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The Effect of Pesticides and Ultraviolet Radiation on Coastal Invertebrates and the Need for More Research on Multiple Stressors and Predator-Prey Interactions

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Cultivating an Attitude of Gratitude: Effects of a Two-Week Gratitude Intervention

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Abstract

Gratitude interventions have been shown to have significant impacts on an individual's mental health. This study tested the effects of a gratitude intervention on college students' psychological well-being (operationalized as happiness, gratitude, life satisfaction, and positive affect) and psychological distress (operationalized as depression, anxiety, stress, and negative affect). Over two weeks, participants in the intervention group spent five minutes a day thinking of things they were grateful for. In contrast, participants in the control group thought about things they had learned that day. Findings indicated that participants in both experimental groups (i.e., intervention and control) showed significantly increased psychological well-being and significantly decreased psychological distress at post-test. A significant time-by-group interaction that favored the gratitude intervention was only observed for the stress outcome. Possible explanations are discussed and ideas for future research are given.

Cultivating an Attitude of Gratitude: Effects of a Two-Week Gratitude Intervention

Gratitude and Mental Health

People are constantly passing around sayings with a central message: be thankful. While the general population would most likely agree that gratitude is an important virtue, most probably do not realize just how influential gratitude is. This subject has been studied extensively in recent years, and findings indicate that gratitude can be both a factor to enhance positive feelings and prevent negative feelings (Fredrickson, 2001; Lyubomirsky, Dickerhoof, Boehm, & Sheldon, 2011; Nelson, 2009; McCullough, Emmons, & Tsang, 2002; Watkins, Woodward, Stone, & Koltz, 2003; Wood, Maltby, Gillet, Linley, & Joseph, 2008). Fredrickson (2001) termed this process the “broaden-and-build theory of positive emotions.” The theory states that when a person opens up their mind (broadens) to positive emotions they are able to create (build) better coping skills, leading to better life outcomes. Although Fredrickson focuses on five specific emotions—joy, contentment, love, interest, and pride—gratitude is another positive emotion that fits under the umbrella of the broaden-and-build-theory. Each emotion works in a slightly different way to shape a person’s personal resources needed to handle everyday challenges. These resources help a person develop good coping skills, which increases one’s overall well-being in life.

Early research into positive psychology found that gratitude was linked with several other positive emotions. Walker and Pitts (1998) found that gratitude was linked to contentment, and Overwalle, Merviedle, and De Schuyter (1995) linked gratitude with hope and happiness. Research has continuously supported this link between gratitude and characteristics such as

happiness and life satisfaction (Fredrickson, 2001; Lyubomirsky et al., 2011; Nelson, 2009; McCullough et al., 2002; Watkins et al., 2003).

Gratitude has also been targeted in numerous experimental research studies in the past. For example, Emmons and McCullough (2003) conducted a series of experiments on the effects of gratitude on daily well-being. They had participants write down five things they were thankful for every day over a two-week period and found that this exercise increased participants' well-being (i.e., positive affect and life satisfaction). Also, the gratitude intervention reduced negative affect in the participants. The current study aimed to build upon these findings while investigating the effects of a gratitude-based intervention on a few new outcomes.

Seligman, Steen, Park, and Peterson (2005) conducted an internet based experiment on the effects of five different types of positive psychology interventions on happiness and depressive symptoms. In the gratitude condition, participants had a week to write a letter to someone they felt needed to be thanked for their kindness and deliver it to that person. The other interventions included thinking of early memories (control group), thinking of good things in life, imaging your best self, recognizing strengths, or using strengths in a new way. Of the six interventions practiced, the gratitude intervention showed the largest positive change in happiness and a significant decrease in depressive symptoms. The current study targeted gratitude in a more general way instead of its manifestation within a personal relationship. Theoretically, a more general form of expressing gratitude should be easier and quicker to practice in everyday life than writing long and personal letters.

Lyubomirsky et al. (2011) conducted a study using interventions of either optimism or gratitude on the effect of well-being over an eight week period. Well-being was measured

through pleasant affect, unpleasant affect, life satisfaction, and happiness. Participants in the gratitude condition were instructed to think for fifteen minutes a week about someone they were grateful for and to write, but not send, that person a letter with details about their gratefulness and how it affected them. The gratitude intervention improved pleasant affect, life satisfaction, and happiness; it also decreased negative affect. Similarly, the present study also investigated the effect of a gratitude based intervention on well-being. However, well-being was defined more broadly, targeting more than just one aspect of happiness.

