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**Gratitude and Mood: Do We Need to Tailor Gratitude Interventions for
People With High vs. Low Levels of Dysphoria?**

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April 2016

Abstract

Prior research has found that trait gratitude is closely associated with enhanced mental and physical wellbeing. Interventions that seek to increase gratitude, such as daily listing of what one is grateful for, have been shown to decrease depressive symptoms and to increase positive affect as well as life satisfaction. This study sought to examine whether tailoring specific gratitude interventions to people with high vs. low dysphoria, a form of subclinical depression, might produce additional benefits given the unique characteristics of each group. We also tested whether a cognitive or an affective mechanism better explains gratitude's effect on wellbeing. Results showed that participants substantially decreased their depressive symptoms after any of three different gratitude interventions. However, the three interventions did not differ from one another in enhancing wellbeing, and we were unable to test whether the affective or cognitive mechanism underlies the salubrious effect of grateful processing. We concluded that gratitude interventions work regardless of whether they involve processing of positive or negative content. We recommend future research examine the possibility of combining different gratitude interventions and the efficacy of such intervention as a pre-treatment solution for people who are waiting for professional help.

Key words: gratitude interventions, wellbeing, person-fit, dysphoria, cognitive-affective

Introduction

Positive psychology aims to promote well-being and optimal functioning beyond just the alleviation of suffering (Lee Duckworth, Steen, & Seligman, 2005). According to Sin and Lyubomirsky (2009), “psychological well-being (WB) is not only the absence of mental disorder but also the presence of positive psychological resources such as hedonic well-being (e.g., positive affect, life satisfaction, happiness; Diener, 1984) and eudaimonic well-being (e.g., self-acceptance, positive relations, autonomy, purpose in life; Ryan & Deci, 2001; Ryff, 1989).”

One well-documented approach to boosting wellbeing is through gratitude interventions. Considerable research supports the efficacy of these interventions in the general population (Wood, Froh, & Geraghty, 2010). More recently, positive psychologists have studied the use of gratitude intervention in clinical populations such as patients with neuromuscular disease and those with a high level of depressive symptoms (Emmons & Cullough, 2003). Many studies have also pointed out the importance of interventions that fit individuals’ characteristics and interests in order to maximize their effect on wellbeing (Fordyce, 1977, 1983; Diener & Fujita, 1995; Sheldon & Elliot; 1999; Sheldon & Lyubomirsky, 2006). People with and without clinically depressive symptoms have unique characteristics, and tailoring specific gratitude interventions to each group may produce greater improvements in wellbeing. This study thus sought to examine whether the effect of different gratitude interventions on wellbeing would vary among college students with or without dysphoria – a subclinical form of depression.

1. Definition of gratitude

The field of gratitude research has yet to agree on a definition of gratitude. Some researchers define gratitude as an emotion following an appreciation for other people’s helpful actions (McCullough, Kilpatrick, Emmons, & Larson, 2001). Yet, people’s sources of gratitude are not restricted to interpersonal thankfulness but also extend to appreciation of various things

in life (Weiner, Russell, & Lerman, 1979; Veisson, 1999). Gratitude can be measured both as a momentary state and as a stable life orientation - or trait gratitude. Researchers have conceptualized trait gratitude as a consistent tendency towards noticing and appreciating positive things in the world (Wood, Maltby, Stewart, & Joseph, 2008). Three scales that measure gratitude are the unifactorial GQ-6 (McCullough, Emmons, & Tsang, 2002), the multifactorial Gratitude, Resentment, and Appreciation Test (GRAT: Watkins, Woodward, Stone, & Kolts, 2003), and the multifactorial Appreciation Scale (Adler & Fagley, 2005). These scales measure eight facets of gratitude including individual differences in grateful affect, appreciation of other people, focus on what one has, feelings of awe when encountering beauty, expressions of gratitude through behaviors, focus on the positive of the present, appreciation that life is short, and positive social comparisons (i.e., appreciation of how life could be worse). Individuals who experience these eight aspects of gratitude in a frequent and strong manner are considered to have a life orientation of gratitude (McCullough, Emmons, & Tsang, 2002).

2. Trait gratitude and wellbeing

A life orientation of gratitude has been shown to correlate with many personality traits that predict wellbeing as well as associate with various aspects of hedonic and eudaimonic wellbeing. Among the Big Five personality traits, trait gratitude has a positive association with agreeableness, conscientiousness and extraversion, and a negative correlation with neuroticism (McCullough, Emmons, & Tsang, 2002) - traits found to predict subjective wellbeing (Hayes & Joseph, 2003). Froh, Yurkewicz and Kashdan (2009) showed that gratitude was related to feeling pride, hope, inspired, forgiveness, and excited. Gratitude's relationship to happiness, hope, pride, optimism, positive mood, self-actualization, smooth interpersonal relationships, and a sense of community was manifested in a study by Emmons and Shelton (2002). In addition, trait gratitude

is also linked with better sleep in terms of subjective sleep quality, sleep duration, sleep latency, and daytime dysfunction (Wood, Joseph, Lloyd, & Atkins, 2009). Among heart failure patients, gratitude shows a relationship with better sleep and self-efficacy to maintain cardiac function, as well as less depressed mood, less fatigue and lower levels of inflammatory biomarkers (Mills et al., 2015).

Dispositional gratitude has also been linked to lower stress and depression (Wood, Maltby, Gillett, Linley, & Joseph, 2008; Lambert, Fincham, & Stillman, 2012). In a longitudinal study, religiously oriented “thankfulness” predicted significantly lower risk of depression, generalized anxiety disorder, phobia, and substance abuse (Kendler et al., 2003). Compared to veterans without posttraumatic stress disorder (PTSD), Vietnam war veterans with PTSD had significantly lower dispositional gratitude (Kashdan, Uswatte, & Julian, 2006). Israel-Cohen, Uzefovsky, Kashy-Rosenbaum and Kaplan (2015) found that life satisfaction and negative affect (but not positive affect) mediated the relationship between gratitude and PTSD among Israeli adolescents who were exposed to missile attacks. Israel-Cohen and colleagues thus suggested that gratitude buffers against PTSD symptoms through a cognitive appraisal mechanism.

Psychological wellbeing is also about promoting both hedonic and eudaimonic flourishing. Hedonic wellbeing refers to positive affect, pleasure and avoidance of negative emotions while eudaimonic wellbeing is conceptualized in terms of meaning and self-actualization (Ryan & Deci, 2001). Froh, Yurkewicz and Kashdan (2009) demonstrated the link between trait gratitude and hedonic wellbeing: adolescents who experience more grateful feelings on a daily basis reported greater positive affect, life satisfaction, optimism, and prosocial behavior. Chen and Kee (2008) also found that gratitude positively predicted life satisfaction and negatively predicted athlete burnout. Trait gratitude was correlated with forgiveness and

subjective wellbeing (or hedonic wellbeing) in a study by Chan (2013). Not only associated with the meaningful-life orientation (Chan, 2013), gratitude is also linked to other aspects of eudaimonic well-being including autonomy, environmental mastery, personal growth, positive relationships, purpose in life, and self-acceptance (Wood, Joseph, & Maltby, 2009). It is strongly related to a sense of coherence - the set of beliefs that life is manageable, meaningful, and comprehensible and that acts as individuals' coping resources in stressful situations (Lambert, Graham, Fincham, & Stillman, 2009). Among college students, gratitude is related to growth-focus, adaptive approach-oriented coping, integration, commitment, persistence, and success in school (Mofidi, El-Alayli, & Brown, 2014). Among Filipino students, gratitude was the strongest determinant of well being after controlling for demographic characteristics (Datu, 2014). In a group of breast cancer patients, gratitude was strongly associated with post-traumatic growth, reduced distress and increased positive emotions. Interestingly, it was not related to eudaimonic well-being (Ruini & Vescovelli, 2013). In summary, although trait gratitude is strongly and closely associated with both hedonic and eudaimonic wellbeing, gratitude might be more correlated to certain aspects of these multifaceted wellbeing constructs.

