THANKFUL OR THANK YOU?
EXPLORING THE IMPACT OF INTRAPERSONAL AND INTERPERSONAL GRATITUDE

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ABSTRACT

Gratitude has been found to have many positive benefits, whether it is introspective or interpersonal in nature. This research explored the differential effects of an interpersonal and intrapersonal gratitude intervention on subjective well-being (SWB). Participants were assigned to one of three intervention conditions that were characterized by a weekly writing task—an interpersonal gratitude letter (n = 73), an intrapersonal gratitude journal (n = 65), or a learning journal (n = 67), which served as the control. A four-week, repeated gratitude intervention design was conducted, wherein participants' SWB was assessed across 12-time points, including a pre- and post-intervention SWB battery to assess the intervention's overall impact. Participants in both gratitude conditions reported an overall increase in positive affect, supported by text analysis. However, participants who wrote gratitude letters had significantly less negative affect compared to the gratitude journal participants. Further analysis revealed a significant difference in SBW between the two gratitude conditions. Specifically, participants who experienced the intrapersonal gratitude journal-writing task reported a significant improvement in life satisfaction, while participants in the interpersonal gratitude letter-writing task evidenced a significant improvement in perceived social support. The control condition unexpectedly exhibited an increase in SWB that was likely due to the salience of the participants' scholastic accomplishments. Finally, individual differences, including The Big Five, predicted gratitude and positive affect, consistent with prior research.

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GENERAL AUDIENCE ABSTRACT

Gratitude has been found in prior research to have many positive benefits, whether it is introspective or interpersonal in nature. However, not as much research has been conducted to understand if gratitude expressed introspectively or interpersonally is psychologically different in relation to one's wellbeing. This research therefore explored the psychological benefits—and differences— between intrapersonal and interpersonal gratitude using a gratitude intervention over four consecutive weeks. Participants were either assigned a thank-you letter (interpersonal condition), an introspective gratitude journal (intrapersonal condition), or a learning journal (control condition). Results demonstrated that those who completed the gratitude letter felt more socially supported, while those who completed the gratitude journal saw an improvement in life satisfaction and how grateful they felt. The control group also found an improvement in their life satisfaction, which may have also been due to the introspective nature of their writing task. Feelings of positivity were greater in both gratitude groups compared to those in the control group. The study provided evidence for the psychological differences between introspective and interpersonal gratitude, and the positive role they both serve.

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Contents

1 Introduction

Throughout human history the concept of gratitude has been discussed at length by many religious and philosophical scholars, accepted as a positive and desirable outcome of relationships (Emmons & McCullough, 2003; Emmons & Shelton, 2002). Etymologically, the word gratitude comes from the Latin word gratia—meaning "thanks"—representing both a cognitive and affective state brought about by an acknowledged personal benefit, whether deserved or earned (Emmons & McCullough, 2003). In philosophical analyses, gratitude is often considered a triadic concept whereby the three variables are: 1) the benefactor of the perceived benefit, 2) the perceived benefit for the beneficiary, and 3) the beneficiary who expresses the gratitude (Roberts, 2004). However, research has since indicated that gratitude may also exist as a dyadic concept whereby gratitude need not be targeted toward a benefactor, but one can simply be grateful without the intervention of another individual (McAleer, 2012).

Whether dyadic or triadic in nature, gratitude is considered a positive emotion coupled with a cognitive recognition that the benefit is attributed to an external source (Emmons & McCullough, 2004; Emmons & Shelton, 2002; Tsang, 2006). Consequently, the cause of gratitude therefore may be human or nonhuman, such as a deity or nature. Specifically in the workplace, an employee's gratitude may be attributed to other employees or the organization (Bono et al., 2004).

Some researchers have suggested that the feeling of gratitude comes in part from: a) the beneficiary's acknowledgement of the benefits received, and b) the beneficiary's recognition of the benefactor's cost to provide the benefits received (Sawyer et al., 2021). Therefore, indebtedness has become part of the gratitude-relevant literature, especially when people show

gratitude toward someone who they perceive to be important in their lives (Oishi, Koo, Lim, & Suh, 2019).

An ongoing debate in the literature is whether gratitude is a state or a trait. Some theorists, especially those within psychological science, consider gratitude to be an episodic emotional *state* (Fredrickson, 2004). However, other psychologists discuss gratitude as a stable emotional disposition—a complex human *trait* (Peter & Seligman, 2004). Nevertheless, psychologists have been studying the phenomenon of gratitude since the turn of the 21st century, catalyzed by the emergence of positive psychology and the concept of flourishing (McCullough, Emmons, & Tsang, 2002; Seligman, Steen, Park, & Peterson, 2005).

The extant literature explicates two types of gratitude: 1) intrapersonal gratitude—a dyadic type of gratitude that results from an individual's introspection, and 2) interpersonal gratitude—a triadic type of gratitude involving an interpersonal social exchange. The key distinction therefore is that interpersonal gratitude requires the presence of a benefactor to "thank," whereas exhibiting intrapersonal gratitude, or being "grateful," does not.

Seligman et al. (2005) evaluated the difference between these two types of gratitude with two different gratitude interventions. After a week-long, daily intrapersonal gratitude intervention in the form of "gratitude journaling," participants reported being happier and less depressed in a follow-up self-report assessment six months later. On the other hand, the interpersonal gratitude intervention—operationalized by writing and delivering one gratitude letter—had an incredibly strong short-term effect on participants' reported happiness, but this positive state decreased much quicker over time compared to the intrapersonal intervention. Despite an attempt to compare the two types of gratitude, an imbalance in the frequency of the

gratitude interventions for intrapersonal vs. interpersonal gratitude could have influenced the results.

In fact, comparisons of these two types of gratitude have been largely studied independently, and direct comparisons between these types of gratitude have not been widely studied in the research literature. Hence, the present study explored differential effects of these two types of gratitude using a repeated gratitude-intervention design by evaluating the influence of gratitude on SWB and affect over four consecutive weeks. By asking participants to perform a gratitude intervention task each week, this study evaluated empirically the impact of intrapersonal and interpersonal gratitude.

1.1 Intrapersonal Gratitude

The bulk of the gratitude-intervention literature to date has evaluated gratitude as a dyadic or intrapersonal process (Guan & Jepsen, 2020; O'Connell, O'Shea, & Gallagher, 2018; McCullough, Emmons, & Tsang, 2002; Seligman et al., 2005). Gratitude lists are used most often as the intervention, in part because of the convenience to have people construct daily gratitude lists without a social exchange. In one such study, participants were assigned to one of three condition groups (hassles, gratitude listing, and neutral life events), and were asked to record their well-being over nine weeks. The participants in the gratitude listing condition reported their lives most positively, had fewer illness symptoms, and had greater perceived gratitude and SWB compared to the participants in the other two conditions (Emmons and McCullough, 2003). Moreover, Geraghy, Wood, and Hyland (2010) found that intrapersonal gratitude interventions had clinical implications. The intervention was found to be as effective as other clinical techniques for treating body dissatisfaction and excessive worry.

In an educational setting, it was reported that middle-school students in a gratitude-listing condition had greater perceived gratitude and less negative affect compared to those in a daily hassle-recording or control condition. Furthermore, the gratitude-listing students showed greater satisfaction with school experiences compared to the control condition (Froh, Sefick, and Emmons, 2008). Similarly, an intrapersonal gratitude intervention whereby 88 participants over 60 years of age recorded 'three good things' a day in a diary for 14 consecutive days, improved eudemonic well-being and decreased perceived negative stress or distress (Killen & Macaskill, 2015).

1.2 Interpersonal Gratitude

Since the quality of social relationships is fundamental to an individual's well-being (Diener & Selgiman, 2002; Ryan & Deci, 2000), researchers and scholars have proposed that exhibiting interpersonal gratitude has a downstream consequence that improves prosocial behavior (Algoe et al., 2020; Atad & Russo-Netzer, 2021; Locklear, Talor, & Ambrose, 2020; Ma et al., 2017). Research concerning interpersonal gratitude therefore builds upon the norm of reciprocity and the need to belong (Baumeister & Leary, 1995; Gouldner, 1960; Trivers, 1971), contemporary scholars suggest interpersonal gratitude may derive from humans' evolutionary past, with gratitude playing a key role in building and maintaining relationships (Algoe, 2012; Algoe et al., 2008; Algoe et al., 2013; Emmons 2007; Lambert, Clark, Durtschi, Fincham, & Graham, 2010).

When people feel grateful after receiving perceived benefits, they become more prosocial toward benefactors with an upstream reciprocity or a "pay it forward" mindset (Algoe, Dwyer, Younge, & Oveis, 2020; McCullough et al., 2008; Nowak & Roch, 2006). Of course, such positive interpersonal exchanges can also be influenced by observational learning (Bandura,

1969). Given these prosocial benefits, gratitude is likely not just a reciprocal complex, but a vehicle to increase connectedness and empathy (Algoe, 2012; Fehr et al., 2017; Tsang & Martin, 2019).

More specifically, multiple theories have attempted to explain the mediating mechanisms of interpersonal gratitude, including: a) the moral affect theory of gratitude (McCullough et al., 2001), b) fine-remind-and-bind theory (Algoe, 2012), c) self-regulation theory (Baumeister, 1998), and d) social exchange theory (DeSteno, Bartlett, Bauman, Williams, & Dickens, 2010). The moral affect theory takes a humanistic approach and suggests people exhibit gratitude out of concern for another person and therefore exhibit natural prosocial feelings and behavior. Similarly, the find-remind-and-bind theory posits that gratitude is used to form, sustain, and strengthen interpersonal relationships. On the other hand, self-regulation theory proposes that the act of gratitude is driven by replenishment of one's self-control resources. It is proposed that gratitude replenishes resources by reducing negative attentional biases and increasing an appreciation of positive life events. Finally, social exchange theory is founded on the notion that gratitude draws from the norm of reciprocity and therefore plays a role in the recognition and reciprocation of perceived benefits.

Locklear et al. (2020) evaluated which of these four contemporary theories influenced the successful outcomes of an interpersonal gratitude intervention in the workplace. These researchers found that interpersonal gratitude helped build self-control resources that in turn reduced employee mistreatment in the workplace, thereby supporting the self-regulation theory of gratitude. This positive effect was even greater for participants who perceived higher norms for workplace gratitude, suggesting that social exchange theory may moderate this effect.

Grant and Gino (2010) evaluated the downstream mechanism of interpersonal gratitude. It was reported that the beneficiaries' perception of social worth served a mediating role in the gratitude expressed towards the helpers' prosocial behavior, rather than the task self-efficacy of the beneficiary. In other words, participants who felt socially worthy when receiving gratitude were consequently likely to exhibit further prosocial behavior, which is more aligned with the find-remind-and-bind theory than self-regulation. A behavioral psychologist might therefore suggest that a "thank you" serves as a positive reinforcer for prosocial behavior.

Psychologists have commonly operationalized interpersonal gratitude through "gratitude visits," in which beneficiaries express thanks to benefactors (Atad & Russo-Netzer, 2021; Seligman et al., 2005). Seligman et al. (2005) asked participants to express gratitude in the form of a gratitude letter and deliver it to the recipient. The interpersonal gratitude participants reported greater happiness and less depressive symptoms, both directly after the intervention and one month later compared to participants who just recounted early memories. Despite the initial large effect sizes, the benefits extinguished after the one-month follow-up. Furthermore, it has been found that interpersonal gratitude interventions can provide physiological benefits. Specifically, Jackowska, Brown, Ronaldson, and Steptoe (2016) found that an interpersonal gratitude intervention improved sleep quality and decreased diastolic blood pressure.

1.3 Need for a Control Condition

Overall, participants that partake in an interpersonal or intrapersonal gratitude intervention report positive improvements in SWB compared to control conditions. However, due to the subsequent attenuation of some 'control' tasks, the conclusions of some studies should be met with skepticism (Wood et al., 2010). While some control condition tasks have required participants to undergo memory-based tasks, such as recounting objects in a room or what they

did that day, others were asked to list their daily hassles. Control tasks that ask participants to list daily hassles might produce a negative psychological state (Froh et al., 2009). Therefore, the present study operationalized the control condition by a learning journal writing task to represent a psychologically-neutral, yet reflective exercise.

1.4 Dispositional Gratitude

Trait gratitude is believed to be a positive resource for individuals because it: a) increases positive affect and life satisfaction (McCullough, Emmons, & Tsang, 2002), b) improves individuals SWB (Wood, Joseph, & Maltby, 2009), and c) cultivates interpersonal relations (Di Fabio, Palazzeschi, & Bucci, 2017). Despite gratitude existing at the episodic (event), persistent (individual) or collective (organizational) level (Fehr, Fulmer, Awtrey, & Miller, 2017), considering gratitude as trait-like can help researchers understand what makes people feel grateful (Wood, Froh, & Geraghty, 2010). Dispositional gratitude can be defined by one's general ability to appraise, feel, and provide gratitude to other people's benevolence (McCullough et al., 2002) —an attenuation to recognize the good things in one's life (Wood et al., 2010).

Guan and Jepsen (2020) found that a grateful disposition can also influence the impact of emotional regulatory processes by accruing positive emotional, cognitive, and social resources. Those who possess higher dispositional gratitude are more likely to gain emotional resources than those who have lower dispositional gratitude due to how intensely they feel gratitude for the same benefits (McCullough et al., 2002). Positive feelings—such as happiness—are associated with gratitude since both involve the two cognitive stages of: 1) acknowledging the positive outcome associated with feeling happy, and 2) assigning the cause of that happiness beyond the self (Weiner, 1985). People who have higher dispositional gratitude therefore exhibit greater

positive affect and SWB, less negative affect, anxiety, and depression than those with low dispositional gratitude (McCullough et al., 2002).

Individuals displaying high dispositional gratitude are also likely to feel grateful more frequently, and over time, leading to an accumulation of SWB resources (Fredrickson, 1998). These resources can consequently generate an upward spiral that creates greater overall SWB (Fredrickson, 2013; Fredrickson & Joiner, 2002). Moreover, grateful people are also more likely to recognize their own role as a beneficiary of others' generosity, building self-acceptance, self-esteem (McCullough et al., 2002; Wood et al., 2009). Due to the upward spiraling of positive emotions and SWB resources (Fredrickson, 2004), the psychological resources cultivated with trait gratitude strengthen the effects of effective emotional-regulation strategies.

Similarly, McCullough et al. (2004) proposed a conductance hypothesis that suggested people who have higher dispositional gratitude are more likely to respond more positively to daily gratitude-relevant events. According to the hypothesis, people who are more grateful are "primed" to receive a greater benefit from positive experiences. On the other hand, McCullough et al. (2004) proposed a resistance hypothesis that theorized those who have high dispositional gratitude are already incredibly positive, such that any specific positive experience may not improve their SWB greater than normal.

Support has since been found in favor of the resistance hypothesis. In a study on gratitude, participants were instructed to write a gratitude letter and deliver it to the recipient. It was found that participants with low dispositional gratitude reported a greater increase in gratitude and positive affect at post-test compared to participants with high dispositional gratitude (Froh et al., 2009). These results were later supported by Rash, Matsuba, and Prkachin (2011) with an intrapersonal gratitude intervention. Therefore, the present study assessed

whether dispositional gratitude influenced the impact of a gratitude intervention for both types of gratitude and supports either of these hypotheses.

