medium gratitude category ($t = 2.10, b = .27, p = .037$). Among those in the medium gratitude category, stressful events accounted for a significant amount of the variance in perceived stress ($t = 4.56, b = .41, p = <.001$) but deservedness did not ($t = -1.61, b = -.09, p = .11$). The effect of

stressful events on perceived stress did not vary significantly for those in the high ($t = .74, b = .10, p = .46$) and low ($t = -.13, b = -.02, p = .90$) compared to those in the medium gratitude group. The overall model of perceived stress with medium gratitude, high gratitude, deservedness, stressful events, and the interaction terms was significant $F(6, 256) = 18.67, R^2=.31, p < .01$. Holding stressful events and deservedness constant, individuals who identified low gratitude perceived significantly more stress compared to those who reported a high ($t = -3.73, b = -.51, p < .01$) and medium ($t = -2.01, b = -.29, p = .04$) level of gratitude. For individuals who reported a low level of gratitude, stressful events accounted for a significant amount of the variance in perceived stress ($t = 4.23, b = .39, p < .01$) but deservedness did not ($t = -1.61, b = -.09, p = .11$). The interactions between stressful events and high ($t = .86, b = .12, p = .39$) and medium ($t = .13, b = .02, p = .90$) gratitude were not significant. See Figure 4.02 for a graphical representation of predicted values of perceived stress at the 6 week follow-up as a function of stressful events for each of the gratitude categories, controlling for deservedness.

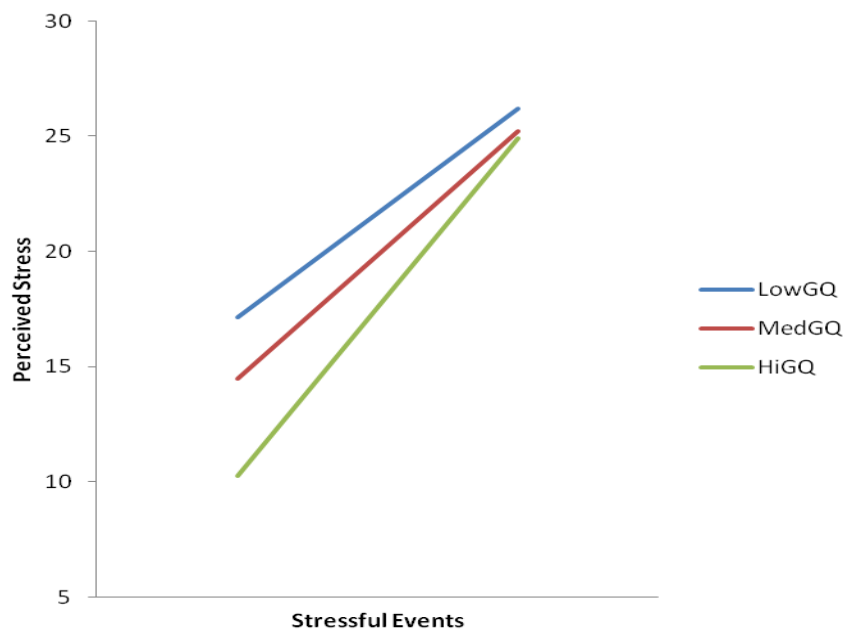


Figure 4.02 Follow-up Perceived Stress, Gratitude and Stressful Events

In sum, there was a significant positive relationship between stressful events and perceived stress. Across all time points individuals who identified a high level of gratitude perceived less stress in their lives compared to those who identified a low level of gratitude, controlling for stressful events and deservedness. However, Gratitude did not negatively moderate the relationship, thus hypothesis two was not supported. Thus hypothesis two was not supported.

Hypothesis 3

Hypothesis three stated that trait gratitude would moderate the effect of the gratitude intervention on perceived stress. A 2 x 3 x 3 (time point x gratitude category x group) repeated measures ANOVA was conducted to assess whether change in perceived stress pre and post intervention varied by group and/or trait gratitude, controlling for deservedness. Tests of within-subjects effects indicated that there was not a significant interaction between time point and group ($F(2, 247) = .17, \eta^2 < .01, p = .85$) or time point and trait gratitude ($F(2, 247) = .838, \eta^2 < .02, p = .06$). Nor was there a three-way interaction between time point, group, and trait gratitude ($F(4, 247) = .53, \eta^2 < .01, p = .71$). Hypothesis three was not supported. See Figure 4.03 and 4.04.