3. Gratitude interventions

Given the evidence of a strong link between trait gratitude and positive wellbeing, daily gratitude - a momentary state of gratitude - may also have salubrious effects on people's wellbeing. Researchers have thus designed interventions that seek to enhance wellbeing by cultivating daily gratitude including grateful counting (listing several things one is grateful for), grateful contemplation, and writing (and delivering) a letter of gratitude. Geraghty, Wood and Hyland (2010a) showed that a gratitude listing intervention was equally effective in reducing body dissatisfaction as monitoring and restructuring - a cognitive behavior therapy that corrects

negative perceptions about one's physical appearance. Moreover, participants in the gratitude group were twice as likely to stay in the intervention than the monitoring and restructuring group (Geraghty, Wood, & Hyland, 2010a). Compared to cognitive behavior therapy, a gratitude intervention was similarly successful in reducing worry with a better retention rate (Geraghty, Wood, & Hyland, 2010b). A four-week gratitude contemplation intervention by Rash, Matsuba and Prkachin (2011) led to higher life satisfaction and self-esteem compared to a memorable events control condition. In another experiment, a four-week counting-your-blessings intervention reduced negative affect but did not increase positive affect (Sheldon & Lyubomirsky, 2006). Healthcare practitioners who took part in a gratitude intervention twice a week for four weeks showed a decline in stress and depressive symptoms over time; the effect was maintained even at a three-month follow-up (Cheng, Tsui, & Lam, 2015). When instructed to write letters of gratitude for a three-week period, participants showed increased happiness and life satisfaction and decreased depressive symptoms (Toepfer, Cichy, & Peters, 2012). Similarly, those who spent one week writing and delivering a letter of gratitude in person experienced greater happiness and fewer depressive symptoms at one-week and one-month follow-up in a study by Seligman, Steen, Park, and Peterson (2005). O'Leary and Dockray (2015) also reported that a grateful diary activity four times a week for three weeks reduced stress and depression and increased happiness. In short, various gratitude interventions, particularly grateful counting (also known as grateful listing or counting-your-blessings), have been shown to enhance well-being with increases in positive affect, life satisfaction, sleep quality and positive expectations for the future, as well as decreases in negative affect, depression, and physical symptoms (Emmons & McCullough, 2003; Watkins, Uher, & Pichinevskiy, 2015; Sheldon & Lyubomirsky, 2006; Froh et al., 2008).

Although many studies have shown the enhanced effect of gratitude interventions on wellbeing, most lack a good neutral control condition. Critics argue that gratitude interventions are only effective compared to control conditions that actually decrease wellbeing (e.g., listing five hassles, listing things one wanted to do over the summer but was unable to do). In addition, failure to control for expectancy effects (e.g., control participants were only asked to fill out surveys without performing the writing activity) compromises conclusions about the effectiveness of gratitude interventions. A recent study on gratitude used better control groups and still found a significant effect of gratitude interventions on wellbeing (Watkins, Uher, & Pichinevskiy, 2015). A one-week gratitude activity (listing three good things from the previous 48 hours for which one is grateful) produced greater improvement in subjective well-being than a comparable pride activity (listing three things that went well from the previous 48 hours and writing about how this made one feel one is better than most others) or a memory placebo group (describing a personal memory like one's typical route to campus). Notably, all groups were told that they were participating in a study designed to improve their happiness, thus keeping the placebo effect constant across. Because the gratitude intervention significantly outperformed the pride intervention, grateful processing appears to enhance wellbeing through a mechanism better than mere activation of positive memories or expectancy effects. The following section explores in greater detail the possible mechanisms through which gratitude improves subjective wellbeing.

4. Gratitude enhances wellbeing by improving accessibility and enjoyment of positive memories

Positive memory recollection is beneficial for subjective wellbeing.

Positive memories have been shown to improve mood (Josephson, Singer, & Salovey, 1996; Rusting & DeHart, 2000). A number of studies have found that recalling positive past events is an effective positive mood induction procedure (Baker & Guttfreund, 1993; Joorman and Siemer, 2004; Jallais & Gilet, 2010).

Positive recollections of past memories induce frequent positive affect, which was found to counteract and “undo” the effect of unpleasant emotions (Fredrickson, Mancuso, Branigan, & Tugade, 2000). A number of studies have found that happy people have a positive memory bias in a life event recall task (that is, people tended to recall more positive memories than negative memories) (Seidlitz, & Diener, 1993; Watkins, Grimm, Whitney, & Brown, 2005). Although the actual incidences of positive and negative life events are difficult to control, compared to their unhappy counterparts, positive memory bias among happy people appears to be mostly due to a cognitive bias. Specifically, Lyubomirsky and Tucker (1998) showed that happy people construe life events in a more positive way than unhappy people.

Gratitude promotes the accessibility of positive memories.

Positive memories tend to come easily to mind for people high in trait gratitude. Watkins, Grimm, and Kolts (2004) asked participants to recall positive and negative life events separately for two minutes each. People with trait gratitude showed an *intentional* positive memory bias in which they recalled more positive memories than their counterparts when they actively tried to retrieve positive past events.

Trait gratitude has also been found to be associated with a *positive intrusive memory bias* (Watkins, Grimm, & Kolts, 2004; Watkins, Cruz, Holben, & Kolts, 2008). Even when participants were asked to recall negative events, positive memories were more likely to intrude into the minds of individuals with high trait gratitude. In addition, trait gratitude is also positively

associated with *involuntary positive memory bias*. When participants were presented with different valenced stimuli (pictures, odors, and music), positive memories spontaneously came to mind more frequently for dispositionally grateful people, even in the absence of explicit instructions to recall positive memories in their past (Watkins, Grimm, Whitney, & Brown, 2005).

Emmons (2008) showed that gratitude is associated with activation in the limbic-prefrontal networks, which play an important role in encoding positive events and retrieving positive memories. Thus, gratitude involves a cognitive elaboration process that enhances the encoding of positive events in one's memory and facilitates their retrievability. Over time, gratitude helps build a rich network of positive memories, conditions a positive memory bias and as a result enhances one's psychological wellbeing.

Gratitude and the Fading Affect Bias

Trait gratitude has also been linked to the *Fading Affect Bias*. Fading Affect Bias is a phenomenon in which emotional intensity fades over time for both positive and negative memories but declines more strongly with negative memories (Walker, Vogl, & Thompson, 1997; Ritchie, Skowronski, Hartnett, Wells, & Walker, 2009; Walker, Skowronski, & Thompson, 2003). Watkins et al. (2004) asked participants to rate the emotional impact of life events when they had originally occurred ("then" rating) and their impact in the present ("now" rating). Grateful and less grateful individuals did not differ in their "then" emotional ratings of positive and negative events. However, participants high in trait gratitude rated the "now" emotional impact of both positive and negative memories more positively than those low in trait gratitude. These findings suggest that gratitude enhances the enjoyment of positive memories and facilitates the Fading Affect Bias for negative memories (Watkins, Grimm, & Kolts, 2004).

Negative memories and grateful processing

Grateful processing of negative memories might not only reduce the unpleasant effects of these memories but might also create meanings in one's life story and thus enhance eudaimonic wellbeing. In a study by Watkins, Cruz, Holben, and Kolts (2008), people experienced more closure and less negative emotional impact of an open, unpleasant memory when asked to write about its positive consequences for which they could be grateful. They also reported less intrusion of these open memories during a three-minute recall task of positive events from the past. Interestingly, the effect of grateful processing on closure and emotional impact was more pronounced at follow-up than immediately after the intervention.

According to McAdams, Reynolds, Lewis, Patten, and Bowman (2001), transforming bad events into good events is more closely associated with one's happiness than the mere presence of positive events. Seeking positive aspects of a difficult event creates meaning in one's life story. Because we often want to have a good life story with meaningful plot and positive purposes, an unpleasant event often does not meaningfully cohere with our life story and therefore continues to intrude into our consciousness. By gratefully processing positive consequences of a troubling event, one's memory might be changed to allow the negative memory to fit coherently and meaningfully into one's life story. As a result, the grateful processing leads to closure and reduces the intrusiveness of the memory. Thus, grateful processing of negative past events can increase one's subjective well-being by reducing the negative emotional impact related to the unfinished agenda, generating meaning and reducing the intrusiveness of the unpleasant memory.

Since grateful processing enables accessibility of positive memories and reduces the intrusiveness of unpleasant memories, grateful people might be more likely to have positive

thoughts before falling asleep and better sleep quality due to reduced intrusiveness of open negative events. Indeed, high trait gratitude predicted greater subjective sleep quality and sleep duration because grateful people are less likely to have negative and worrying thoughts while they are more likely to have positive thoughts before falling asleep (Wood, Joseph, Lloyd, & Atkins (2009). Similarly, in a 21-day prospective study, Emmons and McCullough (2003) found that when people with neuromuscular disease were asked to think back over the past week and list up to five things they were grateful for, they reported more hours of sleep and felt more refreshed upon waking up. Thus, grateful processing of negative memories could be beneficial to one's wellbeing by decreasing the emotional intensity related to the memories and thus their intrusiveness, generating meanings in one's life and improving sleep quality via facilitating positive thoughts before sleep.