1.5 Individual Differences

Recently, the Big Five (McCrae & Costa, 1999) has become the accepted standard for evaluating personality traits in psychology. The Big Five personality traits of extraversion, agreeableness, openness, conscientiousness, and neuroticism capture a large proportion of personality (Goldberg, 1993; John & Srivastava, 1999). These dispositional traits explain many SWB indicators, that include affect and gratitude. It has been since found that dispositional gratitude is positively correlated with agreeableness, conscientiousness, extraversion, and openness, while negatively correlated with neuroticism (McCullough et al., 2002, 2004; Wood, Maltby, Gillett, Linley, & Joseph, 2008). Together, these Big Five traits have accounted for 21% to 28% of the variance in dispositional gratitude (McCullough et al., 2002). Despite these correlations, previous research assessing the link between gratitude and the Big Five dispositions has been inconsistent. In three different studies that showed correlations between dispositional gratitude and neuroticism, r ranged from -.16 to -.42 (McCullough et al., 2002).

The proposed research was designed to further understand the relationship between both interpersonal and intrapersonal gratitude and the dimensions of the Big Five. More specifically, the present study evaluated connections between the Big Five personality traits and positive affect, negative affect, and gratitude.

1.6 Perceived Social Support

Gratitude has been shown to have a positive association with social support (Emmons & McCullough, 2003; Wood et al., 2010). Perceived social support is a construct that refers to the subjective experience of receiving emotional, informational, and/or tangible assistance from

others (Cohen & Wills, 1985), and has been found to be associated with various positive outcomes such as improved mental health, greater life satisfaction, and higher levels of resilience (Huang et al., 2018; Taylor, 2011).

Recent research suggests that perceived social support may be linked to gratitude. For example, studies have shown that perceived social support is positively related to gratitude (Algoe & Way, 2014; Petrocchi et al., 2017), and that gratitude may serve as a coping mechanism for individuals who receive social support, thereby leading to improved SWB (Wong et al., 2016). In addition, research suggests that gratitude may be a protective factor against distress, and that social support plays an important role in promoting gratitude (Petrocchi et al., 2017).

The relations between perceived social support and gratitude is an important area of inquiry. This research studied how social support is connected to both types of gratitude. Since interpersonal gratitude involves a relational component, it was hypothesized that an interpersonal gratitude intervention would improve one's perceived social support, and this would not be the case for intrapersonal gratitude.

The Multi-Dimensional Perceived Support Scale (MDPSS) is a widely used measure of perceived social support (Zimet et al., 1988). The MDPSS assesses individuals' perceptions of social support in several domains, including emotional, informational, and tangible support. The scale consists of 12 items rated on a seven-point Likert scale, with higher scores indicating greater levels of perceived support. The MDPSS has been found to have good psychometric properties, including high internal consistency and test-retest reliability; and it has been used for a variety of populations, including individuals with chronic illness, caregivers, and older adults (Kershaw et al., 2005; Kershaw et al., 2005; Zimet et al., 1990).

Research using the MDPSS has indicated that perceived social support is positively correlated with gratitude. One study reported that high levels of perceived social support were correlated with higher gratitude among Chinese college students (Zhang & Chen, 2016). Another study found that gratitude mediated the relationship between perceived social support and SWB among individuals suffering with multiple sclerosis (Mongrain et al., 2011). Overall, the MDPSS has been a useful tool for assessing perceived social support and for understanding its connection with gratitude, highlighting the importance of social support in promoting positive outcomes.

1.7 Social Status

Socio-economic status (SES) has been reported to be connected to a variety of positive psychological and physical health outcomes, including gratitude. Research has shown that individuals with higher SES experience more gratitude than those with lower SES (Kraus et al., 2011). One possible commonsense explanation for this correlation is that individuals with higher SES have more resources and opportunities available to them, which allows them to feel more grateful for what they have.

To assess socio-economic status, researchers can use objective measures such as income or education level, or subjective measures such as the MacArthur Scale of Subjective Social Status (MacArthur SSS Scale). While objective measures have the advantage of being easily quantifiable and comparable across individuals and populations, subjective measures are often considered more credible since they capture the individuals' own interpretation of their social position, which could be more relevant to their experiences and outcomes (Adler et al., 2000). This is particularly relevant in the context of studying gratitude, which is a subjective experience that depends on an individual's interpretation and evaluation of certain circumstances (Emmons & McCullough, 2003).

Therefore, the MacArthur SSS Scale was used to measure subjective social status (Adler et al., 2000). This survey assesses individuals' perceptions of their own social position relative to others in their community. Participants are asked to place themselves on a hierarchy or a ladder ranging from 1 to 10, with higher scores indicating higher subjective social status. The MacArthur SSS Scale has been found to be a reliable and valid measure of subjective social status, and has been used with a variety of populations, including adolescents, adults, and older adults (Adler et al., 2000; Singh-Manoux et al., 2005).

Research using the MacArthur SSS Scale has shown that subjective social status correlates positively with gratitude. One study found that individuals who had higher subjective social status reported greater levels of interpersonal gratitude than those who had lower subjective social status (Kraus et al., 2011). Another study found that interpersonal gratitude partially mediated the relationship between subjective social status and well-being among adolescents (Mason et al., 2018). These findings suggest that subjective social status is a potential moderator in understanding dispositional gratitude, and that the MacArthur SSS Scale is a useful tool for assessing subjective social status.

1.8 Text Analysis

Text analysis has emerged as a promising tool for evaluating gratitude expressed in written communication, such as letters, emails, and social media posts. Text analysis uses computer software to analyze written language and identify specific linguistic features, such as the use of positive, emotion-related words associated with gratitude expressions. This method enables the objective and systematic evaluation of gratitude expressions in a variety of written communication formats, and has been used in several studies to examine the effects of gratitude interventions.

Park et al. (2016) conducted a gratitude letter-writing intervention, whereby participants were instructed to write a letter expressing gratitude to someone who had positively impacted their life. The researchers used a text analysis program to analyze the letters and found that participants who wrote more gratitude expressions reported greater increases in positive affect and life satisfaction. Similarly, Hancock et al. (2018) analyzed social media posts that expressed gratitude and found that those posts containing more gratitude expressions were associated with higher levels of social support and greater positive affect.

The use of text analysis in gratitude research has several advantages over other measures of gratitude expression. Unlike self-report measures, which rely on participants' subjective judgments of their own feelings and behaviors, text analysis provides an objective and quantifiable measure of gratitude expression that can be used to track changes over time. Additionally, text analysis allows researchers to examine gratitude expression in a variety of written communication formats, including those that may be more convenient or accessible to participants. Since the gratitude interventions in the current study were text-based, text analysis was conducted to discern the impact of emotion-laden words on the participant's gratitude and positive affect.

1.9 Present Study

The present exploratory study was designed to contribute to the current gratitude research literature by evaluating the efficacy of a four-week, repeated gratitude intervention design using four different statistical methods – an ANOVA, paired t-tests, text and regression analyses.

Foremost, the study evaluated how positive and negative affect changed over the course of the four-week gratitude intervention period for both the interpersonal and intrapersonal

interventions compared to a Control condition. It was predicted that both gratitude conditions would exhibit higher positive affect and lower negative affect than the control condition.

Hypothesis 1

(a) Participants' positive affect will be higher in the gratitude conditions than the control condition.

(b) Participants' negative affect will be lower in the gratitude conditions than the control condition.

Secondly, to evaluate the change in SWB over time, positive and negative affect was also assessed at the day and week level. At the week level, it was predicted that participants in both gratitude conditions would see a significant improvement in positive affect and decrease in negative affect at week 4 compared to week 1. At the day level, it was hypothesized that the gratitude task day (Wednesday) would have the highest positive affect and the lowest negative affect for both gratitude conditions compared to the other two days (Tuesday and Thursday).

Hypothesis 2

(a) Participants' positive affect will be significantly higher in Week 4 than Week 1 in both gratitude conditions.

(b) Participants' negative affect will be significantly lower in Week 4 than Week 1 in both gratitude conditions.

Hypothesis 3

(a) Participant's positive affect will be significantly higher on the gratitude task day than the other two days in both gratitude conditions.

(b) Participant's positive affect will be significantly higher on the gratitude task day than the other two days in both gratitude conditions.

Thirdly, the overall efficacy of the four-week gratitude-treatment intervention design was evaluated using paired sample t-tests. The efficacy of the interventions was determined by improvements in SWB, operationalized by trait gratitude, life satisfaction, and perceived social support. Specifically, the paired-sampled t-tests compared pre (t = 1) and post-intervention scores (t = 12), and it was predicted that SWB would increase between Time 1 and Time 12 for the gratitude conditions but not for the control condition.

Hypothesis 4

Participant' life satisfaction in both gratitude conditions will significantly increase in both from Time 1 to Time 12.

Hypothesis 5

Participants' gratitude in both gratitude conditions will significantly increase from Time 1 to Time 12.

Hypothesis 6

Participants' perceived social support in the Interpersonal condition will significantly increase from Time 1 to Time 12.

Fourthly, basic text analysis was used to explore the relationship between gratitude expressed and a participant's positive affect. Consistent with the extant literature, it was hypothesized that the more gratitude expressed by a participant, the greater will be a participant's positive affect. The level of gratitude expressed was operationalized by word count.

Hypothesis 7

The more gratitude a participant expresses, the higher will be the participant's positive affect.

Finally, individual differences were measured to assess their correlation with positive affect and gratitude. More specifically, The Big Five and perceived social status both at the community and national level were used as independent variables in a linear regression model to test the next hypothesis.

Hypothesis 8

(a) The higher a participant's extraversion, agreeableness, openness, and conscientiousness, the higher the participant's gratitude.

(b) The lower a participant's neuroticism, the higher the participant's gratitude.

Hypothesis 9

The higher a participant's perceived social status, the higher the participant's gratitude.

2 Method

2.1 Participants

The participants were undergraduate students taking introductory psychology at Virginia Tech, enrolled in SONA—an extra credit online system managed by the Department of Psychology. To enroll in the study, participants had to be at least 18 years of age and were instructed to sign up only if they could provide data at all 12 time points. Their involvement in the study resulted in SONA credit points for each successful hour of completion, and they were awarded eight total hours of credit upon completion of the entire study.

To determine the sample size needed for the research prior to recruitment, a statistical power analysis was conducted. To adequately power the study using the three intervention groups with a Type I error rate of $\alpha = .05$, a sample size of $N = 192$ was needed. However, due to the predicted attrition over 12 time points, a target sample size of $N= 210$ was determined. The effect size obtained by Seligman et al. (2005) was also used to inform the final sample size.

The initial sample contained 267 undergraduate students ranging from 18 to 22. Upon agreeing to participate in the study by signing an informed consent form, participants were randomly assigned to an interpersonal gratitude writing task condition (Interpersonal condition), an intrapersonal gratitude writing task condition (Intrapersonal condition), or a control writing task condition (Control condition). After 12 time points were collected, the final sample size was 205 participants, with 73 participants in the Interpersonal condition, 65 participants in the Intrapersonal condition, and 67 participants in the Control condition, with an attrition rate of 23%. Other participants were omitted (n = 62) for not completing all 12 data points but were still given extra credit. Despite the attrition, the research project was adequately powered. Most participants were female (67.8%), freshman (64.4%) and Caucasian (65.4%). See Table 1 for the demographic data of all participants.

Table 1

Sociodemographic Characteristics of Participants at Baseline

Baseline Characteristic	Interpersonal (n = 73)		Intrapersonal (n = 65)		Control (n = 67)		Full Sample (n = 205)	
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Class								
Freshman	46	63.01	44	67.69	42	62.69	132	64.39
Sophomore	16	21.92	12	18.46	13	19.40	41	20
Junior	7	9.59	6	9.23	10	14.93	23	11.22
Senior	4	5.48	3	4.62	2	2.99	9	4.39
Gender					67		205	
Female	48	65.75	42	64.62	49	73.13	139	67.8
Male	25	34.25	23	35.38	16	23.88	64	31.22
Fluid	0	0.00	0	0.00	1	1.49	1	0.49
Prefer not to Say	0	0.00	0	0.00	1	1.49	1	0.49

Ethnicity							205	
Caucasian	48	65.75	48	73.85	38	56.72	134	65.37
African American	2	2.74	3	4.62	5	7.46	10	4.88
Latino or Hispanic	1	1.37	1	1.54	3	4.48	5	2.44
Asian or Pacific Islander	16	21.92	9	13.85	14	20.90	39	19.02
Multiracial or Biracial	6	8.22	3	4.62	4	5.97	13	6.34
A race/ethnicity not listed here	0	0.00	0	0.00	2	2.99	2	0.98
Prefer not to Say	0	0.00	1	1.54	1	1.49	2	0.98

2.2 Procedure

The research study was promoted as a study that evaluated subjective wellbeing among students without any mention of gratitude. Participants signed up and consented to the study through SONA before receiving an email about their participation. Figure 1 visually outlines the four-week study design (*t* = time point).

Figure 1

Visual Representation of the Four-Week, Repeated Gratitude Design

Week 1 (t = 1-3)	Tuesday (*t* = 1) Demographics, MacArthur SSS Scale PANAS-X, GQ-6, MPSS,	Wednesday (t = 2) Treatment 1 PANAS-X	Thursday (t = 3) PANAS-X
Week 2 (t = 4-6)	Tuesday (t = 4) PANAS-X	Wednesday (t = 5) Treatment 2 PANAS-X	Thursday (t = 6) PANAS-X
Week 3 (t = 7-9)	Tuesday (t = 7) PANAS-X	Wednesday (t = 8) Treatment 3 PANAS-X	Thursday (t = 9) PANAS-X
Week 4 (t = 10-12)	Tuesday (t = 10) PANAS-X	Wednesday (t = 11) Treatment 4 PANAS-X	Thursday (*t* = 12) (MacArthur SSS Scale PANAS-X, GQ-6, MPSS, SWLS,

On Tuesday of Week 1 (*t* = 1), all participants were given a battery of questionnaires using Qualtrics software. The battery included basic demographic questions and various instruments that measured the participant's individual differences and SWB. On the three subsequent Tuesdays (*t* = 4, 7, 10), the participants in each condition were given the PANAS-X to assess positive and negative affect for the week.

On Wednesday of each week (t = 2, 5, 8, 11), each participant completed a particular writing task. After the participants complied with the intervention prompt, they were asked to complete a PANAS-X questionnaire immediately afterwards to assess their positive and negative affect. The prompt for the Interpersonal condition was: "Write a thank-you letter to someone for whom you are grateful and email or mail the letter." The prompt for the Intrapersonal condition was: "Write down what you are grateful for today." The prompt for the Control condition was: "Write down a summary of what you have learned today." The participants had unlimited time to answer the prompt. The purpose of the Control condition was to provide a reflective exercise that did not induce gratitude.

On Thursday of each week (t = 3, 6, 9, 12), the participants in each condition were given a PANAS-X survey to gauge their positive and negative affect one day after the writing task. On the final Thursday, (t = 12), the participants were also given the same battery of questionnaires as t = 1 (minus the Big Five Inventory). In addition, manipulation checks were administered to gauge whether the participant's gratitude was sincere, if the intervention was a positive experience, and if the participants would continue their specific writing task in the future. In addition, a further manipulation check was given specifically to the Interpersonal condition participants to determine how many letters were sent and to whom they were written. All responses to the intervention prompts were recorded for text analysis (see Appendix H for examples of those answers), which was outlined in the consent form.