Not only does gratitude increase one's psychological well-being, it can also help to reduce one's psychological distress (Fredrickson, 2001; Seligman, 2005). The previous literature reviewed shows several instances of gratitude decreasing depressive symptoms and negative affect. However, these findings focus mostly on depression and have overlooked two other common factors of psychological distress: anxiety and stress. These factors have been researched in relation to gratitude, but no experimental studies showing the effect of gratitude-based interventions on anxiety and stress have been conducted.

For example, Ng and Wong (2013) did study the link between gratitude, anxiety, depression, chronic pain, and sleep disturbances among patients in a hospital experiencing musculoskeletal pain problems. Participants were given several surveys to fill out on each of the aforementioned characteristics. The results showed that gratitude did have a direct link to anxiety and depression, with sleep being a mediating factor. In other words, higher gratitude was correlated with lower anxiety and depression due to the fact that those with higher gratitude are able to sleep better. This population was very specific, and the results were only correlational. A study with an experimental design should be done to investigate if gratitude can reduce anxiety.

Furthermore, minimal research has been done on the link between stress and gratitude. Wood, Maltby, Gillett, Linley, and Joseph (2008) studied the relationship of stress, depression, gratitude, and perceived social support in people going through an intense life change. The participants were all freshmen in their first semester of college; they filled out surveys on the stated four characteristics at the beginning and end of the semester. Gratitude was found to be associated with lower levels of stress and depression. However, as with the study done by Ng and Wong (2013), this population was too specific to be generalizable and the data were only correlational.

Gratitude Intervention Issues

Although these past studies provide evidence for the effectiveness of gratitude interventions to enhance well-being and decrease psychological distress, it is noteworthy that other studies have shown the method of the procedure can moderate the effectiveness of the intervention (Nelson, 2009). Watkins et al. (2003) did a gratitude intervention with three different practice methods: think about someone you are grateful for, write an essay about someone you are grateful for, or write a letter to someone you are grateful for. This study measured positive affect and showed increases in all three methods, with the thinking condition showing the greatest increase.

Another study done by Lyubomirsky, Sousa, and Dickerhoof (2006) found similar results to Watkins et al. (2003) and offered an explanation: thinking about gratitude is seen as more free and relaxing, while writing about it contains a certain amount of structure. One has to form his or her ideas more explicitly when writing and that takes away from the therapeutic value of reflecting upon gratitude. This theory is interesting, because almost all of the past effective

gratitude interventions have used some type of writing. As with many other issues in intervention research, there are most likely pros and cons to both methods. Further research should be done with both methods in order to discern if one is better than the other.

Purposes of the Present Study

It is important to continue researching the effects of gratitude, because people are always looking for ways to improve the quality of life. Furthermore, gratitude interventions are easy to do and require little to no cost. People could use gratitude interventions in their daily life to improve their overall well-being. Moreover, research suggests gratitude can actually prevent people from developing severe mental illnesses (Nelson, 2009; Lyubomirsky, Sheldon, & Schkade, 2005).

Taking into account all of the past research indicating the positive effects of gratitude interventions on mental health as well as the moderating effects of intervention methods, the current study investigated the effects of a two-week gratitude intervention on college students' psychological distress and well-being. Over a two-week span, participants were instructed to think for five minutes a day of one to three things they were grateful for (intervention group) or to think of one to three things they learned that day (control group). This intervention structure combined aspects of several different past studies. Thinking of one to three things to be thankful for has been used numerous times, but most past research has focused on writing about gratitude. Taking into consideration the findings of Watkins et al. (2003) and Lyubomirsky et al. (2006), this intervention strategy focused on thinking about gratitude instead of writing about it.

Both psychological distress and well-being were the outcomes of interest in the present study. Psychological distress was operationalized as stress, anxiety, depression, and overall

negative affect. Psychological well-being was operationalized as gratitude, happiness, life satisfaction, and overall positive affect. Figure 1 shows these factors in a representational model. While past research has investigated the effects of gratitude-based interventions on some aspects of psychological distress and well-being, this was one of the first studies to investigate the effects of a gratitude based intervention on a well-rounded combination of both outcomes.

Research Questions and Hypotheses

R1. Compared to the control group, will a two-week gratitude intervention increase college students' psychological well-being, as indicated by increases in self-reported gratitude, happiness, life satisfaction, and overall positive affect?

H1. Yes, a two-week gratitude intervention will enhance college students' psychological well-being, as manifest by statistically-significant increases (with comparable effect sizes) across self-reported gratitude, happiness, life satisfaction, and overall positive affect. Given the nature of the intervention, it is also hypothesized that improvements in gratitude will be greater than those in happiness, life satisfaction, and overall positive affect.