4. Gratitude interventions and dysphoria

As an outgrowth of the positive psychology movement, gratitude interventions have typically been used to enhance wellbeing in the general population. Positive psychotherapies have attempted to adapt positive psychology interventions for use in clinical populations, mostly with those who experience dysphoria - a less severe, subclinical form of depression (Ramponi, Murphy, Calder, & Barnard, 2010), with some success. Yet, questions remain regarding the relative importance of negative and positive memories in applying gratitude interventions to dysphoric individuals. Classic gratitude interventions typically focus on positive experiences only. However, it is possible that grateful processing of negative materials will enhance wellbeing among dysphoric individuals better than grateful processing of positive events. In the next sections, I will explain the logic behind this seeming paradox.

Dysphoria and depression

People with dysphoria often show a negative memory bias - a tendency to easily recall and have negative memories intrude into one's mind (Mathews, & MacLeod, 2005). In nondysphoric people, the emotional intensity of pleasant events fades more slowly than unpleasant events (Ritchie et al., 2009). However, the Fading Affect Bias appears to be disrupted in dysphoric individuals; the emotional intensity of their negative and positive memories fades at the same rate (Walker, Skowronski, Gibbons, et al., 2003; Watkins et al., 2005). This feeds into the general negative worldview associated with dysphoria.

Depression is linked to the recall of overgeneral memories - a process in which individuals tend to recall very generic memories despite instructions to recall specific events (Williams et al., 2007). Overgeneral memory could be explained by individuals' attempts to block access to details of distressing memories to reduce their negative emotional impact (Williams, 1996). Overgeneral memory is associated with longer duration of depressive episodes and delayed recovery (Gotlib & Joorman, 2010). According to Brittlebank, Scott, Williams, and Ferrier (1993), overgeneral recall of autobiographical memories, particularly for positive memories, predicted lower complete recovery rates from major depression at a seven-month follow-up.

Rumination has also been consistently observed in depression and defined as a form of maladaptive self-focus that involves repetitive and passive focus on causes and consequences of distress without an active problem solving approach (Mor & Winquist, 2002; Nolen-Hoeksema Wisco, & Lyubomirsky, 2008). Rumination often occurs because individuals have unfinished agendas associated with the issues they are rehearsing in their mind. Rumination might deplete the cognitive resources needed to attend to positive information, thus making it hard for people with dysphoria to register positively valenced information (Gotlib et al., 2010).

In summary, people with depression (and dysphoria) show a tendency for a negative memory bias, a disrupted Fading Affect Bias, overgeneral memory and rumination. They might have less positive interpretations of life events to begin with and thus fail to encode positive materials in their memories. People with depression might have difficulty disengaging from negative materials because they lack a strong network of positive materials. Excessive preoccupation with negative materials further prevents them from attending to and enjoying positive events, thus creating a feedback loop that maintains a depressed state.

Modifying classic gratitude intervention for people with dysphoria

In the classic gratitude intervention, people are often asked to list up to three or five things for which they are grateful. However, such attempts to build a positive memory network might not be sufficient to improve depressed persons' wellbeing unless their preoccupation with negative past events is also addressed. Since grateful processing of unpleasant events was shown to facilitate the closure of unpleasant events, reduce rumination and have a positive impact on the Fading Affect Bias, grateful processing of negative memories might enhance wellbeing among dysphoric individuals more effectively than grateful processing of positive events. Grateful processing of unpleasant events as a tailored gratitude intervention might clear some cognitive space for people with depression to be able to pay attention to and enjoy positive stimuli. This method thus can help address the disrupted Fading Affect Bias, improve the encoding of positive events and thus decrease the problem of overgeneral memory and negative memory bias among dysphoric individuals.

In addition, grateful processing of unpleasant events might also have a positive impact on the psychological wellbeing of people with low dysphoria. Because transforming negative events into positivity predicts happiness more than the mere presence of positive events (McAdams et

al., 2001), grateful processing of unpleasant events might help individuals gradually develop a cognitive bias for positive appraisal (even in times of negative events) and generate new meanings in their everyday lives. Consequently, their eudaimonic wellbeing would improve.

Current study

In the present study, participants were randomly assigned to one of the three conditions: *gratitude-positive memory* condition (processing only past positive events), *gratitude-redemptive negative memory* condition (reframing past negative events in terms of their positive elements) or a *classic gratitude* condition (listing one thing for which the individual is grateful). The study used a mixed model 3 (gratitude condition) x 2 (dysphoria level) x 2 (time: pre/post) design. Some elements of this research were derived from a study by Watkins et al. (2007). However, while Watkins and colleagues asked participants to recall an open negative memory only once to examine the emotional closure and intrusion of the past event, the current study involved a daily diary and specifically examined wellbeing. In addition, Watkins' study did not compare wellbeing among people with low vs. high dysphoria.

Hypotheses

In this study, improvement in wellbeing was assessed by decreases in depressive symptoms and increases in hedonic and eudaimonic wellbeing. Because we expected increased wellbeing to occur alongside decreases in depressive symptoms, the hypotheses below are stated only in terms of wellbeing.

We expected a main effect for time of assessment in which overall post-test happiness scores would be higher than pre-test happiness scores across conditions; this would indicate that all three conditions worked to improve wellbeing.

We hypothesized that there would be a main effect for condition. If grateful processing matters regardless of the valence of the grateful events, there would be no main effect of condition; the three conditions would result in the same increase in happiness. However, if the valence of the events plays a role, levels of happiness will differ among the three conditions: If positive valence of gratitude is more beneficial than negative valence, participants in the gratitude-positive memory would show the highest boost in happiness, followed by the classic gratitude group, and then the gratitude-negative memory group. In the gratitude-positive memory group, participants might be likely to recall memories that contain strong, unforgettable positive valence. Although participants in the classic gratitude condition might experience pleasant feelings by being more aware of blessings in their lives, these emotions might not be as strong as the positive emotions evoked by recalling past happy memories. Therefore, if valence is what matters the most, the gratitude-positive memory condition should outperform the classic gratitude group in terms of increased happiness.

In contrast, if cognitions – that is, transforming negativity into positivity – improves happiness more than the mere presence of positive valence, participants in the gratitude-negative memory will show the highest increments in happiness. This condition involved the most cognitive work because participants were asked to detect positivity in a negative past event, which in turn could potentially help them start to view daily negative events in the present with a more positive outlook. Participants in the classic gratitude condition might report higher increased happiness relative to those in the gratitude-positive memory group because the classic gratitude condition might cognitively train people to look for blessings in their lives, whereas the gratitude-positive memory mostly involved the presence of positive emotions only.

We anticipated an interaction between condition and level of dysphoria. The theory of cognition might apply better to people with high dysphoria; they would show the highest boost in happiness in the gratitude-negative memory condition, a smaller boost in the classic gratitude condition and the least increase in the gratitude-positive memory condition. Past research has shown that dysphoric people are likely to ruminate and have easy access to negative materials while having difficulty recalling positive memories. Therefore, grateful processing of negative memories might enhance wellbeing among dysphoric individuals by facilitating emotional closure and reducing intrusiveness of the negative memories, which would consequently decrease rumination. Difficulty in accessing positive memories is likely to produce the least increase in happiness among people with dysphoria in the gratitude-positive memory condition because they do not have as plentiful sources of positive memories or strong positive emotions attached to those memories.

In contrast to people with high dysphoria, we predicted that the emotional valence would matter more for people with low dysphoria and thus we anticipated that they would fare best in the gratitude-positive memory condition, followed by the classic gratitude and finally gratitude-negative memory condition.

An interaction between level of dysphoria and time of assessment was conjectured. Past research showed that gratitude was more effective among those with low positive affect (Harbaugh & Vasey, 2014). As a result, participants with high dysphoria might show a higher increase in happiness compared to those with low dysphoria, regardless of condition.

Method

Design

A 3x2x2 mixed factorial design was utilized in which dysphoria (high dysphoria vs. low dysphoria) and intervention condition (gratitude-positive memory, gratitude-redemptive negative memory and classic gratitude) were between-subjects variables, and time of assessment (pre vs. post) was a within-subjects variable. Participants' dysphoria level was measured by the Center for Epidemiological Studies Depression (CESD) scale (life-time version). Participants were randomly assigned to intervention condition. The CESD scale (one-week version), the Warwick-Edinburgh Mental Well-being scale and a brief version of Ryff's wellbeing test were administered pre- and post- intervention as dependent measures.

Participants

For the pilot study, five Intro to Psychology students (three males, two females, aged 18-25) participated in exchange for course credit. For the main study, 146 people participated including 23 males and 115 females (aged 18-25). However, only 90 participants who met the requirement of completing at least five diaries and both pre- and post- surveys were included. Subjects were recruited online and participation was voluntary. Participants in the main study were informed that they would be eligible to enter a lottery to win Amazon gift cards, including one \$50 prize, two \$25 prizes and five \$10 prizes.