The participants were prompted twice via email each day of the intervention to ensure they completed the questionnaires. If a participant had completed the questionnaires that day, they did not receive a follow-up prompt. The battery of questionnaires was administered at t = 1 and t = 12, to measure either trait-like characteristics (MacArthur SSS Scale, BFI) or used as a

pre/post intervention comparison of SWB (i.e., SWLS, MDPSS, GQ-6). To account for random variance between participants across time, each student's identification (ID) number was collected at each time point. The first day of the intervention was April 12th, 2022 and the final day of the intervention was May 5th, 2022.

2.3 Measures

Positive and Negative Affect Schedule (PANAS-X) (Watson & Clark, 1994)

The PANAS-X measures both positive and negative affect with a 20-item self-report scale, as well as 11 primary emotions labeled: Fear, Sadness, Guilt, Hostility, Shyness, Fatigue, Surprise, Joviality, Self-Assurance, Attentiveness, and Serenity. Each Likert scale ranged from one (very slightly or not at all) to five (extremely). The PANAS-X has been found to be reliable and to possess both convergent and discriminant validity (Watson & Clark, 1994). Each participant received two scores—a total positive affect score and a total negative score—that were used to operationalize positive and negative affect, respectfully. The PANAS-X was the only measurement device used at all 12 time points. These scores were used to gauge the impact of the intervention at the Day, Week, and Treatment level. See Appendix A for the entire scale.

Big Five Inventory (BFI) (John, Naumann & Soto 2008)

The BFI consists of 44 items rated on a five-point Likert scale from 1 (disagree a lot) to 5 (agree a lot). The BFI yields scores for five primary scales: extraversion, agreeableness, conscientiousness, neuroticism, and openness. Scale scores are calculated as the sum of respective items. John et al. (2008) reported good inter-item reliability and construct validity. The BFI was administered just once at $t = 1$ (since these individual differences are treated as traits) and was used to evaluate whether certain personality predispositions influenced gratitude. See Appendix B for the complete inventory.

Gratitude Questionnaire-Six Item Form (GQ-6) (McCullough, Emmons, &Tsang, 2001)

The GQ-6 measures dispositional gratitude and includes items such as "I have so much in life to be thankful for," and "I am grateful to a wide variety of people." Participants rated their level of agreement on each item, ranging from 1 (strongly disagree) to 7 (strongly agree). McCullough et al. (2001) reported that the GQ-6 has good inter-item reliability and construct validity. The GQ-6 was administered at both $t = 1$ and $t = 12$. Although considered more trait-like, the present study evaluated whether the gratitude interventions increased one's propensity for experiencing gratitude. See Appendix C for all items in this survey.

Satisfaction with Life Scale (SWLS) (Diener, Emmons, Larsen, & Griffin, 1985)

The SWLS is a five-item scale that measures general life satisfaction. It includes items such as "In most ways my life is close to my ideals." Participants respond to these items using a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Diener et al. (1985) found the SWLS to have high internal consistency and high temporal reliability. Like the GQ-6, the SWLS was given to participants at $t = 1$ and $t = 12$. Time 1 represented participants' Baseline, while Time 12 reflected the impact of the intervention. See Appendix D for the entire scale.

Multidimensional Scale of Perceived Social Support (MPSS) (Zimet et al., 1990)

This is a 12-item self-report subjective measure of social support. Each item includes a seven-point Likert scale, ranging from 1 (strongly disagree) to 7 (very strongly agree). Within overall perceived social support, there are three sub sections, namely family (items 3, 4, 8, and 11), friends (items 6, 7, 9, and 12), and significant other (items 1, 2, 5, and 10). For the present study, all 12 items were summed to produce an overall perceived social support score. The

scores at $t = 1$ and $t = 12$ were used to discern the impact of each gratitude intervention. See Appendix E for the complete scale.

MacArthur Scale of Subjective Social Status (MacArthur SSS Scale) (Adler et al., 2000)

The MacArthur SSS Scale was used to assess each participant's perceived social-status rank relative to others in their society and immediate community. The participants were asked to rank themselves on one of ten rungs of a ladder that corresponds to their perceived status, the first level being the lowest. The MacArthur SSS Scale was used at both $t = 1$ and $t = 12$ to identify whether the intervention influenced a participant's perceived social status. See Appendix F for the full scale.

2.4 Coding

The data set was "cleaned" in Microsoft Excel after being exported from the Qualtrics software. Extraneous data were removed, such as the IP address and the time taken to complete the surveys. Once collated, each data point was assigned a condition variable (Interpersonal condition = 1, Intrapersonal condition = 2, Control condition = 3) for all between group analyses. For within-group comparisons, the data were partitioned into three data sets containing the data for each condition before being analyzed. The paired sample t-tests required a transformation of the data so that scores at Time 1 and Time 12 for each participant could be compared. Finally, for the text analysis, a word-count variable was created using the writing prompts. Word count was created using a formula in Excel and was used as a more objective measure to operationalize the amount of gratitude expressed by a participant.

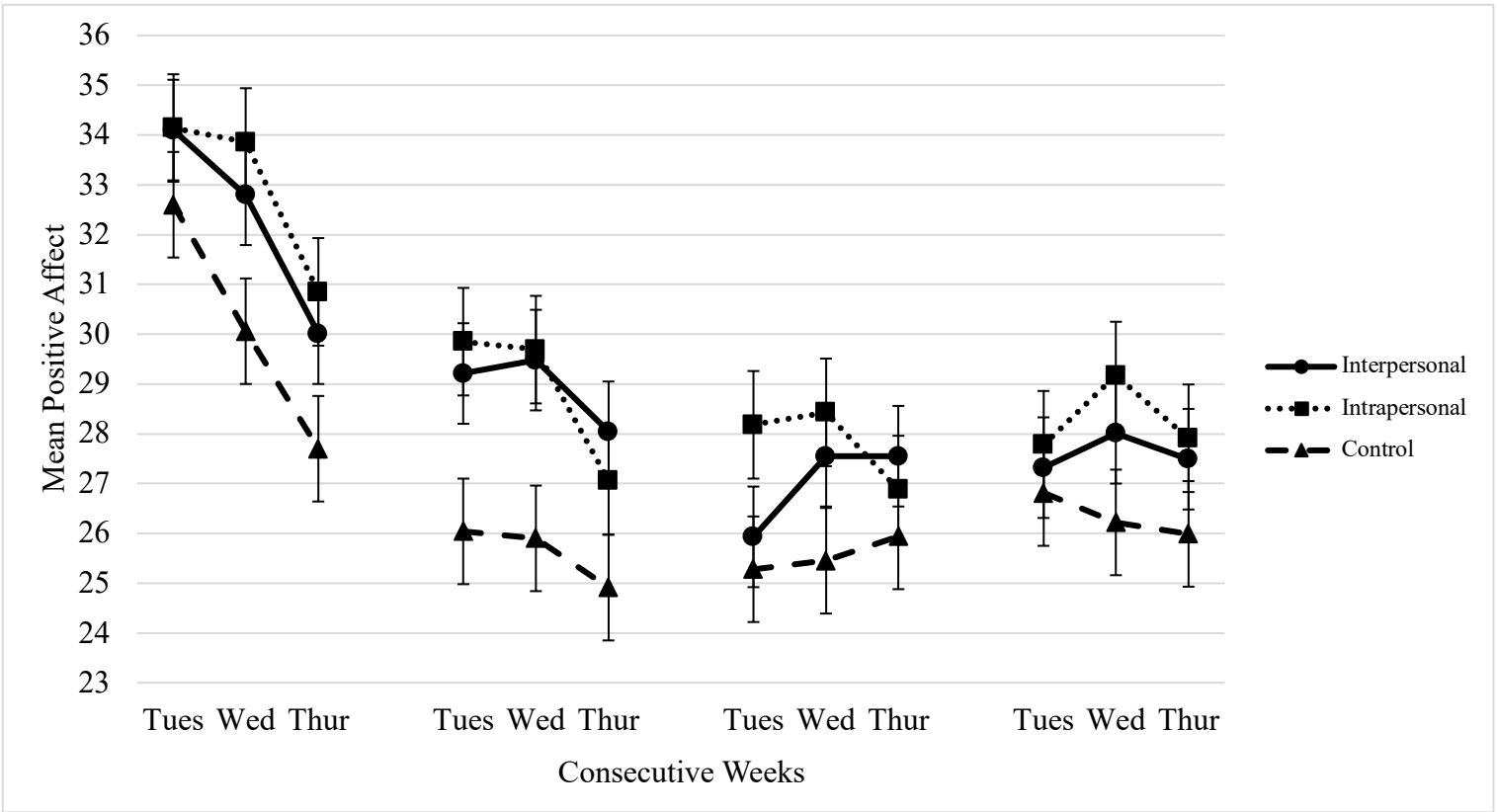
3 Results

3.1 Positive Affect

A mixed factorial ANOVA was conducted to assess the influence of three independent variables (condition, day, week) on the dependent variable positive affect. The condition was the between group independent variable, while the week and the day were within-group independent variables. Figure 2 illustrates the overall trend in positive affect across the intervention for each condition. Participants in all three conditions felt a decrease in positive affect during the first week,

Figure 2

Mean Positive Affect for Participants Over the Course of a Four-Week, Repeated Gratitude Design



As depicted in Table 2, the results of the ANOVA indicated a significant main effect for Condition ($F(2, 2424) = 19.76$, $p < .0001$), Week ($F(3, 2424) = 41.88$, $p < .0001$), and Day ($F(2, 2424) = 6.95$, $p = 0.001$). The only significant interaction was Week X Day ($F(6, 2424)$, $p = .013$). See Appendix Tables I1 and I2 for model parameters.

Table 2

Mixed Factorial Analysis of Variance for Positive Affect Between Condition Groups Over Time

Effect Tests	*df*	*SS*	*F*	*p*
Condition	2	2970.49	19.76	<.0001***
Week	3	9445.59	41.88	<.0001***
Condition*Week	6	275.94	0.61	.72
Day	2	1045.38	6.95	.001***
Condition*Day	4	199.49	0.66	.62
Week*Day	6	1213.70	2.69	.013*
Condition*Week*Day	12	217.14	0.24	.99

Note. *p ≤ .05, **p ≤ .01, ***p ≤ .001.

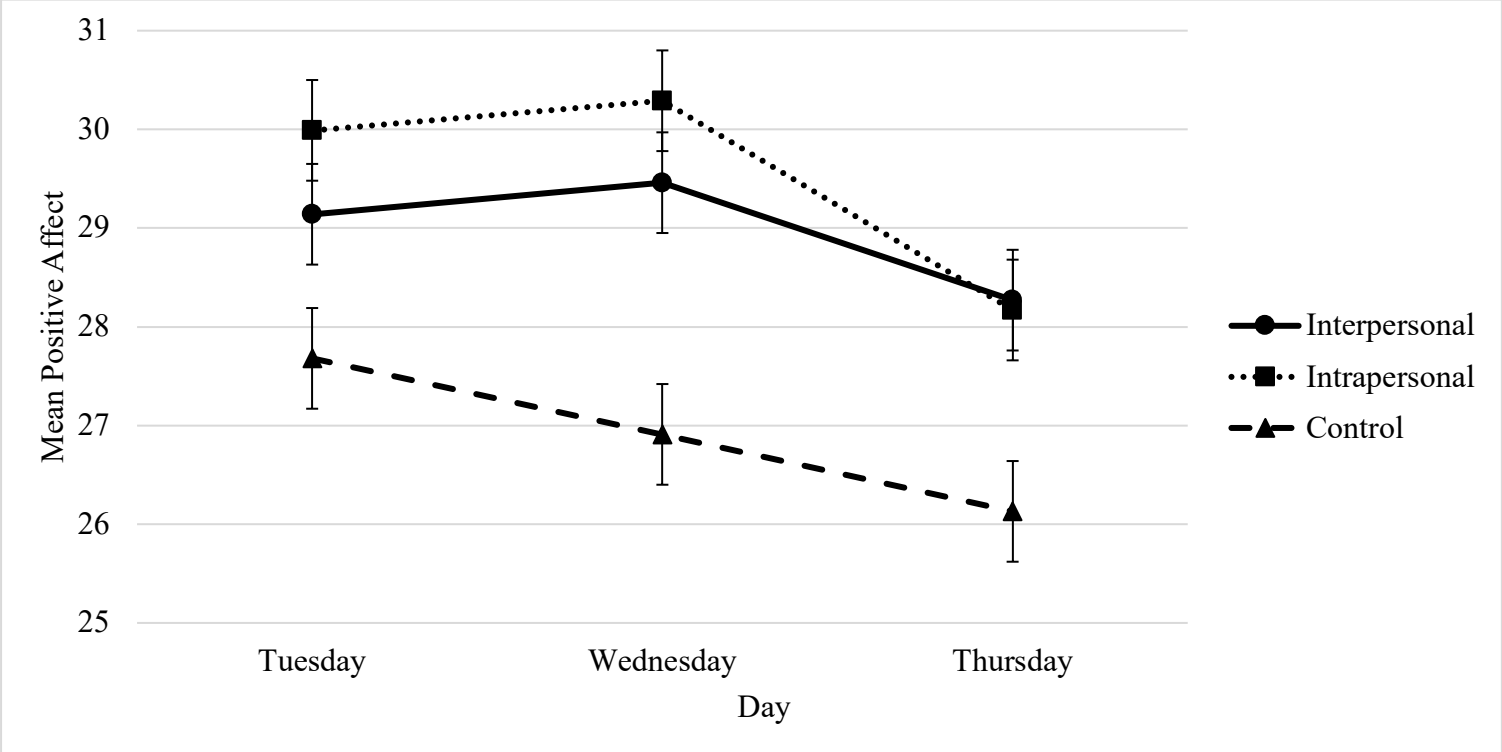
Tukey's HSD post-hoc pairwise comparison tests was used to identify specific differences between group means. The positive affect of the participants in the Interpersonal condition ($M = 28.96$, $SD = 9.28$) and the Intrapersonal condition ($M = 29.48$, $SD = 8.61$) was significantly higher than participants' positive affect in the Control condition ($M = 26.91$, $SD = 8.75$). The positive affect of the participants at Week 1 ($M = 31.79$, $SD = 8.14$) was significantly higher than Week 2 ($M = 27.80$, $SD = 9.17$), Week 3 ($M = 26.80$, $SD = 8.83$) and Week 4 ($M = 27.41$, $SD = 8.84$). The participants positive affect on Thursday ($M = 27.53$, $SD = 8.98$) was significantly lower than on Tuesday ($M = 28.94$, $SD = 8.94$) and Wednesday ($M = 28.89$, $SD =$

8.92). See Appendix Tables I3-I8 for all mean estimates and pairwise comparison tests for the Condition, Week and Day main effects.

To quantify the differences between the gratitude conditions and the control condition across time, the interaction effects between condition and day, and between condition and week were further evaluated using Tukey's HSD post-hoc pairwise comparison tests. Figure 3 illustrates the mean positive affect for each day across all conditions.