R2. Compared to the control group, will a two-week gratitude intervention decrease college students' psychological distress, as indicated by reduction in self-reported depression, anxiety, stress, and overall negative affect?

H2. Yes, a two-week gratitude intervention will diminish college students' psychological distress, as manifest by statistically-significant reductions (with comparable effect sizes) across self-reported depression, anxiety, stress, and overall negative affect.

Method

Participants

Participants were recruited from the Louisiana State University Psychology Department's online recruitment portal and received partial course credit as compensation for their involvement. There were 43 participants in the control group and 54 participants in the intervention group. The control group was 86% female and 14% male; the ages ranged from 17 to 31, with a mean age of 19.84 and a standard deviation of 2.26. Race for the control group broke down as follows: 81.4% white/Caucasian, 14% black/African-American, 2.3% Asian, and 2.3% other. The intervention group was 75.9% female and 24.1% male; the ages ranged from 18 to 25, with a mean age of 19.98 and a standard deviation of 1.72. Race for the intervention group broke down as follows: 64.8% white/Caucasian, 22.2% black/African-American, 1.9% Asian, 3.7% Indian/Pacific Islander, 3.7% Hispanic, and 3.7% other. 100 participants completed the pre-test, and 97 of those participants returned for the post-test. The 3% attrition rate was due to schedule conflicts with the second session; no one was eliminated due to incompleteness of assignments.

Measures

Demographic Questionnaire. This questionnaire asked for the participant's age, sex, and race.

Depression-Anxiety-Stress Scale (DASS-21). This was a 21-item survey of depression, anxiety, and stress. It contained statements such as, "I found it hard to wind down" or "I found it difficult to work up the initiative to do things" and participants indicated how much the item applied to them over the past week on a scale of 0 to 3 (*0=Did not apply to me at all, 1=Applied to me some of the time, 2=Applied to me a good amount of the time, 3=Applied to me most of the*

time). This scale has been used in multiple studies and shows an internal consistency reliability ranging from $\alpha = .82$ to $.97$ (Osman, Wong, Bagge, Freedenthal, Gutierrez, & Lozano, 2012). Past studies have shown these measurements of depression, anxiety, and stress to have a high positive concurrent validity ($r = .40$ to $.65$; Osman et al., 2012).

The Positive and Negative Affect Schedule (PANAS). This scale contained 20 feeling words (e.g. *interested, scared*) to assess rates of positive and negative affect in individuals. The participant rated to what extent he or she has felt that feeling in the past week on a scale of 1 to 5 ($1=Not\ at\ all$, $2=A\ little$, $3=Moderately$, $4=Quite\ a\ bit$, $5=Extremely$). Both scales show a high internal consistency with alpha coefficients ranging from $.86$ to $.90$ for positive affect and $.84$ to $.87$ for negative affect (Watson, Clark, & Tellegen, 1988). Convergent validity for both positive and negative affect have been shown to stay above $r = .90$ (Watson et al., 1988).

Satisfaction with Life Scale (SWLS). This five-item questionnaire had participants rate on a Likert scale how much they agreed with each statement ($1=strongly\ disagree$, $2=disagree$, $3=slightly\ disagree$, $4=neither\ agree\ nor\ disagree$, $5=slightly\ agree$, $6=agree$, $7=strongly\ agree$). An example statement would be, "I am satisfied with my life." This scale shows a strong internal reliability with a coefficient alpha of $.87$ (Diener, Emmons, Larsen, & Griffin, 1985).

Gratitude Questionnaire (GQ-6). This 6-item scale asked participants to rank on a Likert scale how much they agreed with each statement ($1=strongly\ disagree$, $2=disagree$, $3=slightly\ disagree$, $4=neutral$, $5=slightly\ agree$, $6=agree$, $7=strongly\ agree$). An example statement would be, "I have so much in life to be grateful for." Past studies have shown this scale to have a strong consistency reliability of $\alpha = .82$ (McCullough, Emmons, & Tsang, 2002).

Subjective Happiness Scale (SHS). This 4-item questionnaire had participants rate on a scale of 1 to 7 how much each statement described themselves. Lower numbers indicated less happiness and higher numbers indicated greater happiness, except for the last item which is reversed. The scale shows an internal consistency of $\alpha = .79$ to $.94$ and a test-retest reliability mean of $r = .72$ (Lyubomirsky & Lepper, 1999).