Materials

Center for Epidemiologic Studies Depression (CESD). This 20-item scale, developed by the Center for Epidemiologic Studies (Radloff, 1977), is commonly used for depression screening. The scale has been found reliable (Cronbach's alpha $>.85$) in previous research (Hann, Winter, & Jacobsen, 1999). Participants were asked about experiences related to depression by

checking the appropriate box (Rarely or none of the time; Some or a little of the time; Occasionally or a moderate amount of time; All of the time). Example items include “I felt that people disliked me” and “I felt that I could not shake off the blues even with help from my family”. The time frame of the pre-test CESD was changed from “past week” to how people feel “in general” in order to assess trait dysphoria in participants (see Appendix). The pre-test CESD was used to place participants into the two dysphoria groups, and the post-test CESD assessed depressive symptoms after one week of gratitude intervention. Analyses were adapted in recognition that versions of the CESD were used as both a grouping variable (trait form) and a dependent variable (past-week form). Both pretest and posttest CESD measures yielded good reliability (Cronbach alpha = 0.91 at both pretest and posttest).

The Gratitude Questionnaire-Six Item Form (GQ-6). This scale measures trait gratitude on a 7-point Likert scale (1 = *Strongly Disagree*, 7 = *Strongly Agree*) with items such as “I have so much in life to be thankful for”, and “If I had to list everything that I felt grateful for, it would be a very long list” (see Appendix). The GQ-6 has good internal reliability with Cronbach’s alpha between .82 and .87 (McCullough, Emmons, & Tsang, 2002). We included this measure to ensure that trait gratitude would not be a cofounder in the results since past studies showed that gratitude interventions were most effective among those with low trait gratitude (Rash, Matsuba, & Prkachin, 2011). The GQ-6 measure in our study yielded a Cronbach alpha of 0.77.

The Warwick-Edinburgh Mental Well-being Scale (WEMWB). This scale addresses both hedonic (positive affect) and eudaimonic (meaning and self-actualization) aspects of wellbeing and focuses only on positive aspects of mental health. It consists of 14 positively worded items on a five-response rating scale (see Appendix). The scale has shown good

reliability with both student groups (Cronbach's alpha = 0.89) and in the general population (Cronbach's alpha = .91). The WEMWB is significantly correlated with the Positive and Negative Affect Scale, Ryff Scales of Psychological Well-being, Short Depression Happiness Scale, WHO-5 Wellbeing Index, Satisfaction with Life Scale, and Global Life Satisfaction scale (Tennant et al., 2007). The scale also shows good face validity, content validity, construct validity and less social desirability bias than other comparable scales (Tennant et al., 2007). The Warwick-Edinburgh scale yielded excellent reliability with a Cronbach alpha of 0.92 at both pretest and posttest.

Carol Ryff's psychological well-being scale. This measure has good validity and reliability with Cronbach's alpha ranging from 0.87 to 0.96 and test-retest reliability coefficients ranging from 0.78 to 0.97 for six subscales (Akin, 2008). We selected seven items from this scale that assess environmental mastery, purpose in life, personal growth, and self-acceptance. We picked these specific items because they address eudaimonic wellbeing in a state (rather than trait) way. The reliability of this shorter version of Ryff psychological wellbeing scale was acceptable (Cronbach alpha=0.77 at both pretest and posttest).

Daily diary entries:

Gratitude-Positive memory. This group was asked to recall one positive memory they felt grateful for. Participants were encouraged to recall a different positive memory each day. The specific instructions for this group were:

“Sometimes there are good things in life that we might have taken for granted and failed to appreciate. Even a small, simple thing could be a blessing.

Imagine you are a treasure hunter. Each blessing in life is a pearl that wants to be discovered. However, some blessings might be disguised because they are so simple and almost invisible. If we do not look closely, we might fail to notice these “blessed pearls”.

If you can redeem one blessed pearl in the past to put it into your treasure box today, what is one positive event in the past that you feel grateful for? Please reflect on it by writing in the box below.”

Gratitude-Redemptive Negative memory. This group was asked to recall one negative memory that had unforeseen positive consequences that now they can feel grateful for. Participants were encouraged to recall a different memory each day. Some of the instructions for this group were built on an intervention called “One door closes, another door opens” (Rashid & Anjum, 2008; Gander, Proyer, Ruch, & Wyss, 2013). The specific instructions for this group were:

“Sometimes there are good things in life that we might have taken for granted and failed to appreciate. Even a small, simple thing could be a blessing. Imagine you are a treasure hunter. Each blessing in life is a pearl that wants to be discovered. However, some blessings might be disguised because they are so simple and almost invisible. If we do not look closely, we might fail to notice these “blessed pearls”.

For instance, now and then, one door must close for a bigger door to open. When something bad happens, we generally wish it didn’t, but sometimes, even negative events can lead to unexpected positive consequences.

Suppose you could turn a past event into one blessed pearl today. What is a negative event in the past that ended up having some positive consequences for which you are now

grateful? Might you have experienced personal growth, wisdom, insight, faith or compassion as a result of this event? Please reflect on the event by writing in the box below.”

Classic gratitude. This group was asked to list one thing every day they were grateful for. Participants were encouraged to list a different thing each day. The specific instructions for this group were:

“Sometimes there are good things in life that we might have taken for granted and failed to appreciate. Even a small, simple thing could be a blessing.

Imagine you are a treasure hunter. Each blessing in life is a pearl that wants to be discovered. However, some blessings might be disguised because they are so simple and almost invisible. If we do not look closely, we might fail to notice these “blessed pearls”.

Take one moment to look back on your day. What is one thing or event you notice that you can feel grateful for? What is one “blessed pearl” you can discover today? Please reflect on it by writing in the box below.”

Procedure

Participants first filled out demographic information (see Appendix) and a series of surveys including the CESD (lifetime version), the Warwick-Edinburgh Mental Well-being Scale, GQ-6 trait gratitude measure and the shortened version of Ryff’s psychological wellbeing scale. Participants began their seven daily diaries on the first Sunday after they completed their baseline assessment. Qualtrics sent reminders to participants every day. Each daily diary entry included writing about one event in the present (classic gratitude) or one event in the past (gratitude-negative memory and gratitude-positive memory), followed by a mood rating (see Appendix). After the 7-day diary period, participants filled out the CESD (past week version), Warwick-Edinburgh Mental Well-being Scale and Ryff scale and rated how much they enjoyed

the journal activity on a 9-point Likert scale (1 = *I disliked them very much*, 9 = *I enjoyed them very much*). This rating helped to factor into consideration whether enjoying the daily diary is necessary for participants to benefit from the intervention. Finally, they were presented with the debriefing form and thanked for their participation. Each Intro to Psychology student was given course credit for finishing the 7-day daily diary. For the main study, participants were informed that they would be eligible to enter a lottery to win Amazon gift cards: one \$50 prize, two \$25 prizes and five \$10 prizes. Participants earned one lottery ticket for doing baseline testing, one for each day they completed the journal, one for completing the final assessment and five bonus tickets for completing at least five of the seven days as well as pre-and post- measures.

Participants were contacted via email about their lottery results.

One single rater was blinded to participants' conditions and scored each participant on how well he or she adhered to the instructions. Ratings of adherence included 0 = not adherent, 1 = barely adherent, 2 = mostly adherent, 3 = always adherent.

Results

First, we conducted a number of analyses to make sure that the design of our study was free from major confounds. There were no differences between the three conditions in pretest CESD scores, $F(2, 87) = 0.13, n.s.$, pretest Warwick-Edinburgh scores, $F(2, 87) = 0.32, n.s.$, or pretest Ryff scores, $F(2, 87) = 0.49, n.s.$ To determine whether participants were equally likely to persevere with all three gratitude conditions, we conducted a chi-square test. No relationship was found between attrition rates and condition, $X^2(2, N = 110) = 2.67, n.s.$, indicating that attrition was even across conditions. We also used a chi-square test to determine whether people high or low in dysphoria were more likely to drop out of the study, and this, too was not significant, indicating even attrition across dysphoria level, $X^2(1, N = 110) = 1.49, n.s.$ To examine whether

participants were equally likely to adhere to instructions in the three gratitude conditions, we conducted a one-way ANOVA statistical test with condition (classic, positive memory, negative-redemptive memory) as the independent variable and ratings of adherence (0 = *not adherent*; 1 = *barely adherent*, 2 = *mostly adherent*, 3 = *always adherent*) as the dependent variable.

Participants in the negative-redemptive condition ($M = 1.58$, $SD = 0.89$) were less likely to comply with instructions than the classic gratitude ($M = 2.1$, $SD = 0.73$) and positive memory conditions ($M = 2.1$, $SD = 0.87$), $F(2, 103) = 4.48$, $p = .014$, $\eta^2 = 0.08$. Overall, there was reasonably good adherence to the conditions although there was only one rater who evaluated adherence.