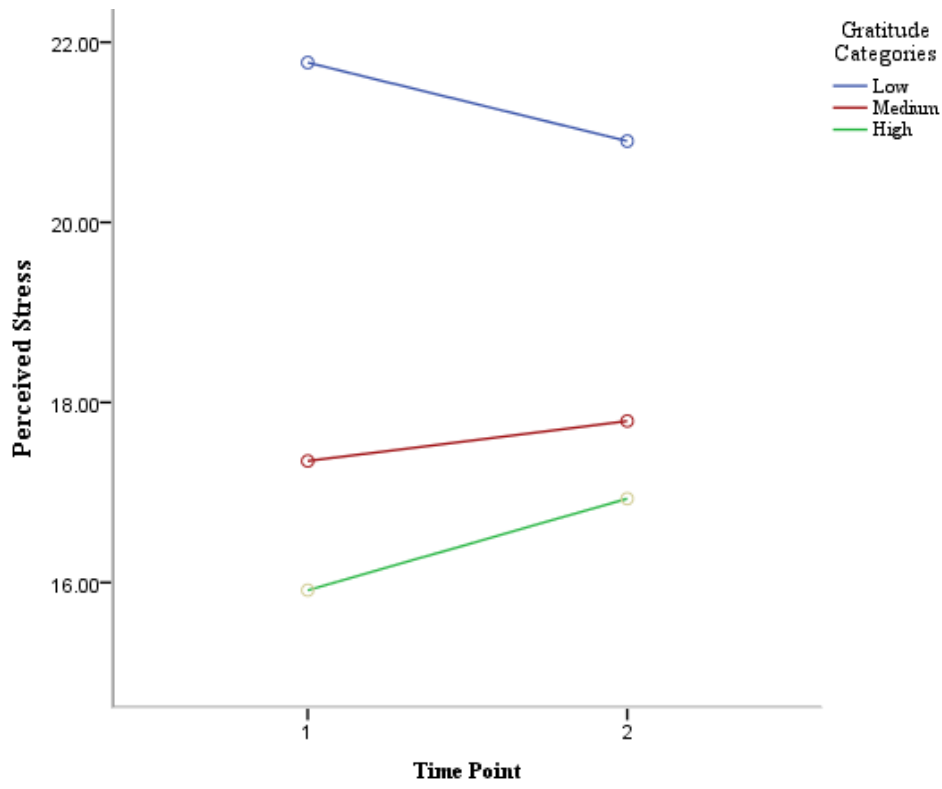


Figure 4.03 Change in Perceived Stress by Gratitude Categories

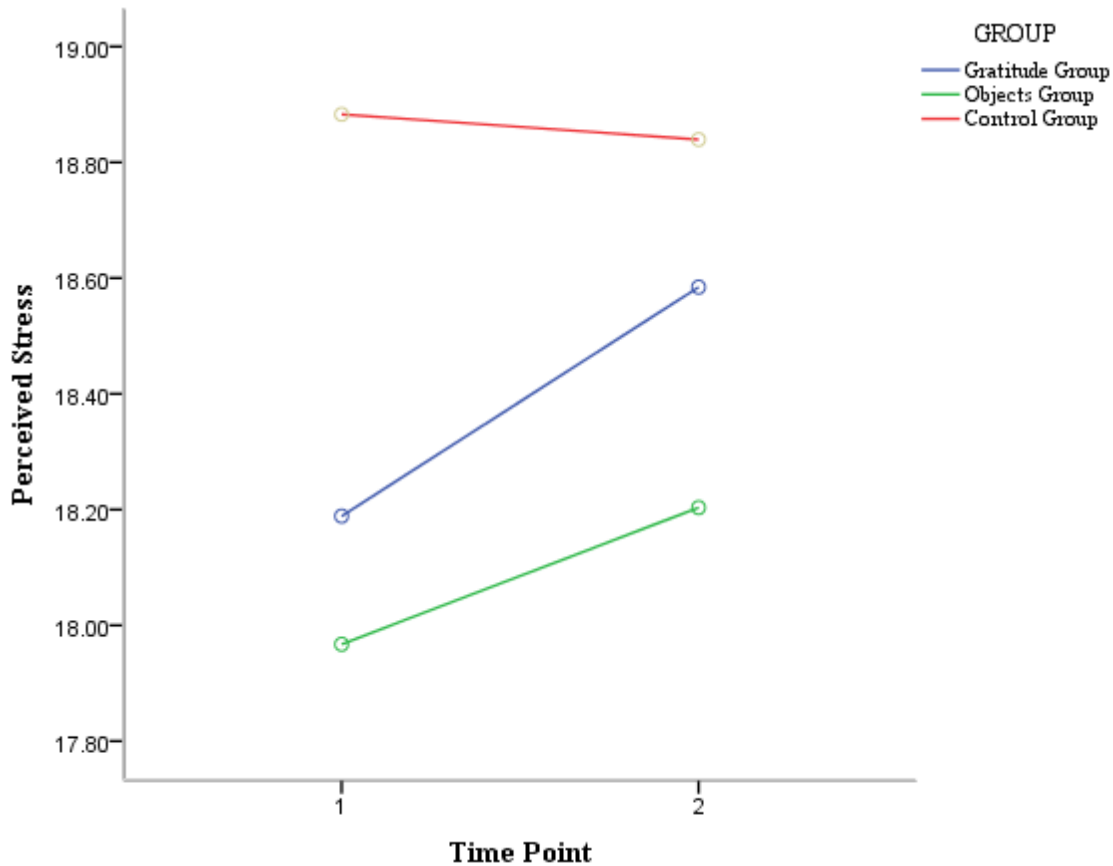


Figure 4.04 Change in Perceived Stress by Study Group

Hypothesis 4a

Hypotheses 4a and 4b suggested that there would be a difference in outcome based on sex-role identification. Hypothesis 4a stated that sex-role identification would moderate the relationship between gratitude and stress such that those in the gratitude condition with higher masculine scores would experience less of a decrease in perceived stress. To first exam this question based on biological sex, a 3 x 2 x 3 (time point x sex x group) repeated measures ANOVA was conducted to assess whether change in perceived stress varied by group and/or sex. Mauchly's Test of Sphericity indicated that the assumption of sphericity had been violated, $\chi^2(2) = 6.34, p = .04$, and therefore, a Greenhouse-Geisser correction was used. Change in perceived

stress did not vary by group $F(3.896, 470) = .90, \eta^2 < .01, p = .46$, sex $F(1.948, 470) = 1.04, \eta^2 < .01, p = .35$, or group and sex $F(3.896, 470) = 1.18, \eta^2 = .01, p = .32$.

Descriptive statistics for the BSRI can be found in Table 4.05 and Table 4.06. Because BSRI ranged -57 to 43, 58 was added to each score so that all scores fell in the positive range. Visual inspection of normality plots indicated that total BSRI and the masculine subscale were roughly normally distributed. This was confirmed by standard skew (BSRI: -.53, masculine: -1.71) and kurtosis (BSRI: .051, masculine: .97) as well as by Shapiro-Wilk Tests (BSRI: $p = .80$, masculine: $p = .32$). The feminine subscale indicated acceptable kurtosis (1.36) but significant negative skew (-2.83) and a Shapiro-Wilk was significant ($p < .01$). Following recommendations for negatively skewed data the feminine subscale scores were squared resulting in acceptable skew (.09) and kurtosis (.34), as well as non-significant Shapiro-Wilk ($p = .85$). Correlations between BSRI and study variables can be found in Table 4.07. Significant small to medium correlations were identified between BSRI and perceived stress ($r = -.20, p < .01$), anxiety ($r = -.16, p < .01$), deservedness ($r = .24, p < .01$), depression ($r = -.14, p = .02$) and stressful events ($r = -.13, p = .04$). There was not a significant relationship between BSRI and gratitude ($r = -.03, p = .63$). The masculine subscale demonstrated small to medium significant correlations with perceived stress ($r = -.24, p < .01$), depression ($r = -.15, p < .01$), anxiety ($r = -.12, p = .03$), gratitude ($r = .23, p < .01$), and deservedness ($r = .13, p = .03$). The masculine subscale and stressful events were not significantly correlated ($r = -.04, p = .46$). There were small to medium significant relationships between the feminine subscale score and deservedness ($r = -.18, p = .03$) and gratitude ($r = .35, p < .01$). The feminine subscale score was not significantly related to any of the other study variables ($r = -.01$ to $.11, p = .06$ to $.90$).