Implementation Fidelity and Social Validity Report. To get a measure of implementation fidelity, participants were asked three additional questions on the post-survey, “(1) How many days did you complete the thinking and writing exercise you were instructed to do? (2) How many days did you complete the thinking portion of the exercise, but not the writing portion? (3) How many days did you complete the writing portion of the exercise, but not the thinking portion?” Participants answered these questions by circling the number of days on a scale from 1 to 14. Also, to see if the participants believed the study was effective or socially valid, they were asked to respond to one final question on the post-survey: “Do you believe this study benefited you in any way, if so, how?” Participants were allowed to write qualitative reactions in an open-response format, which were later coded into thematic responses (i.e., the intervention and control exercises were helpful or not helpful at improving participants’ well-being and reducing their distress).

Procedure

The study used a pre-test–post-test, between-subjects research design. Participants signed up for the study online, but the sessions were conducted in a small conference room at Louisiana State University. It was defined online as a thinking exercises study on aspects of psychological distress and psychological well-being. The experimenter was careful not to mention the phrase

“gratitude intervention,” or anything that sounded remotely positive to prevent participants from having any pre-conceived notions that could potentially cause placebo effects.

Participants signed up for the pre-test and the post-test online at the same time. The two sessions had to be scheduled for the exact same day and time two weeks apart. Sessions ranged anywhere from one to eight participants at one time. First, participants received informed consent and a full description of the study, which they all read silently to themselves. The experimenter then reviewed the procedure by restating the main points of the study: (1) they would fill out surveys on aspects of psychological distress and well-being, (2) their names would never be associated with their answers, (3) they would receive instructions for a daily thinking exercise they had to complete over the next two weeks, and (4) they would return at the end of the two-week period to complete the same surveys again. The pre-test consisted of the demographic questionnaire, the DASS-21, the PANAS, the SWLS, the GQ-6, and the SHS. All tests were administered in the same order to each participant, and they were instructed to turn their paper over once they were finished.

After all surveys were complete, the experimenter passed out the instructions for the daily thinking exercise. Subject numbers were randomly assigned to either the intervention or the control group via a random number generator. The experimenter did not actually assign participants to a subject number; all the papers (consent form, pre-test, etc.) were numbered beforehand and placed face down in front of the seats. Seats were first come, first serve to control for random variables.

Participants were told to read the instructions silently to themselves, and to keep in mind that others in the room might be in a different group. The instructions stated they had either been

randomly assigned to the gratitude exercises (intervention) or the learning exercises (control) group. Those in the gratitude intervention group were instructed to spend five minutes a day for the next two weeks thinking of one to three things they were grateful for and why. There were no limits or set rules on their gratitude, and sample statements were given. For example, “I am thankful for my mom... she helps me with so many expenses... she is so supportive of me and listens to me when I need to vent about a bad day...” It could be something simpler, such as “I am thankful that it didn’t rain on me during my walk to class today... I forgot to bring my umbrella so I would have hated sitting in wet clothes during class...” Participants were instructed to sit and think for a full five minutes before writing down a few words on what they thought about.

Because past research has shown that being specific in writing on gratitude can hinder the benefits, it was made known that just a few sentences were required (Watkins et al., 2003; Lyubomirsky et al., 2006). For example, the above example of being thankful for your mom would be written out as, “my mom...makes sacrifices for me...” They received these writing examples along with the thinking examples. It was made clear they were only logging their thoughts to ensure the assignment was completed correctly. The logging sheet simply had 14 spots that listed the date and “Today I am grateful for...” with space for writing. The experimenter stressed that they would only receive full credit for the study if the exercises were completed every day. Also, they were assured no one would read the logging sheets, the experimenter would simply check that something was written. This encouraged participants to see this as a personal exercise and not worry about being judged.

The control condition received similar instructions, except they were to think of one to three things they learned that day and why it was important or how they could use that information. This included facts and procedural tasks. They were given examples as well, such as “I learned that Rosa Parks started the Montgomery Bus Boycott by refusing to give up her seat on the bus... that was an important boycott in the Civil Rights movement, because it was actually successful... it probably gave other towns the inspiration protest against racial injustices...” The example of writing this thought was, “Rosa Parks starting the Montgomery Bus Boycott, important to Civil Rights, inspired others...” The logging sheet in the learning exercises group was identical to the gratitude sheet, except it said “Today I thought about...” before each writing space.