We included a one-way ANOVA analysis with condition (classic, positive memory, negative-redemptive memory) as the independent variable and trait gratitude (low and high) as the dependent variable. This analysis indicated that level of trait gratitude did not differ among classic ($M = 1.45$, $SD = 0.08$), positive-memory ($M = 1.57$, $SD = 0.08$) and negative-redemptive memory condition ($M = 1.57$, $SD = 0.08$), $F(2, 84) = 0.77$, *n.s.* To confirm past research showing a connection between dysphoria and trait gratitude, we ran a one-way ANOVA with dysphoria level (low and high) as the independent variable and trait gratitude (low and high) as the dependent variable. Those with low dysphoria ($M = 1.79$, $SD = 0.07$) reported higher level of trait gratitude than those with high dysphoria ($M = 1.27$, $SD = 0.06$). There was also a positive correlation between trait gratitude and positive emotions in response to the gratitude exercises, $r = 0.39$, $n = 90$, $p < .001$. Trait gratitude had a significant negative correlation with mean ratings of negative emotions, $r = -0.21$, $n = 90$, $p = .05$. In other words, people high in trait gratitude had more positive and less negative emotions in response to the gratitude exercises.

To test our hypothesis that specific types of gratitude intervention would improve wellbeing for people with high and low dysphoria, we conducted 3x2x2 mixed model ANOVA analyses with time (pre- and post- intervention) as a within-subjects factor; dysphoria level (low and high) and condition (classic, positive, negative) were between-subjects factors. We conducted each analysis separately for CESD, Warwick and Ryff scores.

Depressive symptoms

We conducted 3x2x2 mixed model ANOVA analyses with time (pre- and post-intervention) as a within-subjects factor; dysphoria level (low and high) and condition (classic, positive, negative) were between-subjects factors. The analysis on CESD scores indicated that there was a main effect of time (pre- and post-) on participants' CESD scores, $F(1, 84) = 46.38, p < .001, \eta^2 = 0.36$. Compared to pre-intervention ($M = 21.3, SD = 0.65$), depressive symptoms were significantly reduced at post-intervention across all conditions ($M = 15.97, SD = 0.88$). The main effect of time of assessment was qualified by an interaction between time of assessment and level of dysphoria, $F(1, 84) = 11.58, p = .001$. As displayed in Table 1 and Figure 1, depression scores dropped for both low and high dysphoria participants, but they dropped more dramatically for those with high dysphoria. We did not find a main effect of condition on depression scores, $F(2,84) = 0.46, n.s.$ On average, classic ($M = 18.11, SD = 1.15$), positive-memory ($M = 19.53, SD = 1.15$) and negative-redemptive ($M = 18.27, SD = 1.17$) conditions reported similar levels of depression scores. The two-way interaction effects between time of assessment and condition, $F(2, 84) = 0.65, n.s.$, and dysphoria level and condition, $F(2, 84) = 0.58, n.s.$, as well as the 3-way interaction among time of assessment, dysphoria level and condition, $F(2, 84) = 0.47, n.s.$, were not significant.

Table 1. *Depressive symptoms at different time of assessments among different conditions*

Condition	Time of assessment	Mean	Std. Error
Classic	Pre-intervention	21.397	1.118
	Post-intervention	14.813	1.515
Negative	Pre-intervention	20.569	1.138
	Post-intervention	15.972	1.542
Positive	Pre-intervention	21.933	1.115
	Post-intervention	17.133	1.511

Note. $N = 90$.

Table 2. *Depressive symptoms pre- and post-intervention among people with low vs. high dysphoria*

Dysphoria Level	Time of Assessment	Mean	Std. Error
Low	Pre-intervention	12.785	.939
	Post-intervention	10.119	1.272
High	Pre-intervention	29.815	.896
	Post-intervention	21.826	1.214

Note. $N = 90$.

Table 3. *Depressive symptoms pre- and post-intervention among people with low vs. high dysphoria in different conditions.*

Dysphoria Level	Condition	Time of Assessment	Mean	Std. Error
Low	Classic	Pre-intervention	11.938	1.527
		Post-intervention	8.125	2.069
	Negative	Pre-intervention	13.417	1.764
		Post-intervention	10.500	2.389
	Positive	Pre-intervention	13	1.577
		Post-intervention	11.733	2.137
High	Classic	Pre-intervention	30.857	1.633
		Post-intervention	21.5	2.212
	Negative	Pre-intervention	27.722	1.44
		Post-intervention	21.444	1.951
	Positive	Pre-intervention	30.867	1.577
		Post-intervention	22.533	2.137

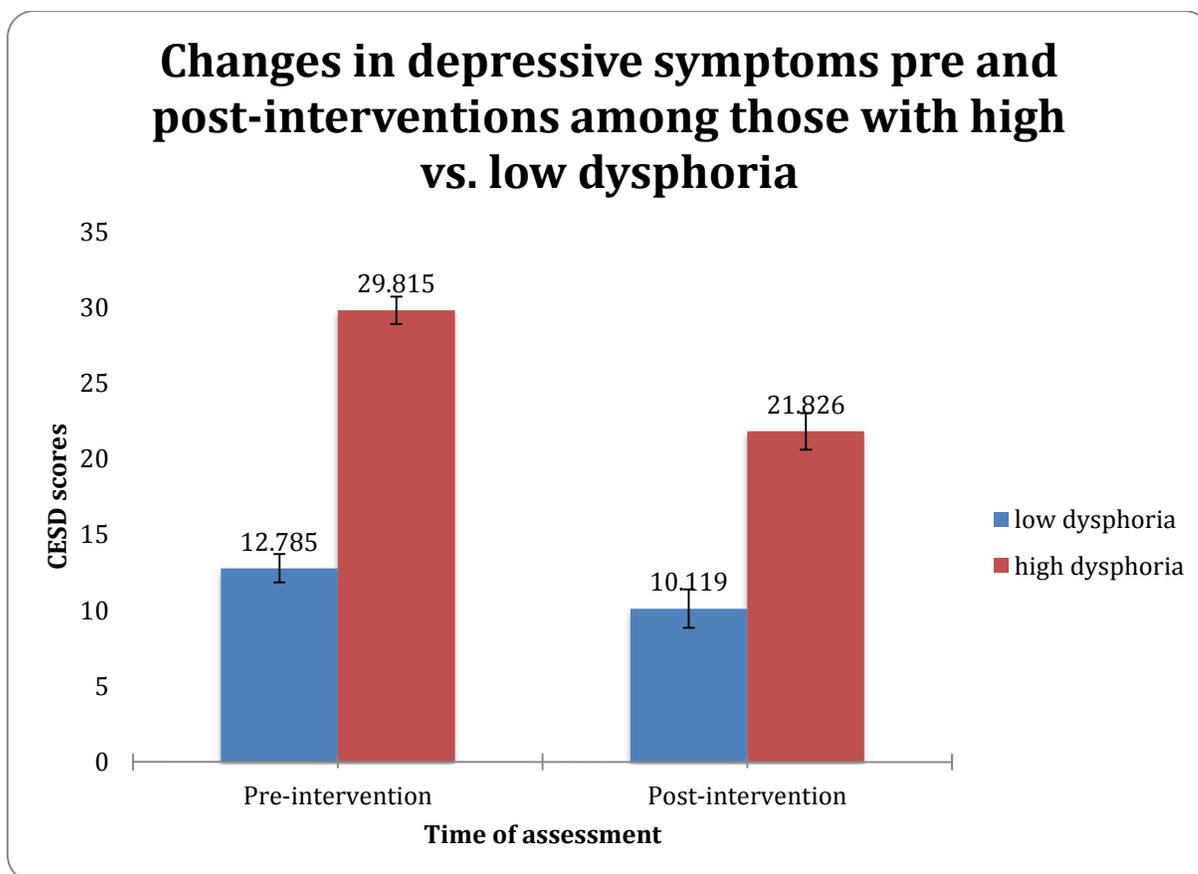


Figure 1. Interaction between time of assessment and level of dysphoria on depressive symptoms.