Table 4.05 Total Bem Score

	Range	Mean (SD)
Men	-35 - 43	6.39 (2.20)
Women	-57- 41	-7.65 (1.16)
Total	-57 - 43	-4.62 (17.92)

Table 4.06 Average Masculine and Feminine Subscale Scores

	<u>Masculine Score</u>		<u>Feminine Score</u>	
	Range	Mean (SD)	Range	Mean (SD)
Men	1.90 - 6.75	4.77 (.82)	2.15 - 6.15	4.46 (.69)
Women	2.25 - 6.40	4.53 (.74)	2.65 - 6.50	4.92 (.65)
Total	1.90 - 6.75	4.59 (.76)	2.15 - 6.50	4.82 (.69)

Table 4.07 Correlations for Bem Scores

	Stress	Dep.	Anx.	St. Ev.	Des.	Gratitude
Total Bem	-.20**	-.14*	-.16**	-.13*	.24**	-.03
Fem. Bem	-.01	.01	.07	.11	-.18**	.35**
Masc. Bem	-.24**	-.15**	-.12*	-.04	.13*	.23**

*Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

An independent samples t-test was used to compare men and woman on the anchored as well as the average scores for the masculine and feminine subscales. Women's BSRI scores ($M = 50.35$, $SD = 17.01$) were significantly lower than men's scores ($M = 64.39$, $SD = 16.91$), $t(272) = 5.62$, $p < .001$. The feminine subscale was significantly higher for women ($M = 4.92$, $SD = .65$) compared to men ($M = 4.46$, $SD = .69$), $t(290) = -4.77$, $p < .01$. There was not a significant difference in the masculine subscale score between women ($M = 4.54$, $SD = .74$) and men ($M = 4.78$, $SD = .816$), $t(290) = 1.76$, $p = .08$.

To test the hypothesis that the effect of the intervention would vary by sex-role identification dummy codes were created for each condition and interaction terms between condition and Bem scores were entered into a series of regression analysis predicting perceived stress post-intervention. Pre-intervention perceived stress was entered as a control variable in each model. None of the interactions between Bem Scores and interventions were significant. See Table 4.08 for detailed results.

Table 4.08 Difference in Perceived Stress post-intervention between condition and Bem Score with the Gratitude Condition entered as the Reference Group

	Objects	Control
Total Bem	$t = -.38, b = -.08, p = .71$	$t = -.97, b = -.20, p = .33$
Masculine	$t = 1.17, b = .43, p = .24$	$t = -.07, b = -.03, p = .93$
Feminine	$t = 1.74, b = .73, p = .08$	$t = 1.13, b = .49, p = .26$

To further explore the relationship between sex-role identity, gratitude, and the study conditions a series of one-way ANOVA's were conducted to determine if there was a difference in Bem scores between gratitude categories at each time point, groups, or the interaction between the two. The first series of models examined differences in total BSRI. There was not a significant difference between groups $F(2, 274) = 2.34, \eta^2 = .02, p = .10$, pre-intervention gratitude category $F(2, 274) = 1.20, \eta^2 = .01, p = .30$, or the interaction term $F(4, 274) = .48, \eta^2 = .01, p = .75$. Nor was there significant difference between post-intervention gratitude category $F(2, 274) = .45, \eta^2 = .02, p = .64$, groups $F(2, 274) = 2.40, \eta^2 = .02, p = .09$, or the interaction term $F(4, 274) = .23, \eta^2 < .01, p = .92$. Finally there was not a significant difference between gratitude at follow-up $F(2, 274) = .28, \eta^2 < .01, p = .76$, groups $F(2, 274) = 2.36, \eta^2 = .02, p = .10$, or the interaction term $F(4, 274) = .10, \eta^2 < .01, p = .98$.

Turning to the masculine subscale, there was a significant difference in scores based on pre-intervention gratitude category $F(2, 292) = 8.98, \eta^2 = .06, p < .01$. This difference did not vary by group $F(4, 292) = .399, \eta^2 = .01, p = .58$ nor was there a main effect for group $F(2, 292) = .34, \eta^2 < .01, p = .71$. Post-hoc analysis with Bonferroni correction indicated that masculine subscale score was significantly lower for those in the low ($M = 4.31$) than those in the high ($M = 4.79$) gratitude category ($p < .01$). There was not a significant difference between medium ($M = 4.62$) and low gratitude ($p = .01$) or medium and high gratitude ($p = .33$). A similar pattern was found with post-intervention gratitude. There was a significant difference in the masculine subscale score between post-intervention gratitude categories $F(2, 292) = 4.91, \eta^2 = .03, p < .01$. This difference did not vary by group $F(4, 292) = .11, \eta^2 < .01, p = .98$ nor was there a main effect for group $F(2, 292) = .28, \eta^2 < .01, p = .76$. Post-hoc analysis with Bonferroni correction indicated that masculine subscale score was significantly lower for those in the low ($M = 4.42$) than those in the high ($M = 4.76$) gratitude category ($p < .01$). There was not a significant difference between medium ($M = 4.64$) and low gratitude ($p = .13$) or medium and high gratitude ($p = .79$). This pattern was also replicated with the follow-up gratitude categories. There was a significant difference in the masculine subscale score between follow-up gratitude categories $F(2, 292) = 6.68, \eta^2 = .04, p < .01$. This difference did not vary by group $F(4, 292) = .14, \eta^2 < .01, p = .97$ nor was there a main effect for group $F(2, 292) = .59, \eta^2 < .01, p = .55$. Post-hoc analysis with Bonferroni correction indicated that masculine subscale score was significantly lower for those in the low ($M = 4.45$) than those in the high ($M = 4.85$) gratitude category ($p < .01$). There was not a significant difference between medium ($M = 4.56$) and low gratitude ($p = .84$) or medium and high gratitude ($p = .04$).

Finally, differences in the feminine subscale between gratitude categories and group were examined. As seen with the masculine subscale scores, there was a significant difference in the feminine subscale scores based on pre-intervention gratitude category, $F(2, 292) = 18.80, \eta^2 = .12, p < .01$. This difference did not vary by group, $F(4, 292) = .13, \eta^2 < .01, p = .97$ nor was there a main effect for group, $F(2, 292) = 2.151, \eta^2 = .015, p = .97$. Post-hoc analysis with Bonferroni correction indicated that feminine subscale score was significantly higher for those in the high ($M = 5.13$) gratitude category compared to those in the low ($M = 4.54, p < .01$) and medium ($M = 4.76, p < .01$) gratitude categories. There was not a significant difference between medium and low gratitude categories ($p = .06$). A similar pattern was found with post-intervention gratitude. There was a significant difference in the feminine subscale score between post-intervention Gratitude Categories, $F(2, 292) = 10.83, \eta^2 = .07, p < .01$. This difference did not vary by group, $F(4, 292) = .47, \eta^2 < .01, p = .75$. Nor was there a main effect for group, $F(2, 292) = 2.11, \eta^2 = .01, p = .12$. Post-hoc analysis with Bonferroni correction indicated that the feminine subscale score was significantly higher for those in the high gratitude category ($M = 5.09$) compared to those in the low ($M = 4.65, p < .01$) and medium ($M = 4.79, p = .01$) gratitude categories. There was not a significant difference between medium and low gratitude ($p = .45$). This pattern was also replicated with the follow-up gratitude categories. There was a significant difference in the feminine subscale score between follow-up gratitude categories, $F(2, 292) = 9.48, \eta^2 = .06, p < .01$. This difference did not vary by group, $F(4, 292) = .35, \eta^2 < .01, p = .84$. Nor was there a main effect for group, $F(2, 292) = 1.25, \eta^2 < .01, p = .29$. Post-hoc analysis with Bonferroni correction indicated that feminine subscale score was significantly higher for those in the high gratitude category ($M = 5.09$) compared to those in the low ($M = 4.65, p < .01$) and

medium ($M = 4.83, p = .04$) gratitude categories. There was not a significant difference between medium and low gratitude ($p = .14$).