After giving the participants time to read over the instructions, the experimenter allowed for any questions. Again, it was reiterated that this exercise had to be done every day over the next two weeks, and they would have to return a completed logging sheet at the second session. The experimenter stressed that the exercise was to *sit and think for a full five minutes a day and then start writing*. In other words, they were not supposed to *write* for five minutes a day. To make sure everyone understood the instructions, they then completed the first thinking exercise. The experimenter started a timer for five minutes, and informed participants when to write. If any participant started to write before time was up, the experimenter told them, again, that they should only be thinking at this time. Once finished writing, they were given the opportunity to ask more questions, then they were dismissed.

When the participants returned two weeks later, they turned in their logging sheet right away. I gave them the numbered post-test that corresponded with the number on their logging

sheet. They completed the same five surveys (DASS-21, PANAS, SWLS, GQ, and SHS) in the same order, along with the post-survey questionnaire. They were then thanked for their participation and dismissed. Every participant that returned for the second session had their logging sheet completely filled out, suggesting 100% implementation validity.

Results

Preliminary analyses

First, descriptive statistics were run on the demographic questionnaire to account for the characteristics of the participants. Descriptive statistics were run on each scale used (DASS-21, PANAS, SWLS, GQ, and SHS), and then each scale was tested for internal consistency. There was a slight skewness and kurtosis at both pre-test and post-test for depression, anxiety, and gratitude. However, the numbers were not high enough to cause any concern. The measures showed at least adequate internal consistency across the board, with Cronbach's alphas ranging between .71 and .90. All of the descriptive results for the pre-test measures are reported in Table 1, and those for the post-test measures are reported in Table 2.

The inter-correlations of all the scales were investigated to ensure they were measuring aspects of either psychological distress or well-being without being too similar (see Table 3). All of the indicators of psychological distress (depression, anxiety, stress, overall negative affect) were moderately positively correlated with one another, as were the indicators of psychological well-being (happiness, gratitude, life satisfaction, and overall positive affect). Most of the indicators of psychological distress showed a small-to-moderate negative correlation with the indicators of psychological well-being. However, anxiety did not have any relationship to the all of the factors of psychological well-being. Moreover, negative affect did not show any

relationship at all to gratitude or positive affect. Finally, life satisfaction and stress showed a weak negative correlation.

Primary analyses

A Repeated Measures Multivariate Analysis of Variance (RM-MANOVA) was run to test for a time-by-group interaction, as well as main effects of the gratitude intervention and time on both psychological distress and psychological well-being. For psychological distress, the independent variable was the experimental group (intervention or control) and depression, anxiety, stress, and negative affect were the dependent variables. For psychological well-being, the independent variable was again the experimental group (intervention or control) and gratitude, happiness, life satisfaction, and positive affect were the dependent variables.

Findings from the RM-MANOVA for psychological distress indicated that there was not a significant group main effect ($F(1,92) = .52, p > .05$) nor was there a significant time-by-group interaction ($F(1,92) = 1.69, p > .05$), but that there was a significant time main effect ($F(1,92) = 10.49, p < .001$, partial eta-squared = .31). Similarly, findings from the RM-MANOVA for psychological well-being indicated that there was not a significant group main effect ($F(1,92) = .19, p > .05$) nor was there a significant time-by-group interaction ($F(1,92) = 1.20, p > .05$), but that there was a significant time main effect ($F(1,92) = 7.83, p < .05$, partial eta-squared = .25).

Findings from the follow-up univariate analyses of variance (ANOVA) confirmed that there was not a significant time-by-group interaction for depression ($F(1,95) = 3.8, p > .05$), anxiety ($F(1,95) = .25, p > .05$), or overall negative affect ($F(1,95) = 2.01, p > .05$). However, a time-by-group interaction in favor of the intervention group was observed for stress ($F(1,95) = 5.27, p < .05$, partial eta-squared = .05; see Table 4). There was not a significant time-by-group

interaction for happiness ($F(1,95) = 1.56, p > .05$), life satisfaction ($F(1,95) = 2.72, p > .05$), gratitude ($F(1,95) = .17, p > .05$), or overall positive affect ($F(1,95) = .56, p > .05$), either. There was not a significant main effect of intervention for depression ($F(1,95) = .18, p > .05$), anxiety ($F(1,95) = .07, p > .05$), stress ($F(1,95) = .72, p > .05$), overall negative affect ($F(1,95) = .09, p > .05$), happiness ($F(1,95) = .04, p > .05$), life satisfaction ($F(1,95) = .03, p > .05$), gratitude ($F(1,95) = .62, p > .05$), or overall positive affect ($F(1,95) = .04, p > .05$).