Warwick-Edinburgh wellbeing

We also conducted a similar 3x2x2 mixed model ANOVA analysis on Warwick scores. There was no main effect of time assessment, $F(1, 84) = 2.39, n.s.$ On average, Warwick scores at pretest ($M = 34.2, SD = 0.68$) did not differ from posttest scores ($M = 33.1, SD = 0.81$). There was no main effect of condition, $F(2, 84) = 0.22, n.s.$ Overall, classic ($M = 34.1, SD = 1.12$), positive-memory ($M = 33.1, SD = 1.1$), and negative-redemptive conditions ($M = 33.8, SD = 1.14$) reported similar Warwick scores. No significant result was found for the interaction between time of assessment and level of dysphoria ($F(1, 84) = 0, n.s.$), or the interaction between time of assessment and condition ($F(2, 84) = .2, p = .822$). A 3-way interaction among time of assessment, dysphoria level and condition was also not significant, $F(2, 84) = 0.12, n.s.$

Table 4. *Warwick-Edinburgh wellbeing scores at different times of assessment among conditions.*

Condition	Time of Assessment	Mean	Std. Error
Classic	Pre-intervention	34.5	1.164
	Post-intervention	33.67	1.393
Negative	Pre-intervention	34.153	1.185
	Post-intervention	33.375	1.419
Positive	Pre-intervention	33.933	1.161
	Post-intervention	32.167	1.390

Note. $N = 90$

Ryff Wellbeing

Time of assessment did not have a main effect on participants' Ryff scores, $F(1, 84) = 0.01$, *n.s.*; Ryff scores at pretest ($M = 31.96$, $SD = 0.43$) were essentially the same as at posttest ($M = 31.93$, $SD = 0.51$). There was also no main effect of condition, $F(2, 84) = 0.86$, *n.s.* People reported similar Ryff scores in the classic ($M = 32.63$, $SD = 0.73$), positive-memory ($M = 31.27$, $SD = 0.73$), and negative-redemptive conditions ($M = 31.94$, $SD = 0.75$).

There was no interaction between time of assessment and level of dysphoria, $F(1, 84) = 1.46$, *n.s.*, or the interaction between time of assessment and condition, $F(2,84) = 2.26$, *n.s.* We did not detect a 3-way interaction among time of assessment, dysphoria level and condition, $F(2, 84) = 1.01$, *n.s.*

Table 5. *Ryff wellbeing scores at different times of assessment among different conditions.*

Condition	Time of assessment	Mean	Std. Error
Classic	Pre-intervention	32.228	0.746
	Post-intervention	33.022	0.873
Negative	Pre-intervention	32.556	0.760
	Post-intervention	31.333	0.889
Positive	Pre-intervention	31.100	0.745
	Post-intervention	31.433	0.871

Note. $N = 90$.

Exploratory analyses

Mood ratings as predictors of CESD, Warwick and Ryff posttest scores. We summed the mood ratings for “happy”, “calm”, “pleased”, and “energetic” to compute the positive rating score each day for each participant. Ratings for the emotions “afraid”, “angry”, “agitated”, and “upset” were added together to form the negative rating score each day for each individual. We then averaged the seven-day positive and negative scores during the seven days to come up with positive mean and negative mean respectively. These mood ratings were completed immediately after participants wrote about the event for which they were grateful for the day. Thus, these ratings provide a good proxy for the immediate effects of gratitude writing.

To examine the relationship between mood ratings and CESD scores at posttest, we conducted a multiple linear regression. When controlling for the pretest CESD scores, the positive and negative mood ratings still uniquely contributed to predict CESD scores at posttest, $R^2\Delta = .148$, $F(2,86)=18.48$, $p<.001$. Each mood rating contributed unique variance (positive part correlation $r = -.193$, $t=-3.09$, $p = .003$, $\beta = -0.21$; negative part correlation $r = .316$, $t=5.05$, $p < .001$, $\beta = 0.34$).

When controlling for the pretest CESD score, the positive and negative mood ratings also uniquely contributed to predict Warwick scores at posttest, $R^2\Delta = .19$, $F(2,86)=17.01$, $p<.001$. Although positive mood ratings contributed unique variance (positive part correlation $r = .41$, $t = -5.46$, $p <.001$, $\beta = 0.45$), the unique variance associated with negative mood ratings was only marginally significant (negative part correlation $r = -.12$, $t = -1.63$, $p = .11$, $\beta = -0.13$).

When controlling for the pretest CESD score, the positive and negative mood ratings also uniquely contributed to predict Ryff scores at posttest, $R^2\Delta = .09$, $F(2,86)=6.20$, $p = .003$. Although positive mood ratings contributed unique variance (positive part correlation $r = .27$, $t =$

-3.22 $p = .002$, $\beta = 0.30$), the unique variance associated with negative mood ratings was not significant (negative part correlation $r = -.10$, $t = -1.17$, $n.s.$, $\beta = -0.10$).

How much participants enjoyed the diary activity in each condition. We conducted a one-way ANOVA with condition (classic, positive-memory, negative-redemptive memory) as the independent variable and participants' ratings of their enjoyment of the gratitude diary activity as the dependent variable. Results indicated that there was a main effect of condition on participants' ratings, $F(2, 95) = 5.51$, $p = .005$. Participants enjoyed the classic ($M = 5.16$, $SD = .25$) and positive-memory condition ($M = 5.15$, $SD = .24$) significantly more than the negative-redemptive memory condition ($M = 4.18$, $SD = .24$).

Discussion

In our study, we tested whether tailoring different gratitude interventions to people with low and high dysphoria would improve their wellbeing. We incorporated three different gratitude interventions in our experiment: classic, positive memory and negative-redemptive memory. We predicted that the negative-redemptive memory would be most beneficial to people with high dysphoria because the intervention would help decrease the emotional intensity of negative memories, facilitate closure of unresolved negative events and thus reduce rumination – a characteristic that is very common among people with high levels of depressive symptoms. We hypothesized that the negative-redemptive memory would also be favorable to people with low dysphoria by creating meaning and thus enhancing eudaimonic wellbeing. Contrary to our prediction, our results did not show that specific types of gratitude intervention improve wellbeing for people with low and high dysphoria; depressive symptoms decreased across all gratitude interventions, but the three gratitude conditions did not differ from one another. The findings attest to the mood enhancing effect of gratitude interventions.

Our study also set out to test two hypotheses regarding the mechanisms through which gratitude is operated: cognitive and affective mechanisms. If gratitude improves people's wellbeing by reinforcing a cognitive bias for positivity, gratitude interventions that involve the higher-order cognitive training in positivity should result in the greatest improvement in wellbeing. In contrast, if gratitude operates under an affective mechanism, grateful processing that involves the strongest intensity of positive emotion should lead to the most enhanced wellbeing. Contrary to our expectations, the positive memory condition did not produce the highest reduction in depressive symptoms or increase in hedonic and eudaimonic wellbeing. This finding suggests that gratitude interventions reduce depressive symptoms, but the data do not clarify the role of affective and cognitive mechanisms in producing this reduction.

Past experiments have included grateful listing of daily events and grateful processing of an unresolved negative memory. Yet none has adopted a grateful practice of recalling positive memories. Under certain circumstances, recollecting positive events might result in decreased life satisfaction if people use positive events in the past as a standard of comparison for current life status and if their current life situation does not measure up to the past (Strack, Schwarz, & Gschneider, 1985). Thus the positive memory condition could backfire, producing less wellbeing. However, participants in the positive-memory condition in the current study still showed reductions in their depressive symptoms consistent with the other gratitude conditions. We did not assess whether participants engaged in comparing their life situation at the moment with their past nor do we know whether participants' current life status is worse or better than the past they chose to recall. Our result suggests one of the following interpretations: grateful processing of past memories works regardless of one's current life status or grateful processing of past memories worked in this study only because participants' memories compared favorably

to their current life status. Future research could shed light on which of these interpretations is accurate.

In our initial hypothesis, people with dysphoria who gratefully processed negative memories were expected to improve their wellbeing the most. Our study results did not provide evidence to support this hypothesis: participants in the negative-redemptive condition did not fare significantly better than those in the other two conditions. However, people in the negative-redemptive condition were less likely to comply with the diary instructions compared to the other two conditions, leaving open the questions of whether the negative-redemptive condition might have been effective had people actually worked on reappraising their negative events. Some participants' feedback showed that most of their negative events did not turn out to be positive. Thus participants might have misunderstood the instructions and was frustrated to look for negative events in their life that later led to major positive events. Since the negative-redemptive condition involves the highest order of cognitive efforts and reappraisal, participants might lack motivation to follow through on the task for all seven days. The poor adherence in this condition suggests that maybe the task is too challenging for use by the general population.

The negative-redemptive condition was also ambiguous. Watkins et al (2007) asked participants to recall an unresolved negative memory associated with sadness, loss, rejection, anger, anxiety, or frustration while avoiding memories associated with shame, guilt, or regret. In our study, we were unable to control for whether the negative memories participants recalled were unresolved or what negative valence they were associated with. Future research could nuance the negative redemptive condition to resolve these uncertainties.

In addition to their lower adherence rates, participants in the negative-redemptive memory condition were neutral about the diary activity and did not enjoy the task as much as

their peers in the classic gratitude and positive-memory conditions, although they did not drop out at a significantly higher rate than the other two conditions. Notably, participants' lack of enjoyment for the gratitude diary activity did not interfere with the salubrious effects of gratitude interventions on reducing depressive symptoms. Nonetheless, the relatively lower enjoyment of this approach warrants fuller consideration in future investigations.