Analysis for hypothesis 4a revealed that those in the high gratitude category endorsed more masculine and more feminine sex-role characteristics than those in the low gratitude category. This pattern was seen across time points and study conditions. However, change in perceived stress did not vary as a function of biological or sex-role identification, regardless of study condition. Thus hypothesis 4a was not supported.

Hypothesis 4b

The second part of hypothesis four stated that there would be a negative relationship between BSRI and interpersonally-based gratitude items. To test this hypothesis the gratitude items were coded. Gratitude items that referred to a relationship with another person were coded as interpersonal. Items that expressed gratitude for nonhuman beings were coded as impersonal. Following the literature, this included items such as “God” and pets (Emmons & Shelton, 2002). Since number of responses varied between participants, an average score for number of interpersonal items and impersonal items was calculated for each participant.

Descriptive statistics for gratitude items can be found in Table 4.09. An independent samples t-test determined that there is not a significant difference in average number of interpersonal, $t(98) = -.63, p = .53$, or impersonal, $t(98) = .22, p = .83$, items between men and women.

Table 4.09 Gratitude Items Descriptive Statistics

	<u>Range</u>		<u>Mean (SD)</u>	
	Men	Women	Men	Women
Interpersonal	.400-2.615	0.00-2.357	1.032 (.548)	1.12(.534)
Impersonal	.385-2.60	.636-3.00	1.851 (.647)	1.820 (.543)

Scatterplots indicated that there was not a linear relationship between average number of interpersonal or impersonal items and BSRI. Nor was there a significant correlation between BSRI and average number of interpersonal ($r = -.11, p = .32$) or impersonal items ($r = .10, p = .34$); masculine subscale and interpersonal ($r = .15, p = .18$) or impersonal items ($r = -.16, p = .15$); or feminine subscale and interpersonal ($r = .15, p = .17$) or impersonal items ($r = -.15, p = .17$). These correlations can be found in Table 4.10.

Table 4.10 Bem Scores and Gratitude Items

	Total Bem	Fem.	Masc.
Interpersonal	-.11	.15	.15
Impersonal	.10	-.15	-.16

Given that the type of gratitude items did not differ between men and women nor was there a relationship between gratitude items and sex-role identification, hypothesis 4b was not supported.

Discussion

The present study provided additional evidence that perceived stress continues to be an issue among undergraduate students. Among study participants, there was also a large and significant correlation between perceived stress, depression and anxiety. Stress alone can have detrimental short and long-term effects but the presence of mental health concerns likely compounds these effects. These results further highlight the importance of addressing perceived stress among undergraduate students.

Unfortunately, the present study failed to provide evidence that recording daily gratitude lists decreases perceived stress among this population. This held true regardless of trait gratitude, deservedness, sex, or sex-role identification. Although this was not the primary focus of the study, there was also no change in anxiety or depression for any of the study groups. These results were somewhat surprising given previous evidence that gratitude lists decrease negative affect (e.g. Emmons & McCullough, 2003) and that those high in trait gratitude benefit more from such as intervention (Watkins, Uher, & Pichinevskiy, 2014).

Although the intervention itself drew insignificant results, the present study provides evidence that there is an important relationship between trait gratitude and perceived stress. In general, the two variables were moderately correlated with one another. However, this relationship appears to be more robust when comparing extreme levels of gratitude. Supporting previous studies, results indicated that those low in gratitude experience a greater deal of stress than those high in gratitude (Deutsch, 1984; Kerr et al., 2014; Krause, 2006; Wood et al., 2008). Given that there is a relationship between these variables, it may be that the lack of significant effect of the intervention is due to characteristics of the participants or the intervention itself.

Through examination of past efficacious gratitude interventions several hypotheses can be formed regarding the present results.

The first distinction between the present and past intervention studies is that the purpose of this study was only vaguely communicated to the participants. Participants were told that the study was merely interested in the relationship between variables. There was no indication that the intervention may be helpful to them in any way. Previous studies with significant results suggested that the intervention would benefit the participant in some way, such as by stating that the intervention was designed to improve happiness, well-being, or simply to “make a difference” (Kerr et al., 2014; Lyubomirsky, Dickerhoof, Boehm, & Sheldon, 2011; Watkins et al., 2014). The same explanations were given for all treatment conditions, suggesting that results were due to more than a placebo effect. These sort of vague statements may lift expectations just enough so that participants are motivated by, and engaged in, the intervention. The intention of the current study in leaving out suggestion of anticipated benefits was to avoid artificial changes in well-being. However, doing so may have limited the potential impact of the intervention. Although it is important to be able to parse out these artificial effects, participants may not have reaped any benefits due to being less engaged and invested in the intervention.

Engagement in the intervention may also have been affected by motivation. All participants in the current study received course credit for taking part in the study. It is not hard to imagine that the credit, particularly for those who were required to get research credit, was the primary motivation for completing the study. This is not to say that course credit precludes the chance that an intervention will produce significant results. Gratitude lists have decreased depression and increased subjective well-being among students who received course credit (Watkins et al., 2014). However, the students in the current study had no reason to believe that

they would gain anything other than course credit for their participation. Thus they may have merely checked boxes rather than fully attending to the things they were grateful for. To better understand the effect of self-selection and expectation, Lyubomirsky and colleagues (2011) had students (who received course credit) sign up for either a ‘happiness study’ or ‘cognitive exercises.’ All participants were told that the study was designed to increase their well-being and were randomly assigned to write a gratitude letter, their best possible self, or their daily activities (control condition). Participants who completed either the gratitude letter or best possible self and who signed up for the ‘happiness study’ (i.e. self-selected into the study) reported greater increases in well-being compared to those who completed the intervention but had selected ‘cognitive exercises’. There was no difference between those who had selected ‘cognitive exercises’ and the control group. This study strongly suggests that expectation and self-selection impact outcomes. Furthermore, participants in Seligman et al. 2005, the gratitude study with the most impressive outcomes to date, were fully informed that the interventions were intended to increase well-being and volunteered with this expectation in mind.