Figure 3

Participant Positive Affect Each Day by Condition



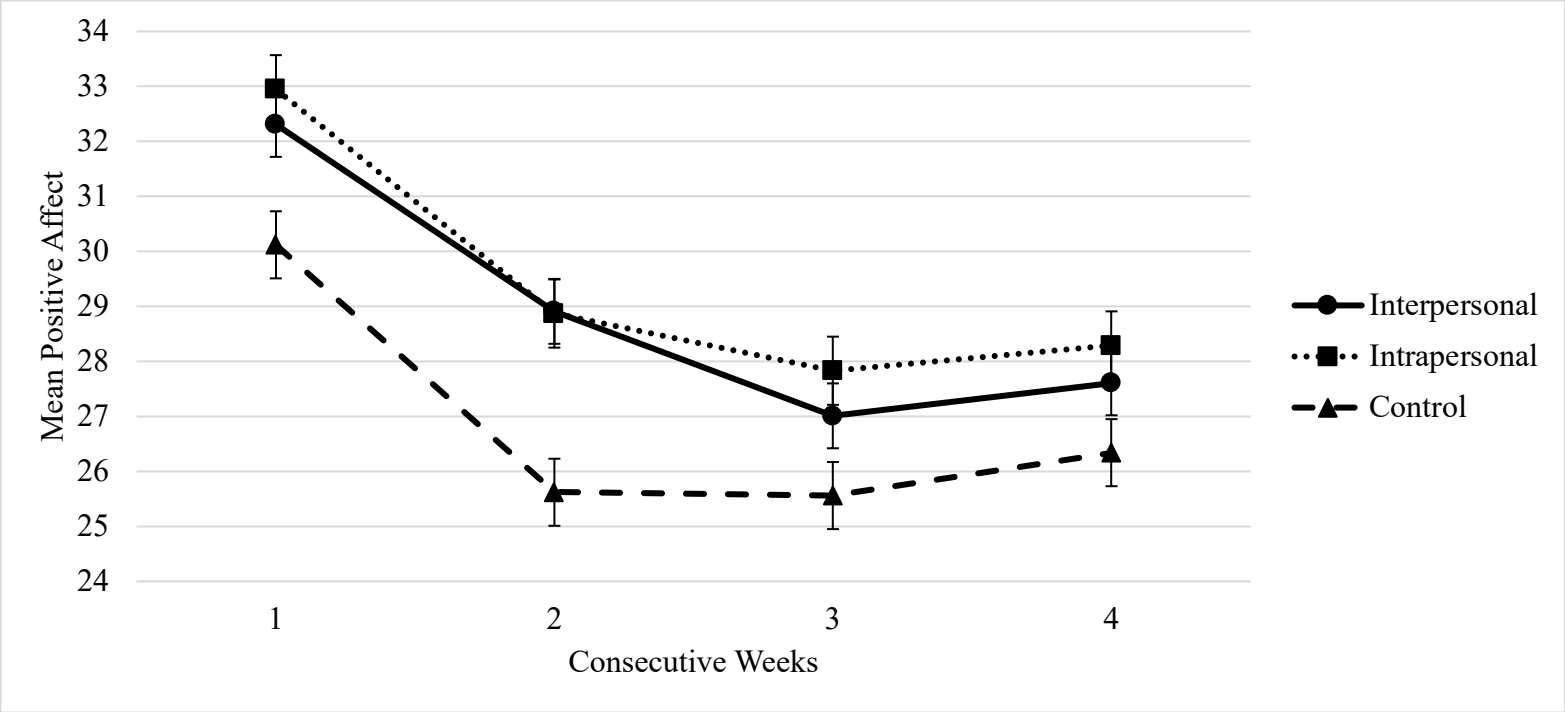
Although there were no significant differences across the three days for any condition, in the Control condition the participant's positive affect on Wednesday (M = 26.91, SD = 8.67) was significantly lower than the positive affect of participants in the Interpersonal (M = 29.46, SD =

9.14) and Intrapersonal (M = 30.29, SD = 8.78) conditions on Wednesday (See Appendix Tables I10 and I11 for all Day X Condition pairwise comparison tests).

Figure 4 illustrates the mean positive affect of participants across each consecutive week for each condition. All three conditions saw a visible decrease after week 1.

Figure 4

Participant Positive Affect Each Week by Condition



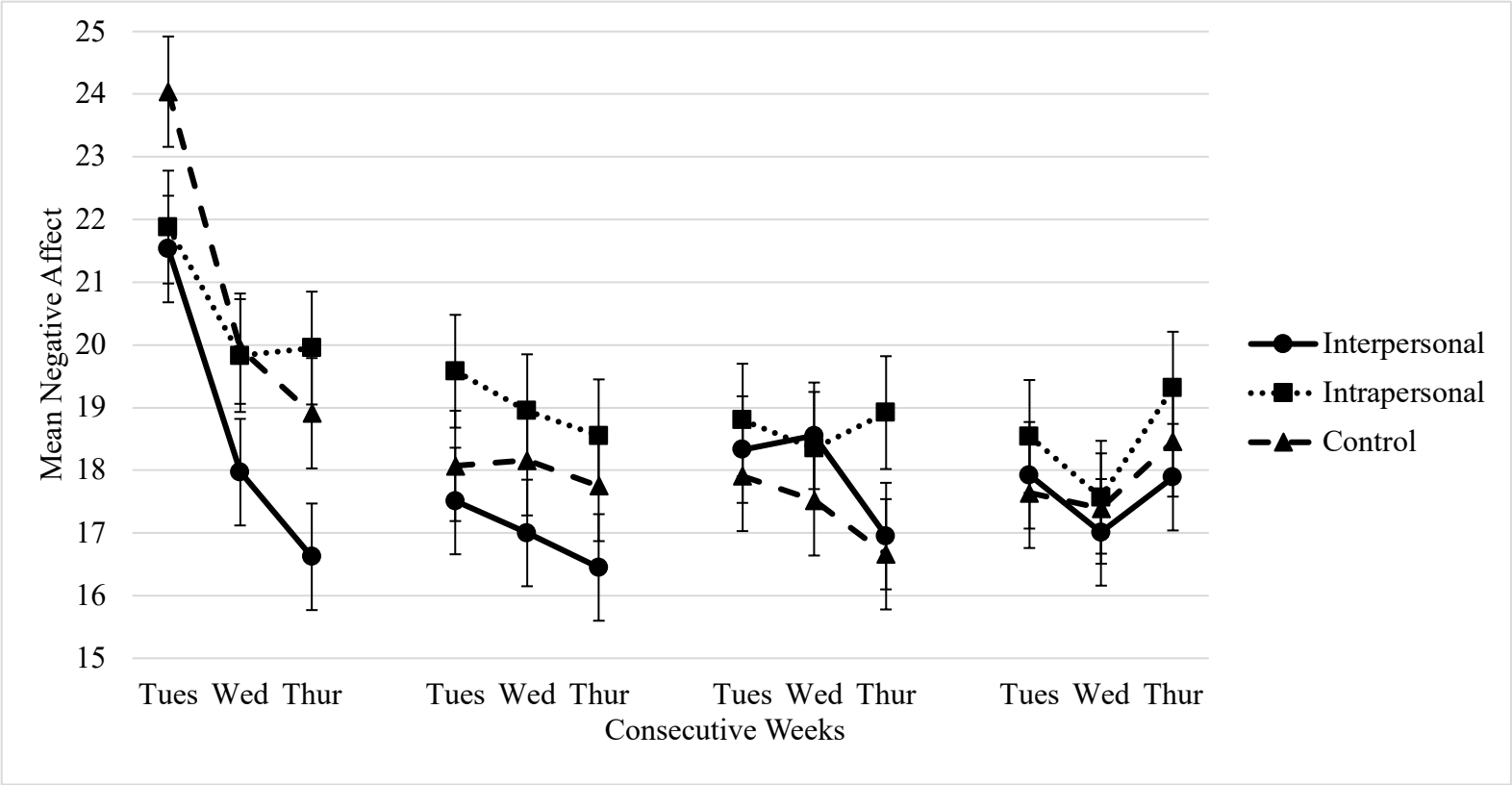
Within each condition, positive affect at Week 1 was significantly higher than Week 2, Week 3, and Week 4. Between conditions, only a significant difference was observed at Week 2. During Week 2, positive affect during the Control condition (M = 25.62, SD = 8.79) was significantly lower than positive affect in the Interpersonal (M = 28.91 SD = 9.64) and Intrapersonal (M = 28.87, SD = 8.62) conditions (See Appendix Tables I13 and I14 for all Week X Condition pairwise comparison tests).

3.2 Negative Affect

Like positive affect, a 3(Condition) X 4(Week) X 3(Day) mixed factorial ANOVA was conducted for negative affect. Figure 5 illustrates the mean negative affect of participants in each condition over the course of the study.

Figure 5

Mean Negative Affect for Participants Over the Course of a Four-Week, Repeated Gratitude Design



As indicated in Table 3, the ANOVA resulted in a significant main effect of Condition (F (2, 2424) = 6.61, p = .0014), Week (F (3, 2424) = 14.14, p <.0001), and Day (F (2, 2424) = 7.04, p = .0009) for participants' negative affect. The only significant interaction was Week X Day (F(6,2424) = 3.84. p = .0008). See Appendix Tables J1 and J2 for model parameters.

Table 3

Mixed Factorial Analysis of Variance for Negative Affect Between Condition Groups Over Time

Effect Tests	*df*	*SS*	*F*	*p*
Condition	2	690.87	6.61	.0014**
Week	3	2218.97	14.14	<.0001***
Condition*Week	6	432.58	1.38	.22
Day	2	735.98	7.04	.0009***
Condition*Day	4	109.03	.52	.72
Week*Day	6	1203.47	3.84	.0008***
Condition*Week*Day	12	205.5	.33	.98

Note. *p ≤ .05, **p ≤ .01, ***p ≤ .001.

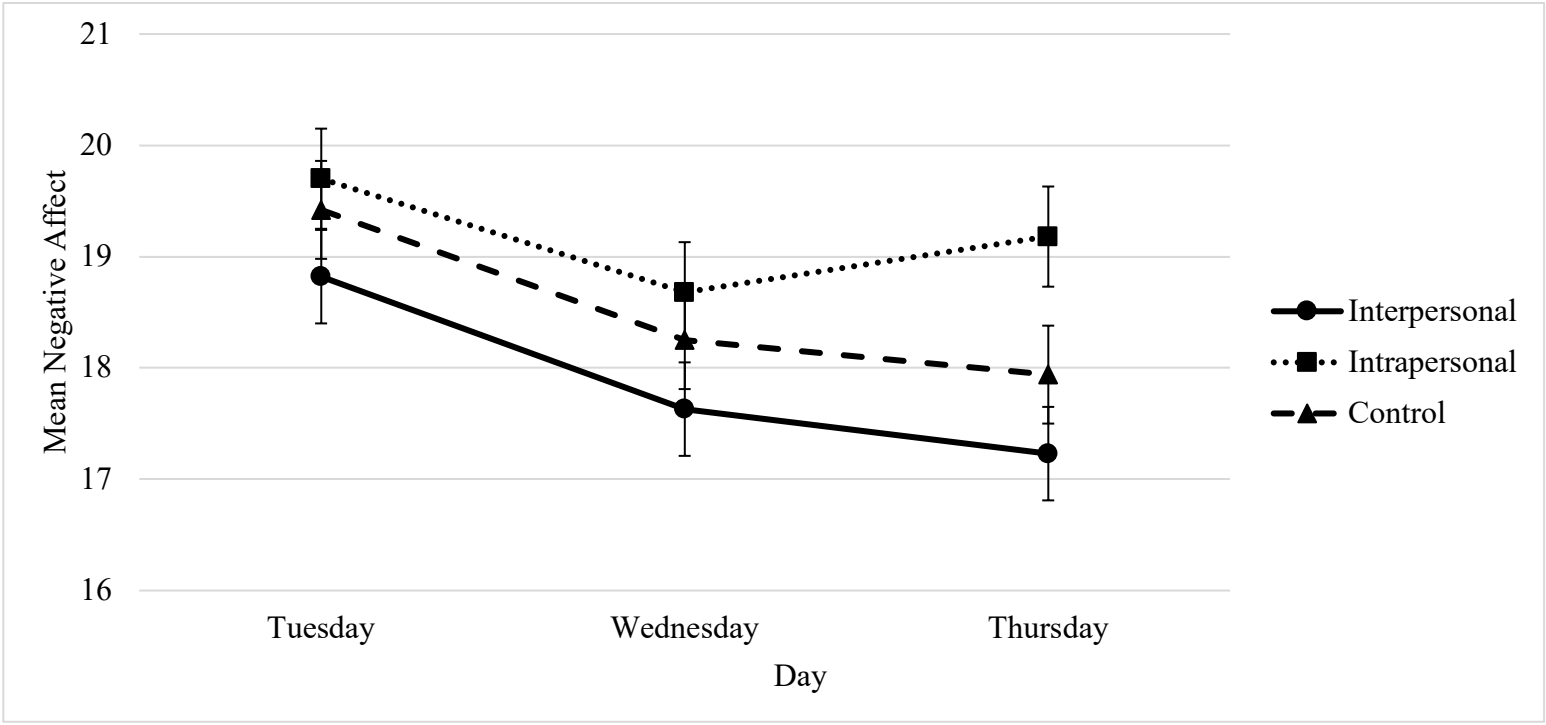
To evaluate the differences between the conditions for the main effects, Tukey's HSD post-hoc pairwise comparison tests were used. The mean negative affect for Interpersonal condition (M = 17.89, SD = 6.75) was significantly lower than for the Intrapersonal condition overall (M = 19.19, SD = 7.97). For the main effect of Week, the negative affect of the participants at Week 1 (M = 20.15, SD = 7.69) was significantly higher than Week 2 (M = 17.96, SD = 7.13), Week 3 (M = 17.99, SD = 7.16), and Week 4 (M = 17.95, SD = 7.12). The negative affect of the participants on Tuesday (M = 19.30, SD = 7.36) was significantly higher than Wednesday (M = 18.17, SD = 7.15) and Thursday (M = 18.08, SD = 7.44). See Appendix Tables J3-J8 for all mean estimates and pairwise comparison tests for the Condition, Week and Day main effects.

To quantify the differences in negative affect between the gratitude conditions and the control condition over time, the interaction effects between Condition and Day and between Condition and Week were further evaluated using Tukey's HSD post-hoc pairwise comparison

tests. Figure 6 shows the mean negative affect for each day across all conditions, indicating a trending decrease over the course of the week. The only exception was an increase in negative affect between Wednesday and Thursday in the Intrapersonal condition.