There was a significant main effect of time across all distress and well-being outcomes: depression ($F(1,95) = 24.73, p < .05$, partial eta-squared = .21), anxiety ($F(1,95) = 15.58, p < .05$, partial eta-squared = .14), stress ($F(1,95) = 37.89, p < .05$, partial eta-squared = .29), overall negative affect ($F(1,95) = 25.67, p < .05$, partial eta-squared = .21), happiness ($F(1,95) = 13.04, p < .05$, partial eta-squared = .12), life satisfaction ($F(1,95) = 5.53, p < .05$, partial eta-squared = .06), gratitude ($F(1,95) = 5.72, p < .05$, partial eta-squared = .06), and overall positive affect ($F(1,95) = 27.01, p < .05$, partial eta-squared = .22). A descriptive analysis of the means and standard deviations at pre-test and post-test indicated that all time main effects were in the hypothesized directions, resulting in reduced psychological distress and improved psychological well-being (see Table 4).

Discussion

This study produced unexpected results. Although the well-being of participants in both groups improved from pre-test to post-test, the gratitude intervention did not increase college students' psychological well-being any more effectively than did the control exercise, which appears to have functioned as an intervention. Moreover, although the distress of all participants was reduced from pre-test to post-test, the gratitude intervention did not decrease students'

psychological distress any more effectively than did the control exercise, except for in the case of stress, where gratitude produced a greater reduction characterized by a small effect size (partial eta-squared = .05). These findings did not support the hypotheses outlined in the beginning of the study.

It was surprising that both the control group and the intervention group showed a decrease in psychological distress and an increase in psychological well-being over the two week period. Does this suggest simply taking a few minutes out of the day to reflect and journal can have a positive outcome, or, was this a classic placebo effect? As stated previously, the experimenter was careful not to make the description and overall instructions of the study reveal its true nature. Everything from the study title to the consent form emphasized it was a study on the *effects of thinking exercises* on psychological well-being and psychological distress.

Past research has found similar, but less drastic, results. Lyubomirsky et al. (2011) did not find significant increases in participants' well-being after a gratitude intervention relative to a control group, either. Seligman et al. (2005) did show an increase in happiness and a decrease in depression in the control condition after one week, but the effects did not continue past that point. Other positive interventions they tested, including a gratitude intervention, lasted for up to three months after the initial pre-test. The effects in this study may have followed the same pattern had the participants been re-tested. It is important to keep in mind the well-rounded nature of psychological distress and well-being in the present study. Past research may have only found one or two aspects that did not change as intended, but they were not testing as many outcomes.

There is some evidence to suggest the results shown were due to a placebo effect. In the post-survey participants were asked, “Do you believe this study benefited you in any way, if so, how?” In the gratitude intervention group, 92.6% of the participants responded “yes.”

Interestingly, 86% of those in the control group responded “yes,” as well. Even though the control group exercise was not intended to produce positive effects, an overwhelming majority of participants found it to be beneficial. One participant in the control group explained, “It was relaxing to take time to think every day.” Perhaps being able to relax for a set time each day created these positive effects. The study’s design did not allow for an exact answer to this question, unfortunately. In the future, a similar study should be done with a passive control group that does not do any intervention-like exercise. This group would simply come in and take the pre-tests and then the post-tests two weeks later. That way we could see if things improve over time, naturally, or if there is something about the act of thinking and writing itself that produced these results.

The present study supports Fredrickson’s “broaden and build theory of positive emotions (2001).” All of the participants showed an increase in the positive aspects studied, which according to the broaden-and-build theory, is likely to lead to a decrease in negative aspects of life. The control group exercise was not intended to be positive; however, the majority of participants perceived it as positive as indicated by the post-survey responses. There has been strong research in the past to support gratitude’s influence on personal well-being (Fredrickson, 2001; Lyubomirsky et al., 2011; Nelson, 2009; McCullough et al., 2002; Watkins et al., 2003; Wood et al., 2008). However, this study does not support those findings to the same degree. It is possible that this is due to design flaws in the current study.

The post-survey was intended to measure how involved participants were in the exercises. Participants were asked how many days they completed both the thinking and writing exercise, how many days they completed only the thinking exercise, and how many days they completed only the writing exercise. However, participants seemed to be confused by the structure of the questions. Many participants answered only one of the three questions. Also, the range went from 1-14 days, and there should have been a “0” option, as well. For example, if someone completed both exercises all 14 days, then they would have needed to answer “0 days” for the other two questions. Furthermore, the participants do rely on the class credit they receive; therefore, there might have been motivation to report socially desirable responses regarding how well they followed the instructions in order to receive credit.