The requirement to complete the intervention in order to receive full credit may have had impacted the outcome in other ways. Theorists have suggested that a lack of congruency between participants’ values and the intervention can diminish the efficacy of the intervention (Lyubomirsky & Layous, 2013; Sheldon & Lyubomirsky, 2007). For example, participants who were interested in gratitude lists benefitted more from them than those who felt pressured or obligated (Sheldon & Lyubomirsky, 2007). Completing a study to fulfill a requirement could certainly fall under the purview of an obligation. Although only speculation can be offered regarding the motivation for participation as well the participants experience with the intervention, the results may have been different if participants were seeking help for their stress.

Borrowing from Lyubomirsky and colleagues (2011), the present study did not assess the ‘will’ of the participants and thus it can’t be said for sure that gratitude is not the ‘way’ to reduce undergraduate stress.

More in-depth processing of gratitude during the intervention may also have been limited by the lack of instruction to do so. The present study used a relatively brief prompt that introduced the concept of gratitude (“there are many things in our lives, both large and small, that we might be grateful about”) and provided instruction (“think back on today and type in the lines below three things you are grateful or thankful for from today.”). This format is nearly identical to many studies. However, others have added verbiage that may have encouraged more engagement in the intervention. For example, Watkins and colleagues (2014) asked participants to “write about how this particular experience or event made (them) feel grateful.” Adding this to the instructions may have enhanced grateful processing in two ways. First, by simply increasing the time spent thinking about things that elicited gratitude. Second, by having participants think about how that event elicited gratitude. Research on cognition has established that taking the time to think about the meaning and forming connections with other concepts, or the why and how, increases the likelihood that it will be encoded into memory (Craik & Watkins, 1973). In contrast, participants in the present study often responded with one to three words and took very little time completing the daily lists. Although not an exact comparison, the present study was more similar to the repetition strategy for learning in which students attempt to memorize a list of words and then typically forget soon after the exam. This “cramming” method likely isn’t particularly useful for more chronic issues such as perceived stress.

The brief instruction provided in this study also did not direct participants towards the outcome of interest (i.e. stress). To focus on employee well-being, Kaplan and colleagues (2013),

suggested that participants “might include supportive work relationships, sacrifices or contributions that others have made for you, advantages or opportunities at work, or thankfulness for the opportunity to have your job in general” on their gratitude lists. Although leaving it open-ended is more typical for this intervention, doing so may have diminished the effects that the current study had on perceived stress. Watkins and colleagues (2008) had participants write about an event that was bothering participants, or what he termed “open memories.” Those who were instructed to write about the positive consequences and things that they could now be grateful for related to that event showed significant improvements after doing so. Specifically, the negative emotional impact of that event diminished, participants felt more closure, and memories of that event became less intrusive. Processing events in this way helped diminish their negative effects and allowed participants to move on, much like the current study hoped to do with stress. Making this connection more explicit by asking participants to identify things they were grateful for related to a stressful event may have been beneficial. For example, exams can be very stressful but focusing on being grateful for having completed the exam may help reduce that stress.

A final way that the instructions may have impacted the outcome is by doing nothing to encourage diversity within participant responses. Given this, it is not surprising that there was repetition in the content of participants’ gratitude lists. Repetition can decrease the impact that some things have. When this occurs with things that are enjoyable it is called hedonic adaptation (Frederick & Loewenstein, 1999). For example, getting a raise can initially cause joy and excitement. The person may spend their extra money on travel, eating out, or other things that felt too extravagant before. Eventually, such spending habits become routine and no longer bring the same amount of enjoyment they once did. In other words, they adapted to these hedonic

activities. In their model for increasing subjective well-being Sheldon and Lyubormirsky (2007) propose varying the content and timing of positive psychology interventions. In support of these recommendations, one study demonstrated that participants who were randomly assigned to vary their acts of kindness showed higher levels of well-being and happiness ten weeks later relative to those who did not vary their acts of kindness (Tkach, 2005). Another study suggested that participants “try to think of new ideas that (they had) not focused on in the past” when creating their gratitude lists, which resulted in increased well-being and work attendance (Kaplan et al., 2013). In the present study, participants who repeated items may have “adapted” to those sources of gratitude and thus no longer felt truly grateful for them.

Given this concern of hedonic adaptation it is important to also consider the dosage of an intervention. Interventions using the gratitude list method have ranged in frequency and duration. Several studies have demonstrated that the once a day for two weeks dosage used in the current study results in positive outcomes (Emmons & McCullough, 2003; Froh, Sefick, & Emmons, 2008; Geraghty, Wood, & Hyland, 2010b). However, others have demonstrated effectiveness in less time and/or with less frequency (e.g. journaling every two or three days; Study 3, Emmons & McCullough, 2003; Seligman et al., 2005). There is some evidence that less may be more when it comes to practicing gratitude. Compared to controls, participants who expressed gratitude three times a week did not show benefits but those who expressed gratitude once a week did (Sheldon & Lyubomirsky, 2007). The authors suggest that requiring participants to engage in the activity too frequently may cause said activity to feel more burdensome rather than meaningful. They added that this may be especially true during the initiation of the activity. Furthermore, studies that had positive outcomes post intervention have shown that benefits are not enhanced with continued practice of the intervention (e.g. Kaplan et al., 2013; Watkins et al.,

2014). Together, the evidence suggests that less is more and that more may actually be less. For the participants in the current study, having to list items daily may have felt like an additional requirement to fulfill in their already busy schedule. Thus it may have inadvertently increased the stress it was intending to diminish.

Based on the current results it is difficult to know whether the intervention failed because it didn't increase gratitude, because it didn't decrease stress, or both. Typically one would assume that a gratitude intervention would increase gratitude and that the failure to do so in the present study explains the non-significant change in perceived stress. However, there is actually limited evidence that gratitude interventions increase gratitude (see Wood et al., 2010). Granted, few studies have actually included a manipulation check to confirm that the intervention impacted gratitude and those that have offer mixed results. One study demonstrated that both a gratitude and kindness conditions increased gratitude relative to a control group (Kerr et al., 2014). However, they did not examine whether this increase in gratitude explained the observed decreases in anxiety and stress (Kerr et al., 2014). Kaplan and colleagues (2013) considered both these issues. They found that the gratitude intervention did increase gratitude but that this change in felt gratitude did not account for the increases in well-being. Despite evidence that gratitude interventions work, increasing gratitude itself may not be the reason why.