Figure 6

Participant Negative Affect Each Day by Condition

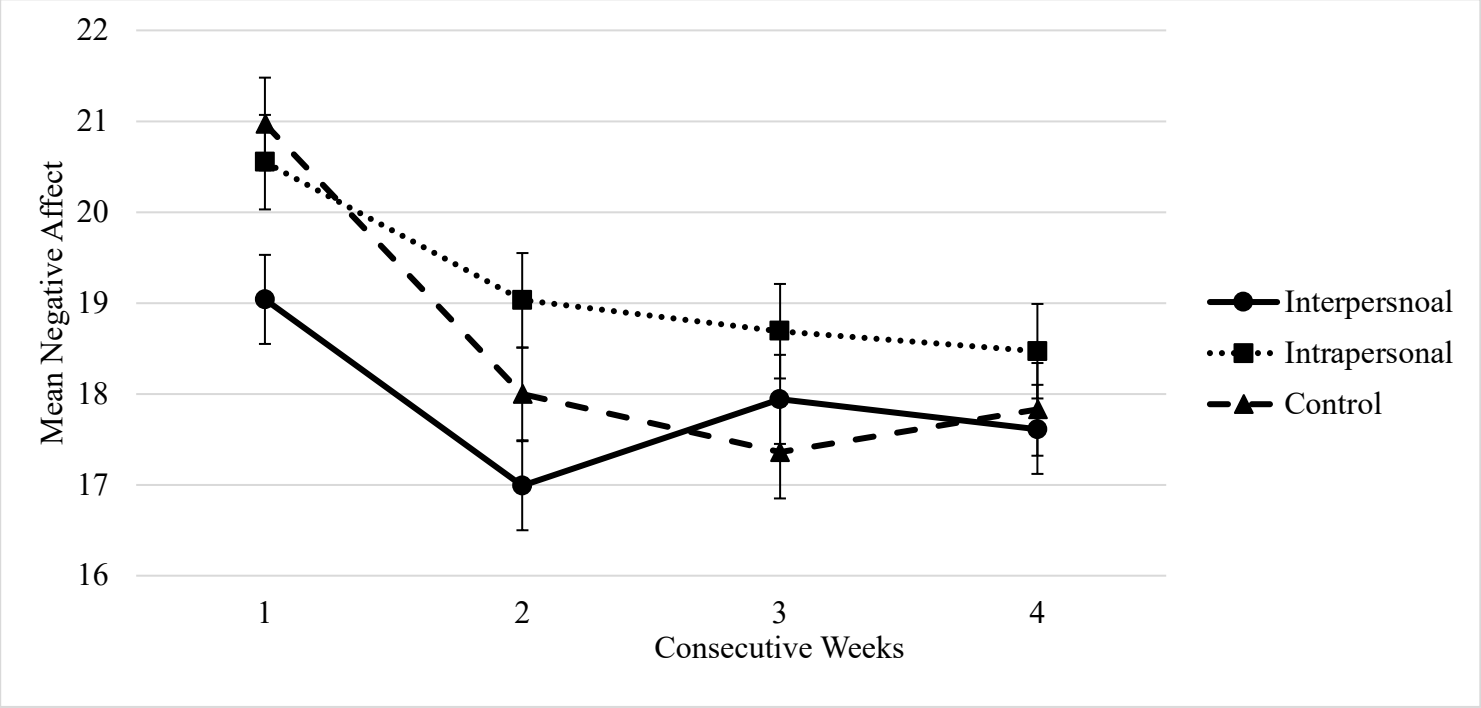


There was no significant difference in mean negative affect across the three days for any condition. Between conditions, negative affect for the Interpersonal condition on Thursday (M = 17.23, SD = 6.59) was significantly lower than the participants' negative affect in the Intrapersonal condition on Thursday (M = 19.18, SD = 8.37). See Appendix Tables J10 and J11 for all Day X Condition pairwise comparison tests.

Figure 7 shows the mean negative affect for each week across all conditions and depicts a trending decrease over the course of the four-week study.

Figure 7

Participant Negative Affect Each Week by Condition



Within condition, only negative affect in the Control condition changed significantly over the course of the four weeks. Negative affect decreased significantly from Week 1 (M = 20.97, SD = 8.30) compared to Week 2 (M = 18.00, SD = 7.03), Week 3 (M = 17.36, SD = 6.61), and Week 4 (M = 17.83, SD = 6.46). No significant difference in negative affect was found between conditions over the four weeks (See Appendix Tables J13 and J14 for all Week X Condition pairwise comparison tests).

To evaluate participants' well-being over the course of the entire study, paired sample t-tests were conducted at Time 1 and Time 12. Trait gratitude, perceived social support (partitioned into significant other, family, friends, and total), life satisfaction, and perceived social economic status were evaluated. Tables 4, 5 and 6 show the results of the t-tests for each condition.

Table 4

t-tests for SWB Variables at Time 1 and Time 12 For the Interpersonal Condition

	Time 1		Time 12				
Variable	***M***	**S*D***	***M***	***SD***	***t*(72)**	***p***	**Cohen's *d***
Trait Gratitude*	35.04	6.45	35.33	5.54	-.48	.32	-.057
PSS (Overall)*	65.63	13.45	68.79	11.44	-2.77	.004**	-.32
PSS (Sig Other)*	21.71	6.47	22.79	5.56	-2.40	.009**	-.28
PSS (Friends)*	22.42	4.11	23.42	3.66	-2.41	.009**	-.28
PSS (Family)*	21.49	5.48	22.58	4.64	-2.41	.009**	-.28
Life Satisfaction*	23.3	6.38	23.74	5.89	-.91	.18	-.11
SES USA**	6.19	1.38	6.23	1.57	-.26	.80	-.03
SES Community**	5.67	1.80	5.66	1.73	0.07	.94	.008

Note. Variables with * are one-tailed, and ** are two-tailed t-tests. *p ≤ .05, **p ≤ .01, ***p ≤ .001.

Table 5

t-Tests for SWB Variables at Time 1 and Time 12 For the Intrapersonal Condition

	Time 1		Time 12				
Variable	***M***	***SD***	***M***	***SD***	***t*(64)**	***p***	**Cohen's *d***
Trait Gratitude*	35.14	5.11	35.89	4.62	-1.98	.026*	-.25
PSS (Overall)*	67.20	12.41	68.52	11.63	-1.62	.055	-.20
PSS (Sig Other)*	22.65	5.97	22.63	5.78	.74	.48	.005
PSS (Friends)*	22.55	4.47	23.58	3.84	-2.49	.008**	-.31
PSS (Family)*	22.00	5.28	22.31	5.01	-.97	.169	-.12
Life Satisfaction*	23.17	6.44	24.26	6.11	-2.07	.021*	-.26
SES USA**	6.12	1.44	6.34	1.69	-1.53	.132	-.19
SES Community**	5.78	1.63	5.65	1.83	.62	.536	-.077

Note. Variables with * are one-tailed, and ** are two-tailed t-tests. *p ≤ .05, **p ≤ .01, ***p ≤ .001.

Table 6

t-Tests for SWB Variables at Time 1 and Time 12 For the Control Condition

	Time 1		Time 12				
Variable	***M***	***SD***	***M***	***SD***	***t*(66)**	***p***	**Cohen's *d***
Trait Gratitude**	34.90	5.34	34.69	5.75	.39	.70	.048
PSS (Overall)**	67.42	11.09	67.88	10.40	-.50	.64	-.058
PSS (Sig Other)**	22.61	5.19	22.85	4.53	-.50	.63	-.059
PSS (Friends)**	22.36	4.36	22.61	3.73	-.70	.51	-.08
PSS (Family)**	22.45	4.69	22.42	4.56	.08	.94	.01
Life Satisfaction**	21.57	7.49	23.43	7.51	-3.00	.003**	-.37
SES USA**	5.63	1.41	6.28	1.39	-4.10	<.001***	-.50
SES Community**	5.10	1.84	5.70	1.52	-3.00	.003**	-.37

Note. Variables with * are one-tailed, and ** are two-tailed t-tests. *p ≤ .05, **p ≤ .01, ***p ≤ .001.

3.3 Trait Gratitude

Participant trait gratitude did not change significantly between Time 1 and Time 12 for the Interpersonal condition ($t(72) = -.48$, $p = .32$) or the Control condition ($t(66) = .39$, $p = .70$), but trait gratitude increased significantly in the Intrapersonal condition ($t(64) = -1.98$, $p = .026$).

3.4 Perceived Social Support

Overall perceived social support increased significantly between Time 1 and Time 12 for the Interpersonal condition ($t\ (72) = -2.77$, $p = .004$). Specifically, perceived social support

increased significantly for significant other ($t(72) = -2.77$, $p = .009$), family ($t(72) = -2.41$, $p = .019$), and friends ($t(72) = -2.41$, $p = .009$).

Overall perceived social support did not change significantly for participants between Time 1 and Time 12 in the Intrapersonal condition ($t(64) = -1.62$, $p = .055$). Specifically, perceived social support for significant other ($t(64) = p = .74$) and family ($t(64) = -.97$, $p = .17$) were non-significant, but perceived social support significantly increased for friends ($t(64) = -2.49$, $p = .015$).

Overall perceived social support did not change significantly from Time 1 to Time 12 for the Control condition ($t(66) = -.50$, $p = .64$). Additionally, perceived social support for significant other ($t(66) = -.50$, $p = .63$), family ($t(66) = .08$, $p = .94$), and friends ($t(66) = -.70$ $p = .51$) were all non-significant for the Control condition.

3.5 Life Satisfaction

Participant life satisfaction did not change significantly between Time 1 and Time 12 in the Interpersonal condition ($t(72) = -.91$, $p = .18$), but increased significantly in both the Intrapersonal condition ($t(64) = -2.07$, $p = .021$) and the Control condition ($t(66) = -3.00$, $p = .0003$).

3.6 Perceived Social Economic Status

Participants' perceived socio-economic status was not significantly different at Time 1 compared to Time 12 at the national or the community level for the Interpersonal condition (USA, $t(72) = -.26$, $p = .80$; Community, $t(72) = .07$, $p = .94$) or for the Intrapersonal condition (USA, $t(64) = -1.53$, $p = .13$; Community, $t(64) = .62$, $p = .54$). However, for the Control condition participants' perceived socio-economic status increased significantly at the national level ($t(66) = -4.10$, $p < .001$) and at the community level ($t(66) = -3.00$, $p = .003$).

3.7 Text Analysis

Basic text analysis was used to provide another measure of participants' gratitude expression in the three conditions. Gratitude expressed was operationalized by a word count of each writing task. A mixed-effects model was used to determine if word count predicted positive affect in each condition. The individual's student ID was chosen as the random effect to account for the random variation across individuals over time, while word count remained as the fixed effect. Tables 7, 8 and 9 outlines the consequent mixed-effects models for each condition.

Table 7

Mixed-Effects Model for Interpersonal Participants Word Count Predicting Positive Affect

Model						
	Levels	*df*Num	*Df* Den	*F*	*p*	
Word Count	1	1	279.8	7.22	.0076	
Effect						
			95% CI			
	Estimate	*SE*	*LL*	*UL*	*t*	*p*
Intercept	27.42	1.18	25.08	29.75	23.16	<.0001***
Word Count	.025	.0091	.0066	.042	2.69	.0076**

Note. *p ≤ .05, **p ≤ .01, ***p ≤ .001.

Table 8

Mixed-Effects Model for Intrapersonal Participants Word Count Predicting Positive Affect

Model						
	Levels	*df*Num	*Df* Den	*F*	*p*	
Word Count	1	1	256.6	9.14	.0027	
Effect						
			95% CI			
	Estimate	*SE*	*LL*	*UL*	*t*	*p*
Intercept	28.36	1.15	26.08	30.63	24.70	<.0001***
Word Count	.066	.0022	.023	.11	3.02	.0027**

Note. *p ≤ .05, **p ≤ .01, ***p ≤ .001.

Table 9

Mixed-Effects Model for Control Participants Word Count Predicting Positive Affect

Model						
	Levels	*df*Num	*Df* Den	*F*	*p*	
Word Count	1	1	256	1.09	.30	
Effect						
			95% CI			
	Estimate	*SE*	*LL*	*UL*	*t*	*p*
Intercept	26.43	1.06	24.87	28.53	24.87	<.0001***
Word Count	.019	.018	-.017	.054	1.04	.30

Note. *p ≤ .05, **p ≤ .01, ***p ≤ .001.

Since positive affect was collected every time a gratitude writing task occurred, four data points were used for each participant to assess the relationship between the word count for the participant's writing task and positive affect. Participant word count was predictive of positive affect in the Interpersonal condition ($F(1,279.8) = 7.22$, $p = .0076$) and the Intrapersonal

condition ($F(1,256.6) = 9.14$, $p = .0027$), but not for the Control condition ($F(1, 256) = 1.09$, $p = .30$).

3.8 Individual Differences

All individual differences for the 205 participants were assessed at Time 1. Linear regression was used to evaluate the direction and the strength of the relationship between individual differences and the measures of SWB. Three regression models were constructed using The Big Five as the independent variables, while positive affect, negative affect, and trait gratitude were the outcome variables.

Table 10 exhibits the results of the linear regression model between The Big Five and the outcome variable positive affect.

Table 10

Results of Linear Regression Analysis of the Big Five Predicting Positive Affect

Predictor	*B*	*B SE*	*ß*	*t*	*p*
Constant	12.76	5.18		2.47	.015*
Extraversion	.39	.065	.37	6.01	<.001***
Agreeableness	.18	.079	.14	2.34	.020*
Conscientiousness	.26	.076	.21	3.39	<.001***
Neuroticism	-.19	.076	-.16	-2.52	.012*
Openness	.046	.078	.034	0.59	.56
	R^2(Adj.)	*SE* Estimate	*df*	*F*	*p*
Model	.36(.35)	5.61	(5,199)	22.74	<.001***

Note. *p ≤ .05, **p ≤ .01, ***p ≤ .001.

The Big Five accounted for a significant proportion of variance in positive affect scores ($R^2 = 0.36$, F (199) = 6.01, $p < .001$). Extraversion ($B = .39$, t (199) = 6.01, $p <.001$), Agreeableness ($B = .18$, $t(199) = 2.34$, $p = .02$), Conscientiousness ($B = .26$, t (199) = 3.39, $p <.001$), and Neuroticism ($B = -.19$, $t(199) = -2.52$, $p = .012$) significantly predicted positive

affect. Table 11 exhibits the results of the linear regression model between The Big Five and the outcome variable: negative affect.

Table 11

Results of Linear Regression Analysis of the Big Five Predicting Negative Affect

Predictor	*B*	B *SE*	*ß*	*t*	*p*
Constant	20.87	5.32		3.92	<.001***
Extraversion	-.011	.067	-.010	-.17	.87
Agreeableness	-.19	.081	-.14	-2.3	.022*
Conscientiousness	-.28	.078	-.22	-3.61	<.001***
Neuroticism	.54	.078	.43	6.85	<.001***
Openness	.097	.081	0.069	1.20	.23
	R^2(Adj.)	*SE* Estimate	*df*	*F*	*p*
Model	.38(.36)	5.76	(5,199)	24.33	<.001***

Note. *p ≤ .05, **p ≤ .01, ***p ≤ .001.

The Big Five accounted for a significant proportion of variance in negative affect (R^2 = .38, $F(5,199) = 24.43$, $p < .001$). Agreeableness (b = -.19, $t(199) = 2.30$, p <.001), Conscientiousness (B = -.28, $t(199) = -3.61$, p <.001), and Neuroticism (B = .54, $t(199) = 6.85$, p <.001) were significant predictors of participants' negative affect.

Table 12 exhibits the results of the linear regression model between The Big Five and the outcome variable: trait gratitude.

Table 12

Results of Linear Regression Analysis of the Big Five Predicting Trait Gratitude

Predictor	*B*	*B SE*	*ß*	*t*	*p*
Constant	18.69	4.71		3.97	<.001***
Extraversion	.12	.059	.14	2.08	.039*
Agreeableness	.16	.072	.14	2.16	.032*
Conscientiousness	.26	.069	.27	3.8	<.001***
Neuroticism	-.11	.069	-.11	-1.51	.13
Openness	.068	.071	.062	.96	.34
	R^2(Adj.)	*SE* Estimate	*df*	*F*	*p*
Model	.21(.19)	5.10	(5,199)	10.50	<.001***

Note. *p ≤ .05, **p ≤ .01, ***p ≤ .001.