Although gratitude interventions were effective in lessening depressive symptoms, they did not improve hedonic or eudaimonic wellbeing. This finding might seem inconsistent with the previously reported positive association between gratitude and both hedonic and eudaimonic wellbeing (Emmons & McCullough, 2003; Froh and Kashdan et al., 2009; Kashdan et al., 2006; Wood, Joseph, & Maltby, 2009). There is mixed evidence about whether gratitude interventions have an impact on decreasing negative affect or increasing positive affect. In a study of people experiencing clinical depression, Kerr et al. (2015) found that a gratitude intervention increased life satisfaction but did not increase the frequency or intensity of positive and negative affect nor did it improve eudaimonic wellbeing. This could be because "shifts in affect might be small and gradual" for people experiencing significant depressive symptoms. According to Keyes (2007), pathology and flourishing are separate constructs (as cited by Froh et al., 2009). In a group of adolescents, gratitude was related to subjective wellbeing and optimism but unrelated to negative affect, which suggests that gratitude interventions may improve hedonic well-being, without reducing distress (Froh et al., 2009). Ouweneel, Le Blanc and Schaufeli (2014) obtained similar results on the impact of a gratitude intervention on daily positive emotions, yet with no effect on negative emotions and concluded that positive psychological interventions seem to promote positive emotions but do not reduce negative emotions. In contrast, Froh et al. (2008) discovered

that counting blessings was unrelated to increased positive affect, but was associated with decreased negative affect.

These mixed results might manifest the different structures of negative affect and positive affect. In our study, the CESD, Warwick, and Ryff scales at pretest were correlated with each other, as they were at posttest, which suggests that the three measures tap into a similar construct. However, only daily positive ratings uniquely predicted outcome in hedonic and eudaimonic wellbeing, although positive and negative emotion ratings after the daily gratitude diary uniquely predicted reduction in depressive symptoms. This implies that the construct of depression might involve both positive and negative emotions, whereas hedonic and eudaimonic wellbeing is only influenced by positive emotion. According to Fredrickson, Mancuso, Branigan, and Tugade (2000), positive affect counteracts and “undoes” the effect of unpleasant emotions but a reduction in negative affect does not necessarily result in increments in happiness. In support of this notion, Watson and Tellegen (1985) regarded negative affect and positive affect as two independent constructs and thus the absence of negative feelings is not equivalent to the presence of positive feelings. Therefore, future studies can clarify the distinctions between decreasing negative mood and increasing positive mood, whether reductions in negative affect result in increases in positive emotion, or whether the relationship is unidirectional such that increased positive affect reduces negative affect, but not the reverse.

Characteristics of our sample may also have created ambiguity in our results. Our sample had very high CESD pre-test scores ($M = 21.57$, $SD = 10.44$), compared to the CESD score of 16 that is indicative of depression in the general population. Given our sample of high dysphoric individuals, the gratitude interventions might have only produced enough positive emotions to reduce depressive symptoms but not to increase hedonic and eudaimonic wellbeing. Future

research could explore how different levels of depressive symptoms might affect the workings of gratitude, and future researchers might want to more carefully distinguish non-dysphoric, dysphoric, and depressed participants.

Other factors may also warrant caution when interpreting the results of the present study including the choice of measures of dysphoria and happiness. The CESD was originally designed to evaluate depressive symptoms “during the last week”, and thus is sensitive to capturing changes in emotions. The Warwick-Edinburgh scale measures hedonic and eudaimonic wellbeing over the past two weeks. While the Ryff scale does not specify a time frame, it tends to assess eudaimonic wellbeing over a long time span (see Appendix). These two wellbeing scales thus might have been less attuned to transitory emotional states. Kerr et al. (2015) measured hedonic wellbeing using the Positive Affect and Negative Affect Schedule and utilized the Purpose in Life test to assess eudaimonic wellbeing. In retrospect, our study might have been better served by using these same measures.

In exploratory analyses, people with low dysphoria reported a higher level of trait gratitude than those with high dysphoria. This aligns with previous research in which trait gratitude was associated with a lower risk of depression, anxiety, stress and PTSD (Wood, Maltby, Gillett, Linley, & Joseph, 2008; Kendler et al., 2003; Kashdan, Uswatte, & Julian, 2006). That participants with low dysphoria experienced a smaller reduction in depressive symptoms is also compatible with past findings, which suggest a floor effect in which once depressive symptoms descend to a certain threshold, they have reduced capacity to continue to decrease (Froh et al., 2009). Tomy, Weinberg and Cummins (2015) proposed the Homeostasis Theory which posits that people who are already operating within their typical set-point-range of wellbeing will have difficulty increasing their subjective wellbeing substantially. Despite the

potential floor effect and the homeostasis theory, it is worth noting that people with low dysphoria still benefited significantly from gratitude interventions.

People with higher negative affect benefit more from gratitude interventions because they have more room for their moods to improve compared to those who have low levels of depressive symptoms at the outset (Harbaugh & Vasey, 2014; Froh, Kashdan, Ozimkowski, & Miller, 2009). Thus they may be particularly beneficial for those with a high level of depressive symptoms. Although lower trait gratitude is often associated with trait depression, people are not doomed to have their depressive symptoms permanently. Daily gratitude - a momentary state of gratitude - actually improves depressive symptoms most effectively among those with lower trait gratitude (McCullough, Tsang, & Emmons, 2004; Rash, Matsuba, & Prkachin, 2011).

On average, participants in our study liked the classic and positive-memory interventions slightly whereas they were neutral about the negative-redemptive memory task. All three groups could have enjoyed their gratitude journals more fully, which might have produced more benefits for their wellbeing. Thus future researchers might think about how to improve the appeal of the experience. One option is to have participants undertake a variety of different kinds of gratitude diaries, rotating among types to avoid tedium. This is consistent with research suggesting that practicing multiple positive psychology interventions activities is more effective than engaging in only one activity (e.g., Fordyce 1977, 1983; Seligman et al., 2005). Employing all three gratitude approaches might confer other benefits. People might not only experience reduced depressive symptoms but also enhanced wellbeing if they have the chance to gain positivity from the past and from the present. Thus combining different gratitude diary tasks might be more refreshing, enjoyable and salubrious to one's wellbeing.

Limitations

Despite our study's strengths, we note a few limitations as well. One concern involves measurement. We adapted the time assessment of the CESD from "the past week" to "the past six months" to categorize people into low and high dysphoria and used the CESD measure as both the pretest and posttest assessment of depressive symptoms. We recommend using a separate measure to classify trait dysphoria because the CESD measure was designed to capture short-term mood states only.

Our study set out with a goal to test a gratitude intervention in which people could process negative life events in the present. However, we were unable to come up with a design to control for the number of negative events that occur in people's daily life. Thus, we asked participants to recall a negative memory each day instead. Taking into consideration the difference in the "past" temporality of the negative-redemptive memory condition compared to the "present" temporality of the classic gratitude intervention, we added the positive memory condition as another comparison group because it also involved the "past" temporality. Ideally, future research should invent a design that allows participants to naturally process their daily negative events instead of intentionally recalling a negative memory in the past. Some people might prefer not to go over the past. In addition, gratefully processing negative events as people go about their lives might be a more natural way to improve wellbeing. The intentional recollection of a negative memory could bring back certain negative feelings that cannot be counteracted by the positive emotions as a result of the negative-redemptive memory intervention.

During pilot testing, several participants in the negative-redemptive condition complained about a lack of clarity in the instructions and repetitiveness, and as a result they grew weary of the diary task. To make the task less boring in the main study, we gave a new prompt every day,

sometimes in the form of a closed-ended question, for instance “Are you grateful today?” Instead of elaborating on their answers, some participants simply replied “Yes” or “No.” These responses did not fulfill the goals of the intervention, and thus undermined our ability to test the effectiveness of this condition.

Some participants considered the given instructions restricting rather than inspiring them to think about blessings in their lives. According to Kaczmarek et al. (2014), too much instruction impedes participants’ full immersion in the gratitude task. Thus, it might have been more effective to let participants recognize and deal with intervention challenges on their own. It is important though to balance clearly defined instructions with participants’ freedom to explore areas in their lives that can elicit a sense of gratitude.

Further studies should also figure out the appropriate “dosage” for the gratitude intervention. The frequency and length of gratitude interventions play a role in how gratitude interventions affect wellbeing. Lyubomirsky, Tkach and Sheldon (2005c) found that students who engaged in a gratitude intervention once a week showed increases in well-being compared to those engaged in the intervention three times a week (as cited by Sheldon & Lyubomirsky, 2006). People might have found counting blessings several times a week less fresh and meaningful over time and thus became fatigued with the practice. Relatedly, students who committed all five acts of kindness in one day experienced significant increases in wellbeing relative to students who performed five gestures of kindness but spread out over the week (Lyubomirsky et al., 2005c). Lyubomirsky and colleagues (2005c) explained that because most of the acts of kindness were small, spreading them over a week might have reduced their salience from participants’ habitual behavior. Thus, future researchers should examine the optimal timing

and dosage for gratitude interventions. Instead of a one-size-fits-all approach, a person-fit strategy might yield better outcomes.