Understanding how gratitude functions is further complicated in the present study by the significant negative skew of the variable. Review of previous studies suggest that this is common when the GQ-6 is used, as typical means reported fall around 35 on a scale that ranges from 7-42. However researchers have neglected to discuss how this was addressed in their analysis, if at all. The present study elected to convert gratitude to a categorical variable using quartile scores. This limited the results by necessitating multiple pairwise comparisons of the quartiles rather

than a single hypothesis test (see Bennette & Vickers, 2012). It also utilizes cut-off scores which draw artificial distinctions between groups. Results of the study indicated that participants who fell in the low gratitude experienced more stress than those in the medium and high categories. However, caution should be exercised in interpreting results based on the medium category as some individuals differed by one point between that and the other categories. That being said, quartile scores are a viable option for examining skewed data. Using this method, the current study provides evidence that individuals who experience a low level of gratitude often experience more stress than those who experience a high level of gratitude.

The current study also failed to provide evidence that sex or sex-role identification moderates the effect of a gratitude intervention on perceived stress. This isn't particularly surprising given that there was not a main effect of the intervention. A relationship was found between the Bem subscales and gratitude. Interestingly there was a moderate positive relationship between both the feminine and masculine subscales and gratitude. This suggests that the distinction is not between feminine and masculine but rather degree to which someone identifies with masculine or feminine traits. However, these results should be interpreted with caution given the violations of normality identified in the gratitude variable.

Limitations

The previous discussion identified several potential limitations of the current gratitude intervention, such as fulfilling credit requirements and offering limited instruction. Several other limitations are worth noting. First, a self-report measure of stress was used. Although this method presents weaknesses typical of self-report measures, several studies have suggested that higher perceived stress increases the likelihood of negative health outcomes (Cooper, Cooper, & Faragher, 1991; Geyer, 1991). This indicates that reducing perceived stress is at least of equal

importance to reducing the physiological responses to stress. However, it would be valuable to know if the relationship between stress and gratitude holds true for physiological measures of stress.

Another limitation is that the current study did not compare the gratitude intervention to a well-supported stress reduction intervention. A challenge arose in identifying an intervention that is comparable to the gratitude list (e.g. internet-based, self-administered, able to track adherence). Given the non-significant impact of the present gratitude intervention, this issue is less concerning. However, if another intervention had been used it may have provided insight into whether non-significant results were due to the gratitude intervention or to other characteristics of the study. In other words, if a previously established stress-reduction intervention had been effective compared to the gratitude intervention it could be stated with more certainty that gratitude lists do not reduce perceived stress. If neither were effective, that would suggest that there was something unique about the study participants or the way that the interventions were carried out.

The attempts to understand the role that deservedness may play in the experience of gratitude also fell short. Results indicated that there is a significant but small negative relationship between these two variables. However, a general measure of deservedness was used and thus the results only indicate that there is a relationship between these dispositional characteristics rather than the degree deservedness felt for gratitude items. Thus, conclusions regarding how deservedness actually impacts the experience of gratitude are limited.

Finally, the current results are limited to the population studied. Although the use of undergraduate students was appropriate given that this was the target population, the current study relied on students from psychology courses. In addition, the sample was overwhelmingly

White (82.2%) and female (78.8%). Thus results are not representative of the general undergraduate population.

Implications for Research

Although the intervention was not successful, this study provides further evidence that there is a relationship between gratitude and stress. Given that this was one of the first applications of a gratitude intervention on perceived stress more work is needed before determining that gratitude lists are not effective in reducing stress. Based on the limitations identified in the present study several suggestions for future research in this area can be made, starting with the way that the study is presented to the participants. Future intervention research is encouraged to indicate that the study will benefit the participant in some way. The hope is that doing so will increase engagement with the study and decrease the sense of burden. However, caution needs to be exercised as there is evidence to suggest that causing expectations to be too high can backfire. If participants don't experience anticipated results they are likely to disengage from the intervention. Dropout among those who have high expectations is an issue in everything from exercise programs (Jones, Harris, Waller, & Coggins, 2005) to positive psychology interventions (Kaczmarek et al., 2014). In contrast, studies suggesting that participation will "make a difference" or "improve well-being" have demonstrated that gratitude interventions are superior to controls (Kerr et al., 2014; Lyubomirsky, Dickerhoof, Boehm, & Sheldon, 2011; Watkins et al., 2014). For studies that award course credit, such as those involving undergraduate students, it may be particularly important to suggest that participation will benefit them in additional ways. Research determining how adding this element could impact the gratitude's effect on stress is needed.

It is also important to know if gratitude's effect on stress is dependent upon level of engagement with the intervention. This includes frequency (e.g. daily) as well as depth of processing. Depth of processing or engagement could be manipulated by requiring more of the participant. For example, participants could be asked to add why they are grateful for the things on their gratitude listed or to vary the content of their lists. It could also be worthwhile to provide a more direct connection between the gratitude intervention and stress. For example, rather than simply listing items, participants could be instructed to add how the things that make them feel grateful reduce the stress in their lives. Alternatively, per Watkins and colleagues' (2014) work on "open memories," participants could write about how stressful events in particular made them feel grateful. The impact of these variations on perceived stress needs to be tested as well as studies comparing each variation to the other.

Further assessment of how congruency between participant and intervention impacts gratitude outcomes is also needed. Measuring participants' reactions to the intervention (e.g. enjoyment, irritation) as well as individual differences (e.g. gender-typical traits, deservedness) may help to tease a part for whom or in what situations it is effective. To assess the effect of deservedness, participants could be asked to rate how much they feel they deserve each item or feel burdened by each item on their gratitude list. Given the non-significant results of the current study, the questions regarding difference in gratitude based on sex, gender-role identification, deservedness, and trait gratitude remain.

In terms of gratitude research in general, future research should consider this issue of negative skew seen with the GQ-6. Using, or comparing, alternative means of measuring gratitude may be beneficial. For example, the Gratitude Adjective Checklist asks participants to rate how frequently they have been grateful, thankful, and appreciative; all gratitude related

emotions (McCullough et al., 2002). This measure has shown sensitivity to change in gratitude (Kerr et al., 2014; Siegel et al., 2014). The GQ-6 is a broader measure that asks respondents to reflect on the role that gratitude has had in their lives across time and contexts rather than their day-to-day emotional experience of gratitude. Honing in on the time-limited affective experience of gratitude may be more useful when examining short-term changes in other affective states (i.e. stress). Regardless of the outcomes being measured, it is imperative that future research discuss assumption violations as they, as well as methods used to address them, can significantly impact results.