The Big Five accounted for a significant proportion of variance in participant trait gratitude (R^2 = .21, F(5,199) = 10.50, p < .001). Extraversion (B = .12, t(199) = 2.08, p = .039), Agreeableness (B = .16, t(199) = 2.16, p = .032) and Conscientiousness (B = .26, t(199), p <.001) were significant predictors of the participants' trait gratitude.

Two further regression models were founded to depict relations between the independent variable—trait gratitude—and the outcome variable of perceived socio-economic status, both at the community and national level.

Table 13 depicts the results of the linear regression model between perceived social economic status at the community level and the outcome variable trait gratitude.

Table 13

Results of Linear Regression Analysis of Trait Gratitude Predicting SES at the Community Level

Predictor	*B*	*B SE*	*ß*	*t*	*p*
Constant	2.10	.74		2.84	.005**
Gratitude	.098	.021	.31	4.68	<.001***
	R^2(Adj.)	*SE* Estimate	*df*	*F*	*p*
Model	.097(.093)	1.69	(1,203)	21.9	<.001***

Note. *p ≤ .05, **p ≤ .01, ***p ≤ .001.

Trait gratitude significantly explained a significant proportion of variance (R^2 = .097, $F(1,203) = 21.90$, $p < .001$) in perceived socio-economic status at the community level. Trait gratitude significantly predicted perceived socio-economic scores at the community level (B = .098, $t(203) = 4.68$, $p < .001$).

Table 14 depicted the results of the linear regression model between perceived social economic status at the national level and the outcome variable trait gratitude. Trait gratitude accounted for a significant proportion of variance in socio-economic scores at the national level (R^2 = .070, $F(1,203) = 15.27$, $p < .001$) and trait gratitude significantly predicted perceived socio-economic scores at the national level (B = .067, $t(203) = 3.91$, $p < .001$).

Table 14

Results of Linear Regression Analysis of Trait Gratitude Predicting SES at the National Level

Predictor	*B*	*B SE*	*ß*	*t*	*p*
Constant	3.65	.60		6.04	<.001***
Gratitude	.067	.017	.27	3.91	<.001***
	R^2(Adj.)	*SE* Estimate	*df*	*F*	*p*
Model	.070(.065)	1.38	(1, 203)	15.27	<.001***

Note. *p ≤ .05, **p ≤ .01, ***p ≤ .001.

3.9 Manipulation Checks

To check if the gratitude conditions induced any feelings of gratitude, a manipulation check was administered at Time 12 for all three condition groups, as presented in Table 15.

Table 15

Participant Levels of Gratitude Sincerity, Positive Intervention Experience, and Future Likelihood of Continuing the Intervention Writing Task

	Interpersonal (*n* = 73)		**Intrapersonal (*n* = 65)**		**Control (*n* = 67)**	
	Count	Percent	Count	Percent	Count	Percent
Sincerity						
Very slightly or not at all	0	0	2	3.07	11	16.42
A little	2	2.74	1	1.54	19	28.36
Moderately	11	15.06	8	12.31	17	25.37
Quite a bit	35	47.95	34	52.31	17	25.37
Extremely	25	34.25	20	30.77	3	4.48
Positive						
Very slightly or not at all	2	2.74	3	4.62	14	20.90
A little	5	6.85	4	6.15	14	20.90
Moderately	17	23.29	21	32.31	16	23.88
Quite a bit	28	38.35	25	38.46	17	25.37
Extremely	21	28.77	12	18.46	6	8.95
Future						
Very slightly or not at all	8	10.95	10	15.39	25	37.31
A little	17	23.29	17	26.15	19	28.36
Moderately	31	42.47	18	27.69	14	20.90
Quite a bit	12	16.44	15	23.08	7	10.45
Extremely	5	6.85	5	7.69	2	2.98

About one third of the participants in both the Interpersonal condition (34.3%) and the Intrapersonal condition (30.8%) felt the gratitude was ‘extremely sincere’, compared to 4.5% of the participants in the Control condition who did not engage in any gratitude task.

To assess face validity, the question: “To what extent do you feel that the [condition] was a positive experience” was asked to gauge participant satisfaction with the intervention. In the Interpersonal condition, 28.8% indicated that the gratitude letter was an extremely positive experience. In the Intrapersonal condition, 18.5% of the participants reported that the gratitude journal was an extremely positive experience. For the control condition, 9.0% indicated that the learning journal was an extremely positive experience.

Finally, for all three conditions, the participants were asked “Did the experience of writing [condition] inspire you to continue to write [gratitude task] in the future?” In the Interpersonal condition, 23.3% of participants reported that they were either extremely likely or quite a bit likely to write a gratitude letter in the future. In the Intrapersonal condition, 30.8% of participants reported that they were either extremely likely or quite a bit likely to write a gratitude journal in the future. In the Control condition, 13.43% of participants were either extremely likely or quite a bit likely to write a learning journal in the future.

Two additional questions were added to the Interpersonal condition regarding the letters the participants wrote. Table 16 shows the proportion of different target gratitude letter recipients by week.

Table 16

Intended Letter Recipients Each Week

	Letter									
Relationship to sender	**First Letter (*n* = 73)**		**Second Letter (*n* = 73)**		**Third Letter (*n* = 72)**		**Fourth Letter (*n* = 72)**		**Total (*n* = 290)**	
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Partner/Spouse	13	17.81	7	9.59	4	5.56	2	2.78	26	8.97
Friend	24	32.88	26	35.61	32	44.44	33	45.83	115	39.65
Parent/Guardian	25	34.24	24	32.88	17	23.61	14	19.44	80	27.59
Another Family Member	6	8.22	8	10.96	15	20.83	12	16.67	41	14.14
Professor	4	5.48	4	5.48	1	1.39	4	5.56	13	4.48
Acquaintance	1	1.37	1	1.37	1	1.39	2	2.78	5	1.72
Other	0	0	3	4.11	2	2.78	5	6.94	10	3.45

For the first letter, most participants (34.2%) wrote to their parent/guardian, and for the subsequent three letters, the participant's friends were the most likely recipients (35.6%, 44.4%, 45.8%). Over the course of all four letters, more than one third of all letters were written to friends (39.7%), followed by their parent/guardian (27.6%), and another family member (14.1%). Partner/spouse accounted for 9.0% of total letters written, while professors accounted for 4.5% overall.

The second question asked how many of the letters were delivered, as stated in the prompt. Table 17 outlines the proportion of letters that were delivered. Only around one quarter (27.4%) of the participants delivered all four letters, while 15.1% of the participants did not deliver any of their letters. See Table 17 for the breakdown of the number of letters sent.

Table 17

The Number of Letters Delivered in the Interpersonal Condition

Number of Letters Sent	Count (n = 73)	Percent
0	11	15.07
1	10	13.70
2	19	26.03
3	13	17.80
4	20	27.40

4 Discussion

The overall aim of the four-week gratitude study was to compare the constructs of interpersonal and intrapersonal gratitude while assessing the overall impact of both an interpersonal and intrapersonal gratitude intervention using measures of SWB.

A significant difference was observed in the SWB of participants between the Interpersonal and Intrapersonal conditions following the intervention, providing compelling evidence for a distinct nature of these constructs. Notably, participants who engaged in the Intrapersonal intervention experienced a significant improvement in life satisfaction, but did not show an overall increase in perceived social support. The introspective practice of maintaining a gratitude journal was beneficial in helping participants recognize the aspects of their lives for which they were grateful, but it did not enhance their overall sense of social support. This finding was further supported by a significant increase in the participants' trait gratitude.

In contrast, participants in the Interpersonal condition did not exhibit a significant increase in life satisfaction or gratitude. However, they did experience a significant improvement in overall perceived social support. Consequently, the Interpersonal condition, employing gratitude letters, served to enhance perceived social support rather than increase overall life satisfaction that was observed in the Intrapersonal condition.

It is however noteworthy that the Intrapersonal intervention demonstrated a significant improvement in perceived social support from friends. This finding can perhaps best be attributed to the salience of the participants' immediate social environment, which likely prompted them to include their friends in their gratitude journals or to prompt the participants to participate in more interpersonal gratitude.

Surprisingly, the Control participants who recorded personal experiences in a learning journal, also exhibited an increase in life satisfaction. This unexpected outcome may be attributed to the introspective nature of the task. Specifically, the act of acknowledging learning experiences potentially induced a form of intrapersonal gratitude or a sense of achievement among the student participants that improved life satisfaction.

Another unexpected finding from the Control participants was that perceived social status increased significantly both at the community and national level. This could potentially be attributed to an increased awareness of participants' pursuit of higher education, as facilitated by the learning journal, which inspired them to perceive themselves at a higher social status.

The positive and negative affect assessed at each of the 12 time points, offered a different perspective. Overall, participants in both gratitude conditions exhibited significantly higher positive affect compared to the Control condition, as hypothesized. For negative affect however, the only significant difference was between the two gratitude conditions, which was contrary to prediction. Participants in the Interpersonal condition exhibited significantly lower negative affect than those in the Intrapersonal condition. Therefore, it is possible that the gratitude journal prompt created both positive and negative rumination.

Despite the overall significant increase in positive affect observed in the gratitude conditions, positive affect decreased significantly after Week 1 for all three conditions. This

raises the question of whether the intervention processes contributed to a decline in positive affect or if external factors—such as entering the final weeks of the semester and the mounting pressure of approaching final exams—were a contributing factor. The same significant decrease was also evidenced in the participant's negative affect over weeks, which may suggest that a novelty effect is more plausible.

To evaluate this intervention effect further, the interaction of Day and Intervention Condition must be considered. First, the analysis of day, conducted across all three conditions, revealed that in both gratitude conditions, the participants' positive affect was significantly higher on Wednesday compared to the participants' positive affect in the Control condition. This finding indicates a positive association between the gratitude writing tasks and positive affect for both gratitude conditions, contrary to the consistent decline observed in the Control condition.

In contrast, negative affect decreased rather consistently throughout the week for the Interpersonal and Control conditions. For the Intrapersonal condition, negative affect increased on Thursday, which was significantly different from the decrease in negative affect for the participants in the Interpersonal condition. The participants in the Intrapersonal condition may have experienced subsequent negative rumination due to the introspective nature of their task, thereby exhibiting more negative affect the following day. Alternatively, in the absence of the positive attenuation provided by the introspective gratitude writing task on Wednesday, negative affect may have intensified thereafter.

Further evidence of an improvement in positive affect for participants in the gratitude conditions was supported by text analysis. Gratitude expression was operationalized as word count in the writing tasks. The regression analysis revealed that both the word count of the gratitude letters and the gratitude journals correlated positively with positive affect.

The results of the linear regression models suggest that the relationships between individual differences and SWB aligned with prior research and provided support for the relevant hypotheses. Specifically, extraversion, conscientiousness, and agreeableness were found to correlate positively with both gratitude and positive affect, while neuroticism correlated negatively with positive affect. The only inconsistency between the results and the corresponding literature was that openness did not correlate significantly with either gratitude or positive affect.

The hypothesized reverse correlations were found for negative affect, except for extraversion, which did not correlate significantly with negative affect. Another finding consistent with the existing literature (Kraus et al., 2011) was the link between trait gratitude and perceived social status. Individuals with higher levels of perceived social status—both at the community and national level— displayed greater levels of trait gratitude.

Overall, it appears that both gratitude interventions enhanced positive affect compared to the control intervention. Asking participants to focus their gratitude toward others (interpersonal) also reduced negative affect, while making the intervention task more introspective seemed to also prompt negative rumination. For future gratitude-based interventions seeking to improve SWB, if the goal is to induce stronger social relationships, an interpersonal gratitude writing task should be considered. On the other hand, an intrapersonal gratitude writing task should be considered if the goal is to improve overall life satisfaction.

4.1 Limitations and Future Direction

The present study had several noteworthy limitations that suggest directions for future researcg. First, it is essential to acknowledge the use of a convenience sample consisting of individuals from a WEIRD (Western, Educated, Industrialized, Rich, and Democratic) population, which raises concerns about the generalizability of the findings, particularly in

clinical contexts (Henrich, Heine, & Norenzayan, 2010). To enhance the external validity of various gratitude interventions, future research should aim to include a more diverse and representative sample, thereby enabling an examination of whether the observed improvements in SWB can be extended to broader populations.

Additionally, it is important to consider the potential impact of the timing of the semester on the positive and negative affect experienced by the student participants. Given that this study was conducted during the final four weeks of the semester, it is possible that students collectively faced heightened stress levels, which could have contributed to the unexpected decrease in positive affect observed over four consecutive weeks. To address this issue, future investigations could adopt a more comprehensive approach by selecting a diverse sample that encompasses individuals at various stages of their academic schedule, thereby minimizing the influence of shared variance associated with mood-related external variables that could influence positive and/or negative affect.

The present study involved certain trade-offs to prevent participant attrition and cognitive fatigue, resulting in the assessment of only positive and negative affect at each time point. One compromise made to mitigate attrition was the selection of specific intervention days for assessing participants' affect. Tuesday, Wednesday, and Thursday were chosen specifically to avoid potential confounding factors such as an increase in positive affect typically observed on Fridays and weekends (Wang et al., 2016). However, future research could explore the effects of a gratitude intervention across the entire week in order to evaluate the generalizability of the intervention effects observed in the present study.

Furthermore, the frequency of the gratitude writing task—occurring on only one weekday—was another compromise implemented to minimize attrition. It is possible that the

efficacy of the gratitude interventions would have been stronger with multiple writing tasks per week, as observed in previous research (Seligman et al., 2004). However, excessive gratitude exercises could lead to desensitization or the adaption-level phenomenon (Rutledge et al.,2014). Therefore, future studies could aim to determine an optimal number of gratitude writing tasks per week to maximize SWB while avoiding potential desensitization or adaption effects.

Another notable limitation of the present study was the absence of an evaluation of long-term effects following the completion of the gratitude interventions, primarily due to the constraints imposed by the semester timeframe. Consequently, it remains unclear whether the positive benefits derived from each gratitude intervention would endure over an extended period after the intervention, or if participants' SWB would decrease markedly at the end of a gratitude intervention. Future research should address this limitation by incorporating post-intervention follow-up assessments, thereby enabling a more comprehensive examination of the long-term impact and durability of the gratitude interventions on subjective well-being (SWB).

Finally, after seeing an increase in life satisfaction in the Control condition, it is likely the control did not offer a true baseline for comparison with the two gratitude interventions. The effectiveness of the control writing task should be reconsidered for future research. Moreover, the manipulation check for the Interpersonal condition revealed that most participants did not deliver their gratitude letters, as requested in the prompt. A follow-up study should assess differences in SWB between participants who delivered their letters versus those who did not.

5 Conclusion

In conclusion, this study provided insight into the effects of particular gratitude interventions on SWB. Beyond improving participants positive affect, the findings suggest that both interpersonal and intrapersonal gratitude interventions have distinct positive effects on

SWB, highlighting the multifaceted nature of gratitude as a positive psychological construct. An intrapersonal gratitude intervention significantly improved life satisfaction, while an interpersonal gratitude intervention significantly increased overall perceived social support. Those findings aligned with prior research that demonstrated differential impact of similar gratitude interventions on SWB.