Moreover, this design flaw makes it unclear whether participants focused more on thinking about their task as opposed to writing about it. The current study’s emphasis on thinking was modeled after the studies of Watkins et al. (2003) and Lyubomirsky et al. (2006), which supported the notion of thinking exercises as superior to writing exercises. A goal for future research might be to have participants come into the lab every day to complete the exercise. That would ensure more researcher control over the process; however, this would make the gratitude exercise less sustainable and useful in daily life post-intervention.

Past research on stress and gratitude was only correlational (Wood et al., 2008). This study indicated that, compared to the control group, the gratitude intervention was slightly more effective at decreasing stress. Several participants mentioned that they found the exercise relaxing in their post-survey questionnaire, which gives some insight as to why that was the only aspect of psychological distress affected by the intervention. This finding was unforeseen,

however, because several studies have shown decreases in negative attributes due to gratitude interventions (Emmons & McCullough, 2003; Seligman et al., 2005; Lyubomirsky, 2011). This was the first study of gratitude and stress to use a control that was both positive and highly similar to the intervention, which may explain this finding.

Despite these interesting results, it is noteworthy that the participant pool did not produce a reliable base for generalizability. The female participants greatly outweighed the males. Also, participants were predominantly white, and the Asian and Hispanic representations were both under 3%. In the future, researchers should aim to attract more diverse participants to increase the validity of the results.

Research into positive psychology and the science of being happy is still relatively new, but incredibly important. While the findings from this study did not support the original hypotheses, they do shed some light into the field of positive psychology and the importance of a combination of both passive and active control groups for future research. Findings from the present study suggest that the success of gratitude interventions may not be from the act of being thankful; rather, it may simply be about setting aside time in your daily routine to focus on something, as the control group did in this study. However, thorough research should be conducted into this hypothesis before any conclusions can be made.