Considerably more work needs to be done to address perceived stress among undergraduate students. The current study provided additional evidence that undergraduate students experience a more than average amount of stress. Other than testing variations of the gratitude intervention, alternative avenues for reducing stress should be explored. This includes evaluating services that are already in place as well as developing new interventions. Given the low utilization of existing services by undergraduate students, it is imperative that research also focus on reasons for initiation and participation. In the meantime, undergraduate stress will likely continue to be a problem that negatively impacts their health and well-being.

Implications for Practice

The present study identified that perceived stress is an issue among undergraduate students and that it is often accompanied by symptoms of depression and anxiety. Individuals working with this population, such as medical and mental health providers as well residential directors, are advised to implement screenings for perceived level of stress. Results of the screening could be used to provide appropriate resources for individual students as well as inform needed resources on a larger scale. For example, if screening revealed that a significant

portion of the student body was struggling with stress that would suggest that implementing stress management classes may be beneficial. Even without such data, it may be prudent for college faculty to normalize the experience of stress and routinely discuss healthy coping mechanisms. Adding this to the core curriculum, perhaps particularly in the first year, could help set students up for greater success and mitigate the damaging effects of stress.

Requiring coursework on stress management would create some of the issues identified earlier. In particular, simply requiring an intervention may override its potential benefits. Thus instructors are advised to identify that the purpose and intended outcomes of the curriculum is to benefit the student, beyond checking off a required course. Outcomes may be enhanced further by encouraging the students' autonomy in fulfilling the course requirement. This could be done by allowing them to select their own goal for stress management and how they plan to reach those goals. Even with this approach, it is likely that some students would be resistant to the curriculum, possibly due to lack of perceived need or a sense of obligation. It is strongly recommended that any systematic effort to address stress in a university setting is evaluated. This would help inform where resources should be allocated and provide guidance for other institutions who might be interested in addressing the same concern.

The present study also adds to the growing evidence that those low in gratitude experience a greater deal of stress than those high in gratitude (Deutsch, 1984; Kerr et al., 2014; Krause, 2006; Wood et al., 2008). It is important for those working to reduce stress in any setting to be aware of such relationships and to form treatment goals accordingly. In a clinical setting, when clients endorse little gratitude it is important to assess the level of stress they perceive in their lives and vice versa. Although a causal relationship was not supported in the present study, integrating gratitude into stress management may be beneficial. Past research suggests that

gratitude interventions may be particularly effective for distressed populations or those seeking therapeutic change. However, the lack of effect in the present study suggests that clinicians should be mindful of how they present interventions.

The goal of interventions in a clinical setting is to benefit the client in some way and most individuals who participate in therapy are seeking some form of help. Thus priming and self-selection are active, and largely unavoidable, ingredients in most clinical work. In terms of self-selection, patients who are mandated to therapy are more resistant to change but often still benefit from therapy (see Snyder & Anderson, 2009 for a review), suggesting that it is a less important ingredient for therapeutic change. Regardless of having self-selected or not, therapy clients know that there is an expectation that therapy will impact them in some way. The lack of priming and self-selection in the present study is comparable to a client not knowing why he/she was mandated to treatment. The non-significant results obtained with this method highlights the importance that clinicians form clear goals with their clients and make explicit connections between interventions and those goals.

Drawing connections between therapy and treatment goals may be more crucial for interventions that don't always directly map on to specific goals, such as gratitude lists. For example, participants who signed up for a happiness study experienced an increase in well-being after writing a gratitude letter whereas those who signed up for cognitive exercises did not, despite the fact that they were all told that the study would increase their well-being (Sonja Lyubomirsky et al., 2011). This suggests that identifying the purpose of an intervention (e.g. cognition versus happiness) plays an important role in the outcome of that intervention. Recommending that clients simply complete daily gratitude lists may be less impactful than, for example, asking them to do so because focusing on gratitude could help decrease stress. Drawing

on Watkins and colleagues (2014) work on open memories, the gratitude list may be even more powerful if clients were instructed to list items relevant to their goals for treatment. For decreasing stress, this may mean recognizing the adaptive qualities of stress or viewing the sources of stress in a more positive way. Clinicians play an important role in framing, and providing guidance for, interventions that may largely determine the effectiveness of that intervention.

Discussing clients' experience with an intervention is also important to verify that it is having the intended effect. Clients are less likely to benefit from an intervention if it does not align with their values, and gratitude interventions are no exception (Lyubomirsky & Layous, 2013; Sheldon & Lyubomirsky, 2007). When presenting any intervention in therapy clinicians have to walk the line between motivating the client to engage in the intervention for their benefit versus the clinician's. Clients may follow through with an intervention simply out of obligation, much like the students in the present study were obligated to complete the intervention to receive their course credit. Clinicians are encouraged assess clients' reactions to and experience with the intervention and to adjust or change direction as needed.

Assessment of interventions in therapy is an ongoing process. As demonstrated in previous studies, even those who benefit from gratitude lists at one time may not continue to do so (e.g. Kaplan et al., 2013; Watkins et al., 2014). Given that the evidence on effective dosage for gratitude lists is mixed, clinicians are also encouraged to elicit client feedback on what frequency might be most beneficial to them. Some clients may benefit from daily gratitude lists whereas others may not due to it causing additional distress or hedonic adaptation. Clinicians need to be flexible in their approach and know when an intervention has run its course.

Conclusion

The present study confirms that stress continues to be a significant concern for undergraduate students and that those low in gratitude experience more stress than those high in gratitude. The lack of significant effect of the gratitude list in reducing stress emphasizes the importance of continued effort to address this issue. Work in clinical and research settings on perceived stress and gratitude are encouraged to consider the issues of priming and self-selection. The present study also highlighted several concerns in the gratitude literature, including its measurement as well as the impact of deservedness, sex-role identity, and trait gratitude. These gaps still need to be filled and readers of the gratitude literature are cautioned to do so with a critical eye.

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Appendix

Perceived Stress Scale 10-Item (PSS-10)

The questions in this scale ask you about your feelings and thoughts during the last two weeks.

In each case, please indicate how often you felt or thought a certain way.

0 = never 1 = almost never 2 = sometimes 3 = fairly often 4 = very often

1. How often have you been upset because of something that happened unexpectedly?
2. How often have you felt that you were unable to control the important things in your life?
3. How often have you felt nervous and "stressed"?
4. How often have you felt confident about your ability to handle your personal problems?
5. How often have you felt that things were going your way?
6. How often have you found that you could not cope with all the things that you had to do?
7. How often have you been able to control irritations in your life?
8. How often have you felt that you were on top of things?
9. How often have you been angered because of things that were outside of your control?
10. How often have you felt difficulties were piling up so high that you could not overcome them?