However, several limitations should be acknowledged. The convenience sample from a WEIRD population raises concerns about the generalizability of the findings, particularly for clinical settings. Additionally, the timing of the semester may have influenced participants' affective experiences and mood-states, which could have affected the results. Moreover, the control intervention positively impacted the participants' SWB, which raises questions about the appropriateness of the control writing task.

Further follow-up research is needed to: a) evaluate long-term intervention effects beyond the one-week intervention period, b) explore additional variables assessed at each time point, and c) consider optimal frequency and duration of a gratitude intervention. Addressing these limitations and pursuing these needs for future investigation will advance the understanding of gratitude-related interventions, especially their potential impact on SWB that may have implications on basic human welfare.

In summary, this study demonstrated distinct positive effects of interpersonal vs. intrapersonal gratitude interventions on SWB, while also acknowledging certain limitations and suggesting promising directions for follow-up research. By building upon this foundation, researchers can continue to refine and expand the application of gratitude-related interventions across diverse populations and contexts.

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Appendix

Appendix A: Positive and Negative Affect Scale (PANAS-X - amended to include only the positive and negative effect dimension scales)

(Watson & Clark, 1994)

This scale consists of a number of words and phrases that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you have felt this way during the past few weeks. Use the following scale to record your answers:

1 very slightly or not at all

2 a little

3 moderately

4 quite a bit

5 extremely

_____ active	_____ hostile
_____ guilty	_____ strong
_____ enthusiastic	_____ alert
_____ attentive	_____ jittery
_____ afraid	_____ interested
_____ nervous	_____ irritable
_____ distressed	_____ ashamed
_____ excited	_____ upset
_____ determined	_____ scared
_____ proud	_____ inspired

Appendix B: The Gratitude Questionnaire – Six Item Form (GQ-6)

(McCullough, Emmons, & Tsang, 2002)

The Gratitude Questionnaire-Six-Item Form (GQ-6) is a six-item self-report questionnaire designed to assess individual differences in the proneness to experience gratitude in daily life. Instructions: Using the scale below as a guide, write a number beside each statement to indicate how much you agree with it.

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.

Appendix C: Big Five Inventory

(John & Srivastava, 1999)

Here are several characteristics that may or may not apply to you. For example, do you agree that you are someone who likes to spend time with others? Please write a number next to each statement to indicate the extent to which you agree or disagree with that statement.

1 Disagree strongly
2 Disagree a little
3 Neither agree nor disagree
4 Agree a little
5 Agree Strongly

I see Myself as Someone Who...

____1. Is talkative
____2. Tends to find fault with others
____3. Does a thorough job
____4. Is depressed, blue
____5. Is original, comes up with new ideas
____6. Is reserved
____7. Is helpful and unselfish with others
____8. Can be somewhat careless
____9. Is relaxed, handles stress well
____10. Is curious about many different things
____11. Is full of energy
____12. Starts quarrels with others
____13. Is a reliable worker
____14. Can be tense
____15. Is ingenious, a deep thinker
____16. Generates a lot of enthusiasm
____17. Has a forgiving nature
____18. Tends to be disorganized
____19. Worries a lot
____20. Has an active imagination
____21. Tends to be quiet
____22. Is generally trusting
____23. Tends to be lazy
____24. Is emotionally stable, not easily upset
____25. Is inventive
____26. Has an assertive personality
____27. Can be cold and aloof
____28. Perseveres until the task is finished
____29. Can be moody
____30. Values artistic, aesthetic experiences
____31. Is sometimes shy, inhibited
____32. Is considerate and kind to almost everyone
____33. Does things efficiently
____34. Remains calm in tense situations
____35. Prefers work that is routine
____36. Is outgoing, sociable
____37. Is sometimes rude to others
____38. Makes plans and follows through with them
____39. Gets nervous easily
____40. Likes to reflect, play with ideas
____41. Has few artistic interests
____42. Likes to cooperate with others
____43. Is easily distracted
____44. Is sophisticated in art, music, or literature

Appendix D: Satisfaction with Life Scale (SWLS)

(Diener, Emmons, Larsen & Griffin, 1985)

Instructions: Below are five statements with which you may agree or disagree. Indicate your agreement with each item by tapping the appropriate box, from strongly agree, to strongly disagree. Please be open and honest in your responding.

		Strongly agree	Agree	Slightly agree	Neither agree nor disagree	Slightly disagree	Disagree	Strongly disagree
1	In most ways my life is close to my ideal.	**7**	**6**	**5**	**4**	**3**	**2**	**1**
2	The conditions of my life are excellent.	**7**	**6**	**5**	**4**	**3**	**2**	**1**
3	I am satisfied with my life.	**7**	**6**	**5**	**4**	**3**	**2**	**1**
4	So far I have gotten the important things I want in life.	**7**	**6**	**5**	**4**	**3**	**2**	**1**
5	If I could live my life over, I would change almost nothing.	**7**	**6**	**5**	**4**	**3**	**2**	**1**

Appendix E: Multidimensional Scale of Perceived Social Support

Multidimensional Scale of Perceived Social Support (Zimet, Dahlem, Zimet & Farley, 1988)

Instructions: We are interested in how you feel about the following statements. Read each statement carefully. Indicate how you feel about each statement.

Circle the "1" if you **Very Strongly Disagree**
Circle the "2" if you **Strongly Disagree**
Circle the "3" if you **Mildly Disagree**
Circle the "4" if you are **Neutral**
Circle the "5" if you **Mildly Agree**
Circle the "6" if you **Strongly Agree**
Circle the "7" if you **Very Strongly Agree**

1.	There is a special person who is around when I am in need.	1	2	3	4	5	6	7	SO
2.	There is a special person with whom I can share my joys and sorrows.	1	2	3	4	5	6	7	SO
3.	My family really tries to help me.	1	2	3	4	5	6	7	Fam
4.	I get the emotional help and support I need from my family.	1	2	3	4	5	6	7	Fam
5.	I have a special person who is a real source of comfort to me.	1	2	3	4	5	6	7	SO
6.	My friends really try to help me.	1	2	3	4	5	6	7	Fri
7.	I can count on my friends when things go wrong.	1	2	3	4	5	6	7	Fri
8.	I can talk about my problems with my family.	1	2	3	4	5	6	7	Fam
9.	I have friends with whom I can share my joys and sorrows.	1	2	3	4	5	6	7	Fri
10.	There is a special person in my life who cares about my feelings.	1	2	3	4	5	6	7	SO
11.	My family is willing to help me make decisions.	1	2	3	4	5	6	7	Fam
12.	I can talk about my problems with my friends.	1	2	3	4	5	6	7	Fri

The items tended to divide into factor groups relating to the source of the social support, namely family (Fam), friends (Fri) or significant other (SO).

Appendix F: MacArthur Scale of Subjective Social Status

1. Standing in the United States

Think of this ladder as representing where people stand in the United States. At the top of the ladder are the people who are the best off – those who have the most money, the most education, and the most respected jobs. At the bottom are the people who are the worst off – those who have the least money, least education, the least respected jobs, or no job. The higher up you are on this ladder, the closer you are to the people at the very top; the lower you are, the closer you are to the people at the very bottom.

Where would you place yourself on this ladder?

Please place a large "X" on the rung where you think you stand at this time in your life relative to other people in the United States.

2. Standing in Communities

Think of this ladder as representing where people stand in their communities. People define community in different ways; please define it in whatever way is most meaningful to you. At the top of the ladder are people who have the highest standing in their community. At the bottom are the people who have the lowest standing in their community.

Where would you place yourself on this ladder?

Please place a large "X" on the rung where you think you stand at this time in your life relative to other people in your community.

Appendix G: Writing Prompts

Control condition:

Write down a summary of what you have learned today.

Intrapersonal condition:

Write down what you are grateful for today.

Interpersonal condition:

Write a thank-you letter to someone for whom you are grateful and email or mail the letter.

Appendix H: Writing task response examples

Control condition:

"What I learned today is that you really have to push yourself when you want something. Though it is hard to get the motivation. Yesterday I wanted to study although throughout the whole day, I wasn't feeling well. I felt very heavy so I decided to take a walk. It's been feeling like a jail cell in my dorm so I needed that fresh air."

"I learned a lot about the death of JFK for my final history project."

Intrapersonal condition:

"There are a lot of things that I am grateful for today, starting with the weather, it is such a beautiful day out. I am so grateful that I have made such a great group of friends so far at my time here at Virginia Tech, they are such a great support system. I am also so grateful for my family, I miss them so much and I am so glad they are so supportive of me."

"I am grateful for my friends, my boyfriend, and my mom. I'm also grateful that I have the opportunity to go to a school that I love."

Interpersonal condition:

"Dear Hav,

I wanted to tell you today how grateful I am for your presence in my life. it's insane to think that we only met just a few months ago when we came here to Virginia Tech. now you are one of my best friends and I can't imagine not knowing your hilarious soul.

We get along so well and our personalities mesh. I love asking you for fashion advice and just chit chatting about life. I am very grateful for you and I hope we can be friends for life.

Love, Abby"

"Dear Mom and Dad,

Thank you both for being great parents and always taking care of me. I wish we were able to do more when I come down to see you guys. Time flies so fast. Thank you mom for taking care of my cats while I'm gone and thank you dad for sending me 2 money every week to buy myself food and other stuff. I love you both.

Audry"

Appendix I: Positive Affect Mean Estimates and Pairwise Comparisons

Table I1

Summary of Fit for the Overall ANOVA for the Dependent Measure Positive Affect

Summary of Fit	
Rsquare	.078
Rsquare Adj.	.065
Root Mean Square Error	8.67
Mean of Responses	28.45
Observations	2460

Table I2

The ANOVA results for the dependent measure positive affect

Analysis of Variance	*df*	*SS*	*MS*	*F*	*p*
Model	35	15404.56	440.13	5.85	<.0001***
Error	2424	182235.34	75.18		
C. Total	2459	197639.90			

Table I3

Mean Estimates for Positive Affect by Condition

					95% CI	
Condition	*M*	*SD*	*SE*	*df*	*LL*	*UL*
Interpersonal	28.96	9.28	.29	2424	28.38	29.53
Intrapersonal	29.48	8.61	.31	2424	28.87	30.09
Control	26.91	8.75	.31	2424	26.31	27.51

Table I4

Tukey's HSD Pairwise Comparisons of Positive Affect Between Conditions

						95% CI	
Factor Pair		Difference	*SE*	*t*	*p*	*LL*	*UL*
Interpersonal	Intrapersonal	-.53	.43	-1.23	.43	-1.53	.48
Interpersonal	Control	2.05	.42	4.84	<.0001***	1.06	3.04
Intrapersonal	Control	2.58	.44	5.91	<.0001***	1.55	3.60

Note. *p ≤ .05, **p ≤ .01, ***p ≤ .001.

Table I5

Mean Estimates for Positive Affect by Week

					95% CI	
Week	*M*	*SD*	*SE*	*df*	*LL*	*UL*
1	31.79	8.14	.35	2424	31.10	32.48
2	27.80	9.17	.35	2424	27.11	28.48
3	26.80	8.83	.35	2424	26.11	27.49
4	27.41	8.84	.35	2424	26.72	28.10

Table I6

Tukey's HSD Pairwise Comparisons of Positive Affect Between Weeks

						95% CI	
Factor Pair		Difference	*SE*	*t*	*p*	LL	UL
Week 1	Week 2	3.99	.50	8.07	<.0001***	2.72	5.27
Week 1	Week 3	4.99	.50	10.08	<.0001***	3.72	6.27
Week 1	Week 4	4.38	.50	8.85	<.0001***	3.11	5.65
Week 2	Week 3	1.00	.50	2.02	.18	-.27	2.27
Week 2	Week 4	.39	.50	.78	.86	-.89	1.66
Week 3	Week 4	-.61	.50	-1.24	.60	-1.88	.66

Note. *p ≤ .05, **p ≤ .01, ***p ≤ .001.

Table I7

Mean Estimates for Positive Affect by Day

					95% CI	
Day	*M*	*SD*	*SE*	*df*	*LL*	*UL*
Tuesday	28.94	8.94	.30	2424	28.34	29.53
Wednesday	28.89	8.98	.30	2424	28.29	29.48
Thursday	27.53	8.92	.30	2424	26.93	28.12

Table I8

Tukey's HSD Pairwise Comparisons of Positive Affect Between Days

						95% CI	
Factor Pair		Difference	*SE*	*t*	*p*	*LL*	*UL*
Tuesday	Wednesday	.050	.43	.12	.99	-.96	1.06
Tuesday	Thursday	1.41	.43	3.29	.003**	.40	2.41
Wednesday	Thursday	1.36	.43	3.17	.0044**	.35	2.36

Note. *p ≤ .05, **p ≤ .01, ***p ≤ .001.

Table I9

Mean Estimates for Positive Affect Each Day by Condition

					95% CI	
Day	*M*	*SD*	*SE*	*df*	*LL*	*UL*
			Interpersonal			
Tuesday	29.14	9.41	.51	2424	28.14	30.13
Wednesday	29.46	9.14	.51	2424	28.47	30.46
Thursday	28.27	9.28	.51	2424	27.28	29.27
			Intrapersonal			
Tuesday	29.99	8.41	.51	2424	28.93	31.04
Wednesday	30.29	8.78	.51	2424	29.23	31.34
Thursday	28.17	8.53	.51	2424	27.12	29.23
			Control			
Tuesday	27.68	8.78	.51	2424	26.64	28.72
Wednesday	26.91	8.67	.51	2424	25.87	27.95
Thursday	26.13	8.77	.51	2424	25.10	27.17

Table I10

Tukey's HSD Pairwise Comparisons of Positive Affect Between Days Within Condition

Factor Pair (Within Group)		Difference	*SE*	*t*	*p*	95% CI	
						LL	*UL*
Interpersonal							
Tuesday	Wednesday	-.33	.72	-.45	1.00	-2.55	1.90
Tuesday	Thursday	.86	.72	1.20	.96	-1.36	3.09
Wednesday	Thursday	1.19	.72	1.66	.77	-1.04	3.42
Intrapersonal							
Tuesday	Wednesday	-.30	.76	-.39	1.00	-2.66	2.06
Tuesday	Thursday	1.82	.76	2.39	.29	-.55	4.18
Wednesday	Thursday	2.12	.76	2.78	.12	-.25	4.78
Control							
Tuesday	Wednesday	.78	.75	1.04	.98	-1.55	3.10
Tuesday	Thursday	1.55	.75	2.07	.50	-.78	3.87
Wednesday	Thursday	.77	.75	1.03	.98	-1.55	3.10

Note. *p ≤ .05, **p ≤ .01, ***p ≤ .001.

Table I11

Tukey's HSD Pairwise Comparisons of Positive Affect of Each Day Between Conditions

Factor Pair (Between Group)		Difference	*SE*	*t*	*p*	95% CI	
						LL	*UL*
			Tuesday				
Interpersonal	Intrapersonal	-.85	.74	-1.15	.97	-3.15	1.44
Interpersonal	Control	1.45	.73	1.98	.56	-.82	3.73
Intrapersonal	Control	2.31	.75	3.05	.058	-.038	4.65
			Wednesday				
Interpersonal	Intrapersonal	-.83	.74	-1.12	.97	-3.12	1.47
Interpersonal	Control	2.55	.73	3.48	.015*	.28	4.83
Intrapersonal	Control	3.38	.75	4.48	.0003***	1.04	5.72
			Thursday				
Interpersonal	Intrapersonal	.10	.74	.14	1.00	-2.19	2.40
Interpersonal	Control	2.14	.73	2.92	.085	-.14	4.42
Intrapersonal	Control	2.04	.75	2.70	.15	-.30	4.38

Note. *p ≤ .05, **p ≤ .01, ***p ≤ .001.