Because of the limited number of participants in the study overall, we were unable to drop people who scored in the midrange of the trait dysphoria measure. Thus some high and low dysphoria participants had CESD scores that differed only by one point. The median score was higher than 16, thus some dysphoric people were in the nondysphoric group. We also note problems with our measures for hedonic wellbeing and eudaimonic wellbeing. That all items on the Warwick scales are positively worded might have led some participants to skew all their answers in one direction. Our shortened Ryff scale was not validated in the literature to fully capture eudaimonic wellbeing. Despite its robust alpha levels, this scale's psychometric properties are unknown and await further replication. Thus, future research should employ measures that are more truly reflective of trait dysphoria, hedonic wellbeing and eudaimonic wellbeing.

Due to the time constraints, we were unable to follow-up with participants. Many studies have pointed out the “deferred” benefits of gratitude interventions in which wellbeing did not show substantial improvement until some time after the end of the intervention (Watkins, Uher, & Pichinevskiy, 2015; Seligman, Steen, Park, & Peterson, 2005; Froh, Sefick, & Emmons, 2008; Carson, Muir, Clark, Wakely, & Chander, 2012). We suspected that to test the cognitive mechanism of gratitude might require a longer time frame as cognitive bias develops over time. Similarly, changes in eudaimonic wellbeing might need to be measured over an extended course of time. We were also unable to analyze the diary content to examine whether grateful processing was mostly self-focused or involved interpersonal relationships (being grateful for

others) or whether successful processing involves comparing one's life to worse-off others. Future research could explore these important and interesting issues.

In addition, our study lacked a control group that only engaged in the daily diary activity to compare with the gratitude interventions. Critics have questioned the validity of gratitude interventions due to a lack of appropriate control groups. Thus the results of our study would be furthered strengthened if a control condition were included.

Future Directions

Gratitude interventions are salubrious to wellbeing. Thus it is crucial to consider pragmatic factors to put this positive psychology intervention into use for the general population. Research has shown that gratitude can be naturally cultivated through other interventions such as meditation (Shapiro, Schwartz, & Santerre, 2002), progressive muscle relaxation (Khasky & Smith, 1999), or imagining being forgiven by others (Witvliet, Ludwig, & Bauer, 2002). Naikan therapy, a type of psychotherapy that originated in Japan, incorporates all three techniques to foster clients' awareness of their moral relationships with others and to cultivate gratitude (Hedstrom, 1994; as cited by Emmons & Stern, 2013) and thus can act as a potential complement to gratitude interventions.

Our study had a gender skew in which the number of female participants ($N = 71$) was five times greater than that of male participants ($N = 14$). This gender imbalance in the participant pool has been common in previous studies (Emmons & McCullough, 2003; Watkins et al., 2007). Thus we have to be cautious in generalizing the results of this study to both men and women. The effect of gratitude interventions in reducing depressive symptoms in study might just apply to women. Women are more likely to initiate and stay in gratitude interventions than men. Yet, because men tend to have lower trait gratitude, gratitude interventions are likely

to have a greater impact on their wellbeing compared to women. Researchers might wish to determine how best to keep male participants in gratitude interventions (Froh, Yurkewicz, & Kashdan, 2009; Kaczmarek et al., 2014).

In addition, the timing of this research was during an academic semester. Students are occupied with heavy workloads and might not have the sufficient time and an ideal state of mind to practice gratitude interventions. Particularly, the negative-redemptive memory condition requires deep deliberations and reflections. Therefore, we suggest future research replicate this study during summer to examine whether gratitude interventions work best when people have more plenty of time to fully benefit from their effect.

Conclusions

Gratitude interventions have been considered the “poster child” of positive psychology. Extensive research has shown their effectiveness in reducing depressive symptoms and increasing happiness in both non-clinical and clinical populations. Our study aimed to examine whether tailoring specific gratitude interventions for people with low and high dysphoria would produce further benefits to each group. We also wanted to test whether the affective or cognitive mechanisms of gratitude interventions would result in the most improvement in wellbeing. Although the study failed to demonstrate that gratitude interventions tailored to individuals’ level of dysphoria work better than the classic intervention, participants across all types of interventions substantially decreased their depressive symptoms, which opens the possibility of combining a variety of interventions into one gratitude intervention package. Kerr et al. (2015) proposed using gratitude interventions as a pre-treatment intervention for people who are waiting for therapy. By further affirming the effectiveness of different gratitude interventions, our research thus contributes to the literature on positive psychology by supporting the possibility of

joining different types of gratitude interventions to provide temporary solutions for people with a high level of depressive symptoms who are unable to receive immediate professional help.

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Appendix

Center for Epidemiological Studies Depression Scale (pre-test, lifetime version)

Please indicate *how these characteristics are of you in general*. Try **not to be influenced just by how you feel at this moment**:

0 = *Rarely or none of the time*; 1 = *Some or a little of the time*; 2 = *Occasionally or a moderate amount of time*; 3 = *Most or all of the time*

1. I was bothered by things that usually don't bother me
2. I didn't feel like eating; my appetite was poor
3. I felt that I could not shake off the blues even with help from my family or friends
4. I felt I was just as good as other people
5. I had trouble keeping my mind on what I was doing
6. I felt depressed
7. I felt that everything I did was an effort
8. I felt hopeful about the future
9. I thought my life had been a failure
10. I felt fearful
11. My sleep was restless
12. I was happy
13. I talked less than usual
14. I felt lonely
15. People were unfriendly
16. I enjoyed life
17. I had crying spells
18. I felt sad
19. I felt that people dislike me
20. I could not get "going"

Center for Epidemiological Studies Depression Scale (post-test)

Please indicate how often you have felt this way for the **past week**:
0 = *Rarely or none of the time*; 1 = *Some or a little of the time*; 2 = *Occasionally or a moderate amount of time*; 3 = *Most or all of the time*

1. I was bothered by things that usually don't bother me
2. I didn't feel like eating; my appetite was poor
3. I felt that I could not shake off the blues even with help from my family or friends
4. I felt I was just as good as other people
5. I had trouble keeping my mind on what I was doing
6. I felt depressed
7. I felt that everything I did was an effort
8. I felt hopeful about the future
9. I thought my life had been a failure
10. I felt fearful
11. My sleep was restless
12. I was happy
13. I talked less than usual
14. I felt lonely

15. People were unfriendly
16. I enjoyed life
17. I had crying spells
18. I felt sad
19. I felt that people dislike me
20. I could not get “going”

The Gratitude Questionnaire-Six Item Form (GQ-6)

Using the scale below, indicate how much you agree with the following items:

1 = *Strongly Agree*; 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.

The Warwick-Edinburgh Mental Well-being Scale (WEMWBS)

0 = *None of the time*; 1 = *Rarely*; 2 = *Some of the time*; 3 = *Often*; 4 = *All of the time*

1. I've been feeling optimistic about the future
2. I've been feeling useful
3. I've been feeling relaxed
4. I've been feeling interested in other people
5. I've had energy to spare
6. I've been dealing with problems well
7. I've been thinking clearly
8. I've been feeling good about myself
9. I've been feeling close to other people
10. I've been feeling confident
11. I've been able to make up my own mind about things
12. I've been feeling loved
13. I've been interested in new things
14. I've been feeling cheerful.

Short version of Ryff psychological well-being scale

(1 = *Strongly disagree*, 2 = *Moderately disagree*, 3 = *Slightly disagree*, 4 = *Slightly agree*, 5 = *Moderately agree*, 6 = *Strongly agree*)

1. The demands of everyday life often get me down (environmental mastery)
2. In general, I feel that I continue to learn more about myself as time goes by (personal growth)
3. I am not interested in activities that will expand my horizons (personal growth)
4. My daily activities often seem trivial and unimportant to me (purpose in life)
5. I have a sense of direction and purpose in life (purpose in life)
6. I made some mistakes in the past, but I feel that all in all everything has worked out for the best (self-acceptance)
7. For the most part, I am proud of who I am and the life I lead (self-acceptance)

Mood rating. Participants filled out this measure each day after they finished their diary entries. On a scale of 1-5, please indicate your rating of the following items: 1 = *Very Slightly or Not at All*, 2 = *A little*, 3 = *Moderately*, 4 = *Quite a bit*, 5 = *Extremely*.

1. Happy
2. Upset
3. Angry
4. Calm
5. Afraid
6. Pleased
7. Agitated
8. Energetic