Patient Health Questionnaire 2-Item (PHQ-2)

Over the **LAST TWO WEEKS**, how often have you been bothered by the following problems?

0 = not at all 1 = several days 2 = more than half the days 3 = nearly everyday

1. Little interest or pleasure in doing things.
2. Feeling down, depressed, or hopeless.

Generalized Anxiety Disorder 7-item (GAD-7)

Over the **LAST TWO WEEKS**, how often have you been bothered by the following problems?

0 = not at all 1 = several days 2 = more than half the days 3 = nearly everyday

1. Feeling nervous, anxious or on edge.
2. Not being able to stop or control worry.
3. Worrying too much about different things.
4. Trouble relaxing.
5. Being so restless that it is hard to sit still.
6. Becoming easily annoyed or irritable.
7. Feeling afraid as if something awful might happen.

Gratitude Questionnaire 6-Item (GQ-6)

Using the scale below please indicate how much you agree with the following statements:

1 = strongly disagree 2 = disagree 3 = slightly disagree 4 = neutral 5 = slightly agree

6 = agree 7 = strongly agree

1. I have so much in life to be thankful for.
2. If I had to list everything that I felt grateful for, it would be a very long list.
3. When I look at the world, I don't see much to be grateful for.
4. I am grateful to a wide variety of people.
5. As I get older I find myself more able to appreciate the people, events, and situations that have been part of my life history.
6. Long amounts of time can go by before I feel grateful to something or someone.

Bem Sex-Role Inventory (BSRI)

For each of the following items please answer the question, "How does the term best fit you?" according to the following scale:

1 = Never or Almost Never True 2 = Usually Not True 3 = Sometimes but Infrequently True
4 = Occasionally True 5 = Often True 6 = Usually True 7 = Always or Almost Always True

- | | | |
|-----------------------------------|--------------------------------------|-----------------------------|
| 01. Acts as a leader | 22. Inefficient | 44. Solemn |
| 02. Adaptable | 23. Defends own beliefs | 45. Soft-spoken |
| 03. Affectionate | 24. Receptive to Flattery | 46. Tactful |
| 04. Conceited | 25. Dominant | 47. Self-reliant |
| 05. Aggressive | 26. Jealous | 48. Sympathetic |
| 06. Cheerful | 27. Gentle | 49. Self-sufficient |
| 07. Ambitious | 28. Likable | 50. Theatrical |
| 08. Conscientious | 29. Forceful | 51. Tender |
| 09. Childlike | 30. Gullible | 52. Truthful |
| 10. Conventional | 31. Has leadership abilities | 53. Strong personality |
| 11. Analytical | 32. Moody | 54. Understanding |
| 12. Compassionate | 33. Loves children | 55. Willing to take a stand |
| 13. Assertive | 34. Reliable | 56. Unpredictable |
| 14. Friendly | 35. Independent | 57. Warm |
| 15. Does not use harsh language | 36. Loyal | 58. Unsystematic |
| 16. Happy | 37. Individualistic | 59. Willing to take risks |
| 17. Athletic | 38. Secretive | 60. Yielding |
| 18. Eager to soothe hurt feelings | 39. Sensitive to the needs of others | |
| 19. Competitive | 40. Sincere | |
| 20. Helpful | 41. Makes decisions easily | |
| 21. Feminine | 42. Shy | |
| | 43. Masculine | |

Undergraduate Stress Questionnaire (USQ)

Please check the appropriate stressors that have affected you during the **PAST TWO WEEKS**.

1. Death (family member or friend)
2. Had a lot of tests.
3. It's finals week.
4. Applying to graduate school.
5. Victim of a crime.
6. Assignments in all classes due the same day.
7. Breaking up with boy/girlfriend.
8. Found out a boy/girlfriend cheated on you.
9. Lots of deadlines to meet.
10. Property stolen.
11. You have a hard upcoming week
12. Went into a test unprepared
13. Lost something (especially wallet).
14. Death of a pet
15. Did worse than expected on test
16. Had an interview
17. Had projects, research papers due
18. Did badly on a test
19. Parents getting divorce
20. Dependent on other people
21. Having roommate conflicts
22. Car/bike broke down, flat tire
23. Got a traffic ticket
24. Missed your period and waiting
25. Thoughts about the future
26. Lack of money
27. Dealt with incompetence at the Register's Office
28. Through about unfinished work
29. No sleep
30. Sick, injury
31. Had a class presentation
32. Applying for a job
33. Fought with boy/girlfriend
34. Working while in school
35. Arguments, conflicts of values with friends
36. Bothered by having no social support of family
37. Performed poorly at a task
38. Can't finish everything you needed to do
39. Heard bad news
40. Had confrontation with an authority figure
41. Maintaining a long-distance boy/girlfriend
42. Crammed for a test
43. Feel unorganized
44. Trying to decide on major
45. Feel isolated
46. Parents controlling with money
47. Couldn't find a parking space
48. Noise disturbed you while trying to study
49. Someone borrowed something without asking permission
50. Had to ask for money
51. Ran out of toner while printing
52. Erratic schedule
53. Can't understand your professor
54. Trying to get into your major or college
55. Registration for classes
56. Stayed up late writing a paper
57. Someone you expected to call did not
58. Someone broke a promise
59. Can't concentrate
60. Someone did a "pet peeve" of yours
61. Living with boy/girlfriend
62. Felt need for transportation
63. Bad haircut
64. Job requirements changed
65. No time to eat
66. Felt some peer pressure
67. Had a hangover
68. Problems with you computer
69. Problem getting home from bar when drunk
70. Used a fake id
71. No sex in a while
72. Someone cut ahead of you in line
73. Checkbook didn't balance
74. Visit from a relative and entertaining them
75. Decision to have sex on your mind
76. Spoke with a professor
77. Change of environment (new doctor, dentist, etc.)
78. Exposed to upsetting TV show, book, or movie
79. Got to class late
80. Holiday
81. Sat through a boring class
82. Favorite sporting team loss.

Deservingness Scale

Please answer the following questions about yourself by indicating the extent to which you agree or disagree with each statement.

1 2 3 4 5 6 7

Strongly Disagree Agree Somewhat Strongly Agree

- _____ 1. I honestly feel I'm just more deserving than others.
- _____ 2. Great things should come to me.
- _____ 3. If I were on the Titanic, I would deserve to be on the first lifeboat!
- _____ 4. I demand the best because I'm worth it.
- _____ 5. I do not necessarily deserve special treatment.
- _____ 6. I deserve more things in my life.
- _____ 7. People like me deserve an extra break now and then.
- _____ 8. Things should go my way.
- _____ 9. I feel entitled to more of everything.