Table I12

Participant Positive Affect Each Week by Condition

Week	*M*	*SD*	*SE*	*df*	95% CI	
					LL	*UL*
Interpersonal						
1	32.31	8.20	.59	2424	31.16	33.45
2	28.91	9.64	.59	2424	27.76	30.06
3	27.01	9.28	.59	2424	25.86	28.16
4	27.61	9.09	.59	2424	26.46	28.76
Intrapersonal						
1	32.95	7.59	.62	2424	31.73	34.17
2	28.87	8.62	.62	2424	27.65	30.08
3	27.83	8.54	.62	2424	26.61	29.05
4	28.29	8.73	.62	2424	27.07	29.50
Control						
1	30.12	8.35	.61	2424	28.92	31.32
2	25.62	8.79	.61	2424	24.42	26.82
3	25.56	8.50	.61	2424	24.36	26.76
4	26.34	8.61	.61	2424	25.14	27.54

Table I13

Tukey's HSD Pairwise Comparisons of Positive Affect of Each Week Within Condition

Factor Pair (Within Group)		Difference	*SE*	*t*	*p*	95% CI	
						LL	*UL*
Interpersonal							
Week 1	Week 2	3.40	.83	4.10	.0025*	.69	6.11
Week 1	Week 3	5.30	.83	6.39	<.0001***	2.59	8.01
Week 1	Week 4	4.70	.83	5.67	<.0001***	1.99	7.41
Week 2	Week 3	1.90	.83	2.29	.48	-.81	4.61
Week 2	Week 4	1.30	.83	1.57	.92	-1.41	4.01
Week 3	Week 4	-.60	.83	-.72	1.00	-3.31	2.11
Intrapersonal							
Week 1	Week 2	4.08	.88	4.65	.0002***	1.21	6.95
Week 1	Week 3	5.12	.88	5.83	<.0001***	2.25	7.99
Week 1	Week 4	5.31	.88	5.31	<.0001***	1.79	7.53
Week 2	Week 3	1.04	.88	1.18	.99	-1.84	3.91
Week 2	Week 4	.58	.88	.66	1.00	-2.29	3.45
Week 3	Week 4	-.46	.88	-.52	1.00	-3.33	2.42
Control							
Week 1	Week 2	4.51	.86	5.21	<.0001***	1.67	7.33
Week 1	Week 3	4.56	.87	5.27	<.0001***	1.73	7.39
Week 1	Week 4	3.78	.86	4.37	.0008***	.95	6.61
Week 2	Week 3	.06	.86	.07	1.00	-2.77	2.89
Week 2	Week 4	-.72	.86	-.83	1.00	-3.55	2.11
Week 3	Week 4	-.78	.86	-.90	1.00	-3.61	2.05

Note. *p ≤ .05, **p ≤ .01, ***p ≤ .001.

Table I14

Tukey's HSD Pairwise Comparisons of Positive Affect of Each Week Between Condition

Factor Pair (Between Group)		Difference	*SE*	*t*	*p*	95% CI	
						LL	*UL*
			Week 1				
Interpersonal	Intrapersonal	-.64	.85	-.75	1.00	-3.44	2.15
Interpersonal	Control	2.19	.85	2.58	.29	-.58	4.96
Intrapersonal	Control	2.83	.87	3.25	.054	-.022	5.68
			Week 2				
Interpersonal	Intrapersonal	.042	.85	.05	1.00	-2.75	2.83
Interpersonal	Control	3.29	.85	3.89	.0059**	052	6.06
Intrapersonal	Control	3.25	.87	3.73	.011*	.40	6.10
			Week 3				
Interpersonal	Intrapersonal	-.82	.85	-.96	1.00	-3.61	1.97
Interpersonal	Control	1.45	.85	1.71	.86	-1.32	4.22
Intrapersonal	Control	2.27	.87	2.61	.28	-.58	5.12
			Week 4				
Interpersonal	Intrapersonal	-.68	.85	-.80	1.00	-3.02	2.57
Interpersonal	Control	1.27	.85	1.50	.94	-.72	4.82
Intrapersonal	Control	1.95	.87	2.24	.52	-.90	4.80

Note. *p ≤ .05, **p ≤ .01, ***p ≤ .001.

Appendix J: Negative Affect Mean Estimates and Pairwise Comparisons

Table J1

Summary of Fit of the Mixed Factorial ANOVA for the Dependent Measure Negative Affect.

Summary of Fit	
Rsquare	0.042
Rsquare Adj.	0.028
Root Mean Square Error	7.23
Mean of Responses	18.51
Observations	2460

Table J2

Model Assessment of the ANOVA for the Dependent Measure Negative Affect

Analysis of Variance	*df*	*SS*	*MS*	*F*	*p*
Model	35	5599.8	159.99	3.06	<0.0001
Error	2424	126754.68	52.29		
C. Total	2459	132354.47			

Table J3

Mean estimates for Negative Affect by Condition

					95% CI	
Condition	*M*	*SD*	*SE*	*df*	*LL*	*UL*
Interpersonal	17.89	6.75	.24	2424	17.41	18.37
Intrapersonal	19.19	7.97	.26	2424	18.68	19.69
Control	18.54	7.26	.26	2424	18.04	19.04

Table J4

Tukey's HSD Pairwise Comparisons of Negative Affect Between Condition

						95% CI	
Factor Pair		Difference	*SE*	*t*	*p*	*LL*	*UL*
Interpersonal	Intrapersonal	-1.29	.36	-3.63	.0008***	-2.13	-.46
Interpersonal	Control	-.64	.35	-1.83	.16	-1.15	.18
Intrapersonal	Control	.65	.36	1.78	.17	-.20	1.50

Note. *p ≤ .05, **p ≤ .01, ***p ≤ .001.

Table J5

Mean Estimates for Negative Affect by Week

					95% CI	
Week	*M*	*SD*	*SE*	*df*	*LL*	*UL*
1	20.15	7.69	.29	2424	19.61	20.76
2	17.96	7.13	.29	2424	17.43	18.58
3	17.99	7.16	.29	2424	17.43	18.57
4	17.95	7.12	.29	2424	17.40	18.54

Table J6

Tukey's HSD Pairwise Comparisons of Negative Affect Between Weeks

Factor Pair		Difference	*SE*	*t*	*p*	95% CI	
						LL	*UL*
Week 1	Week 2	2.18	.41	5.29	<.0001***	1.12	3.24
Week 1	Week 3	2.19	.41	5.30	<.0001***	1.13	3.25
Week 1	Week 4	2.22	.41	5.37	<.0001***	1.16	3.28
Week 2	Week 3	.0053	.41	0.01	1.00	-1.06	1.07
Week 2	Week 4	.034	.41	0.08	1.00	-1.03	1.10
Week 3	Week 4	.029	.41	0.07	1.00	-1.03	1.09

Note. *p ≤ .05, **p ≤ .01, ***p ≤ .001.

Table J7

Mean Estimates for Negative Affect by Day

Day	*M*	*SD*	*SE*	*df*	95% CI	
					LL	*UL*
Tuesday	19.30	7.36	.25	2424	18.82	19.81
Wednesday	18.17	7.15	.25	2424	17.69	18.68
Thursday	18.08	7.44	.25	2424	17.62	18.61

Table J8

Tukey's HSD Pairwise Comparisons of Negative Affect Between Days

Factor Pair		Difference	*SE*	*t*	*p*	95% CI	
						LL	*UL*
Tuesday	Wednesday	1.13	.36	3.15	.0048**	.29	1.96
Tuesday	Thursday	1.20	.36	3.34	.0024**	.36	2.03
Wednesday	Thursday	.07	.36	0.20	.98	-.77	.91

Note. *p ≤ .05, **p ≤ .01, ***p ≤ .001.

Table J9

Mean Estimates for Negative Affect Each Day by Condition

					95% CI	
Day	*M*	*SD*	*SE*	*df*	*LL*	*UL*
			Interpersonal			
Tuesday	18.82	6.87	.42	2424	17.99	19.65
Wednesday	17.63	6.71	.42	2424	16.8	18.46
Thursday	17.23	6.59	.42	2424	16.4	18.06
			Intrapersonal			
Tuesday	19.70	7.76	.45	2424	18.82	20.58
Wednesday	18.68	7.76	.45	2424	17.8	19.56
Thursday	19.18	8.37	.45	2424	18.31	20.06
			Control			
Tuesday	19.42	7.49	.44	2424	18.55	20.28
Wednesday	18.25	6.99	.44	2424	17.39	19.12
Thursday	17.94	7.24	.44	2424	17.08	18.81

Table J10

Tukey's HSD Pairwise Comparisons of Negative Affect Between Days Within Condition

Factor Pair (Within Group)		Difference	*SE*	*t*	*p*	95% CI	
						LL	*UL*
Interpersonal							
Tuesday	Wednesday	1.89	.60	1.99	.55	-.67	3.05
Tuesday	Thursday	1.60	.60	2.67	.16	-.26	3.45
Wednesday	Thursday	.41	.60	.68	1.00	-1.45	2.27
Intrapersonal							
Tuesday	Wednesday	1.02	.63	1.61	.80	-.95	2.99
Tuesday	Thursday	.52	.63	.81	1.00	-1.45	2.48
Wednesday	Thursday	-.51	.63	-.80	1.00	-2.48	1.46
Control							
Tuesday	Wednesday	1.16	.62	1.86	.64	-.78	3.10
Tuesday	Thursday	1.47	.62	2.36	.31	-.47	3.41
Wednesday	Thursday	.31	.62	.50	1.00	-1.63	2.25

Note. *p ≤ .05, **p ≤ .01, ***p ≤ .001.

Table J11

Tukey's HSD Pairwise Comparisons of Negative Affect of Each Day Between Conditions

Factor Pair (Between Group)		Difference	*SE*	*t*	*p*	95% CI	
						LL	*UL*
Tuesday							
Interpersonal	Intrapersonal	-.88	.62	-1.42	.89	-2.79	1.04
Interpersonal	Control	-.60	.61	-.97	.99	-2.50	1.30
Intrapersonal	Control	.28	.63	.45	1.00	-1.67	2.24
Wednesday							
Interpersonal	Intrapersonal	-1.04	.62	-1.69	.75	-2.96	.87
Interpersonal	Control	-.62	.61	-1.01	.98	-2.52	1.28
Intrapersonal	Control	.42	.63	.67	1.00	-1.53	2.38
Thursday							
Interpersonal	Intrapersonal	-1.96	.62	-3.18	.04*	-3.87	-.044
Interpersonal	Control	-.72	.61	-1.17	.96	-2.62	1.18
Intrapersonal	Control	1.24	.63	1.97	.56	-.71	3.19

Note. *p ≤ .05, **p ≤ .01, ***p ≤ .001.

Table J12

Mean Estimates for Negative Affect Each Week by Condition

					95% CI	
Week	*M*	*SD*	*SE*	*df*	*LL*	*UL*
			Interpersonal			
1	19.04	6.92	.49	2424	18.08	20.00
2	16.99	6.27	.49	2424	16.03	17.94
3	17.94	6.91	.49	2424	16.98	18.90
4	17.61	6.75	.49	2424	16.65	18.57
			Intrapersonal			
1	20.55	7.75	.52	2424	19.54	21.57
2	19.03	7.99	.52	2424	18.02	20.05
3	18.69	7.92	.52	2424	17.68	19.71
4	18.47	8.11	.52	2424	17.46	19.49
			Control			
1	20.97	8.30	.51	2424	19.96	21.97
2	18.00	7.03	.51	2424	16.99	19.00
3	17.36	6.61	.51	2424	16.36	18.36
4	17.83	6.46	.51	2424	16.83	18.83

Table J13

Tukey's HSD Pairwise Comparisons of Negative Affect Between Weeks Within Condition

Factor Pair (Within Group)		Difference	*SE*	*t*	*p*	95% CI	
						LL	*UL*
Interpersonal							
Week 1	Week 2	2.05	.69	2.97	.12	-.21	4.32
Week 1	Week 3	1.10	.69	1.59	.91	-1.16	3.36
Week 1	Week 4	1.43	.69	2.07	.64	-.83	3.69
Week 2	Week 3	-.95	.69	-1.38	.97	-3.21	1.31
Week 2	Week 4	-.62	.69	-.90	1.00	-2.88	1.64
Week 3	Week 4	.33	.69	.48	1.00	-1.93	2.59
Intrapersonal							
Week 1	Week 2	1.52	.73	2.08	.64	-.87	3.92
Week 1	Week 3	1.86	.73	2.54	.31	-.53	4.26
Week 1	Week 4	2.08	.73	2.84	.16	-.31	4.48
Week 2	Week 3	.34	.73	.46	1.00	-2.06	2.73
Week 2	Week 4	.56	.73	.76	1.00	-1.84	2.95
Week 3	Week 4	.22	.73	.30	1.00	-2.18	2.62
Control							
Week 1	Week 2	2.97	.72	4.12	.0023**	.61	5.33
Week 1	Week 3	3.60	.72	4.99	<.0001***	1.24	5.96
Week 1	Week 4	3.13	.72	4.35	.0009***	.77	5.49
Week 2	Week 3	.63	.72	.88	1.00	-1.73	2.99
Week 2	Week 4	.16	.72	.23	1.00	-2.20	2.52
Week 3	Week 4	-.47	.72	-.65	1.00	-2.83	1.89

Note. *p ≤ .05, **p ≤ .01, ***p ≤ .001.

Table J14

Tukey's HSD pairwise Comparisons of Negative Affect of Each Week Between Conditions

Factor Pair (Between Group)		Difference	*SE*	*t*	*p*	95% CI	
						LL	*UL*
			Week 1				
Interpersonal	Intrapersonal	-1.51	.71	-2.12	.61	-3.84	.82
Interpersonal	Control	-1.92	.71	-2.72	.21	-4.23	.39
Intrapersonal	Control	-.41	.73	-.57	1.00	-2.79	1.97
			Week 2				
Interpersonal	Intrapersonal	-2.04	.71	-2.87	.15	-4.37	.28
Interpersonal	Control	-1.01	.71	-1.43	.96	-3.32	1.30
Intrapersonal	Control	1.04	.73	1.42	.96	-1.34	3.41
			Week 3				
Interpersonal	Intrapersonal	-.75	.71	-1.06	1.00	-3.08	1.58
Interpersonal	Control	.58	.71	.82	1.00	-1.73	2.89
Intrapersonal	Control	1.33	.73	1.83	.80	-1.05	3.71
			Week 4				
Interpersonal	Intrapersonal	-.86	.71	-1.21	.99	-3.19	1.46
Interpersonal	Control	-.22	.71	-.32	1.00	-2.53	2.09
Intrapersonal	Control	.64	.73	.88	1.00	-1.74	3.02

Note. *p ≤ .05, **p ≤ .01, ***p ≤ .001.