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Figure 1

Components of Psychological Distress and Well-being

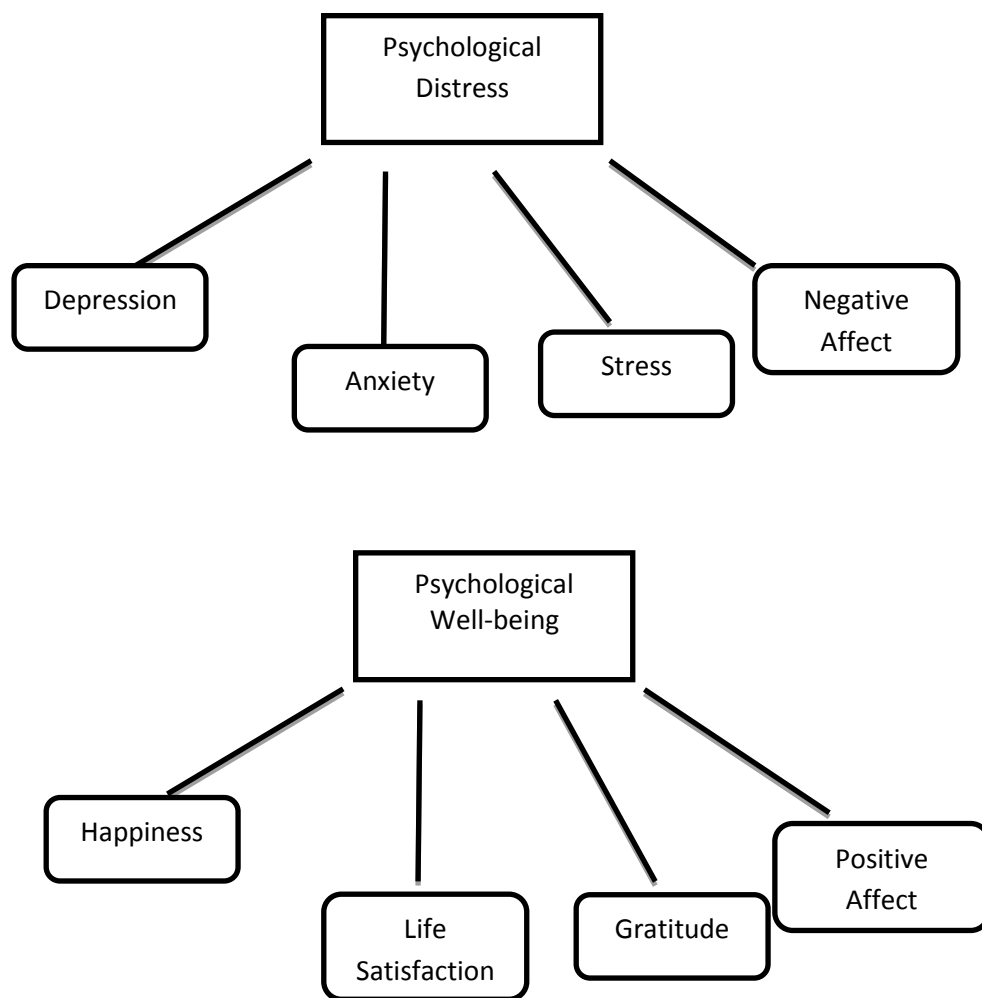


Table 1

Descriptive Statistics of Scales Used at Pre-test

Construct	Scale	# Items	Min., Max.	<i>M</i>	<i>SD</i>	Skewness	Kurtosis	α
Depression	DASS-21	7	0, 15	3.98	3.48	1.41	1.64	.83
Anxiety	DASS-21	7	0, 18	3.72	3.27	1.29	2.56	.71
Stress	DASS-21	7	1, 18	7.21	3.69	.78	.92	.77
Negative Affect	PANAS	10	10, 39	19.94	6.48	.77	-.04	.85
Happiness	SHS	4	8, 28	20.81	4.18	-.58	-.02	.86
Life Satisfaction	SWLS	5	5, 35	24.14	6.64	-.63	-.19	.88
Gratitude	GQ-6	6	17, 42	37.55	4.96	-2.06	5.2	.84
Positive Affect	PANAS	10	11, 47	30.19	7.52	-.12	-.28	.90

Note. Min., Max. = Minimum and maximum observed scale scores

Table 2

Descriptive Statistics of Scales Used at Post-test

Construct	Scale	# Items	Min., Max.	<i>M</i>	<i>SD</i>	Skewness	Kurtosis
Depression	DASS-21	7	0, 12	2.38	2.25	1.75	3.67
Anxiety	DASS-21	7	0, 16	2.45	2.75	2.06	5.99
Stress	DASS-21	7	0, 15	4.89	3.52	.87	.61
Negative Affect	PANAS	10	9, 30	16.77	4.77	.59	-.38
Happiness	SHS	4	13, 28	21.89	3.57	-.34	-.44
Life Satisfaction	SWLS	5	8, 35	25.32	5.57	-.63	-.35
Gratitude	GQ-6	6	20, 42	38.25	4.05	-2.15	6.52
Positive Affect	PANAS	10	11, 49	33.94	7.44	-.61	.75

Note. Min., Max. = Minimum and maximum observed scale scores.

Table 3

Bivariate Correlations Among Scales at Pre-test

	Scale	1.	2.	3.	4.	5.	6.	7.	8.
1.	Depression	1							
2.	Anxiety	.42	1						
3.	Stress	.64	.65	1					
4.	Negative Affect	.58	.57	.71	1				
5.	Happiness	-.56	-.12 [†]	-.44	-.26*	1			
6.	Life Satisfaction	-.58	-.1 [†]	-.29	-.29	.65	1		
7.	Gratitude	-.4	-.08 [†]	-.11 [†]	-.14 [†]	.53	.6	1	
8.	Positive Affect	-.49	-.05 [†]	-.26	-.18 [†]	.59	.5	.44	1

Note. [†] = No significant correlation. * = Correlation significant at the $p < .05$ level. All other correlations significant at the $p < .01$ level.

Table 4

Descriptive Results by Experimental Group

Construct	Control Group		Intervention Group	
	Pre-test <i>M</i> (<i>SD</i>)	Post-test <i>M</i> (<i>SD</i>)	Pre-test <i>M</i> (<i>SD</i>)	Post-test <i>M</i> (<i>SD</i>)
Depression	3.77 (3.18)	2.84 (2.71)	4.15 (3.72)	2.02 (1.75)
Anxiety	3.56 (3.19)	2.47 (2.99)	3.85 (3.36)	2.44 (2.56)
Stress	7.05 (3.26)	5.65 (3.63)	7.33 (4.03)	4.28 (3.34)
Negative Affect	19.63 (6.28)	17.42 (4.85)	20.19 (6.68)	16.26 (4.68)
Happiness	20.93 (3.98)	21.6 (3.79)	20.72 (4.38)	22.11 (3.41)
Life Satisfaction	24.47 (6.25)	24.79 (5.44)	23.89 (6.99)	25.74 (5.69)
Gratitude	37.09 (6.07)	37.93 (4.56)	37.91 (3.88)	38.5 (3.61)
Positive Affect	30.33 (7.26)	33.49 (8.1)	30.07 (7.78)	34.3 (6.92)