Study Protocol and Statistical Analysis Plan: Cultivating Gratitude: Does Manipulating Expectations Improve the Efficacy of a Gratitude Intervention?

NCT03784001

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Interventions designed to elicit gratitude, an emotion expressed when one feels they have received something beneficial from other people or entities (Emmons & McCullough, 2003), have been shown to positively affect psychological and physical well-being. In previous studies, participants instructed to cultivate feelings of gratitude reported reductions in stress (i.e., O'Leary & Dockray, 2015) and increases in life satisfaction (e.g., Emmons & McCullough, 2003, study 1; Froh, Sefick, & Emmons, 2008; Khanna & Singh, 2016; and Gilek, 2010; Kerr, O'Donovan, & Pepping, 2015), positive mood (e.g., Emmons & McCullough, 2003, study 2; Martínez-Martí, Avia, & Hernández-Lloreda, 2010; Khanna & Singh, 2016; and Froh et al., 2014, study 2), and well-being (e.g., Khanna & Singh, 2016; Deng et al., 2019; and Jachowska, Brown, Ronaldson, & Steptoe, 2015) (e.g. Froh, Sefick, & Emmons, 2008; Emmons & McCullough, 2003; Watkins, Woodward, Stone, & Kolts, 2003, study 3, study 4). Though gratitude interventions are widely used, there are very few studies that examine whether small additions to methodology can enhance the effectiveness of these interventions. Drawing from literature on mindset and the placebo effect, we hypothesized that providing participants with information about the positive effects of previous gratitude interventions would improve their well-being, mood, and sleep after participating in a gratitude intervention.

The majority of randomized controlled trials (RCTs) designed to cultivate gratitude report beneficial outcomes, though these effects are typically small. Evidence from studies on mindset and expectations suggest that these effects may be enhanced, though few studies have tested this. Research on mindset - conscious or embodied expectation (Crum, Leibowitz, &

Verghese, 2017)- and the placebo effect indicates that individuals may experience greater health improvements when they know the benefits of a job or activity (e.g., Crum & Langer, 2007; Desharnais, Jobin, Côté, Lévesque, & Godin, 1993). In one study, for example, hotel maids who were told how many calories each of their job tasks burned and informed that their work met the requirements for good exercise and an active lifestyle exhibited significant health improvements--reduced weight, blood pressure, and body fat--when compared to hotel maids who were not provided with this information (Crum & Langer, 2007). In another study, participants who were told that an exercise program was meant to improve psychological well-being showed significant improvements in well-being relative to uninformed participants (Desharnais, Jobin, Côté, Lévesque, & Godin, 1993). These studies suggest that knowing the benefits of an activity beforehand can enhance beneficial effects.

Indeed, motivation and participant engagement are important factors in intervention efficacy (Lyubomirsky & Layous, 2013). Being motivated to first begin, and then continue to put effort into, a positive intervention can enhance intervention benefits. Participants who chose to engage in (and actually received) a "happiness" intervention (either promoting optimism or gratitude) experienced the greatest increases in happiness; of those receiving a happiness intervention, participants who put the most effort into their intervention's exercises had the greatest gains in well-being (Lyubomirsky, Dickerhoof, Boehm, & Sheldon, 2011). Similarly, there is some evidence that reading encouraging information about an intervention improved outcomes. In an intervention in which the experimental conditions wrote about their best possible selves - their goals in different domains of life - participants who read peer testimonies about the effectiveness of the intervention had greater improvements in well-being than participants who

read unrelated testimonies and participants in the control condition (Layous, Nelson, & Lyubomirsky, 2012).

To our knowledge, only two gratitude interventions have tested outcome differences between informed (of benefits of gratitude interventions) versus not informed conditions. In one intervention, one gratitude condition was assigned to read fake articles about gratitude practices being effective. These participants experienced decreased well-being (at post-intervention), then increased well-being (at a three-week follow-up) compared to participants who read articles about gratitude practices being ineffective (Sin, Della Porta, & Lyubomirsky, 2011). These results do not clearly indicate if it is beneficial to advertise intervention efficacy, and utilized fake testimonies for encouragement. Harbaugh and Vasey (2014) had one gratitude condition read a short paragraph explaining the rationale for the intervention which concluded with the statement, "Filling out the following questionnaire is expected to have a positive effect on your well-being". Participants were shown this rationale at the beginning of their instructions for every writing session, but did not experience better outcomes than the gratitude condition not shown the rationale (Harbaugh & Vasey, 2014). This finding may indicate that providing encouraging information about gratitude does not enhance intervention effectiveness. However, informed participants in Harbaugh and Vasey (2014) were only told one general benefit of gratitude. The present study told participants six specific, favorable outcomes from past gratitude studies. This design was intended to remind participants of intervention benefits each time they made a gratitude list, and was predicted to significantly improve participant's outcomes.

The present study sought to determine whether telling participants the benefits of gratitude exercises would improve the effectiveness of a two-week gratitude intervention.

Participants were randomized to one of three conditions: gratitude + expectations (GE), gratitude + no expectations (GNE), or events control. Participants in the GE condition were shown a beneficial outcome from a past gratitude study each time they made a gratitude list; those in the GNE condition were not. Based on studies in which participants experienced improved health and well-being when they knew the benefits of an activity (e.g., Crum & Langer, 2007; Desharnais, Jobin, Côté, Lévesque, & Godin, 1993), we hypothesized that participants in the GE condition would experience the greatest improvements in outcomes. Our primary outcome was well-being and our secondary outcomes were positive affect, sleep quality, sleep quantity, gratitude, stress, and depressive symptoms. We hypothesized that, compared to the control and GNE conditions, (1) the GE condition would report the greatest increases in hedonic, eudaimonic, and overall well-being and (2) the GE condition would report the greatest gains in positive affect, sleep quality, sleep quantity, and gratitude, and the greatest reductions in stress and depressive symptoms.

Method

Participants and Procedure

Participants were recruited from an undergraduate psychology class at a large, public university. Inclusion criteria were being 18 years or older and having access to an email account. The study was announced to all 197 students in-person by the professor and via email. Study participation was offered as an alternative to completing one of the six class writing assignments, which were of comparable effort and time investment to study activities. All students were emailed a study information sheet. Students had to affirm that they met inclusion criteria and electronically sign and date the information sheet to enroll in the study. One hundred and

twenty-nine participants elected to enroll in the study by submitting a signed information sheet. All study procedures were approved by the University of California, Los Angeles Institutional Review Board and consent was obtained from participants. The ClinicalTrials.gov identifier for this trial is NCT03784001.

Participants were randomly assigned to one of the three conditions (GNE, GE, or events control) using a random number generator. On the first day of the study, participants received a baseline questionnaire via email. After completing their baseline questionnaire, participants were prompted to an online form, with instructions to type a short list, specific to the condition they were in (see *Interventions* below for more information). Every two days, participants were emailed a link to a new condition-specific online form. In total, participants were instructed to complete six condition-specific lists. Participants were emailed their post-intervention questionnaire two weeks after they received their baseline questionnaire. Participants received a reminder email to complete their baseline and post-intervention questionnaire if they did not complete either questionnaire one day after dissemination.

Interventions

Participants received an email with a link to each list, sent two days after completion of the previous list. GNE participants were instructed to list up to five things they were grateful for; GE participants were shown positive findings from gratitude RCTs and were instructed to list up to five things they were grateful for. Participants in the events control condition were instructed to list up to five events they engaged in that day.

Both gratitude conditions (GNE and GE) were given the following instructions, adapted from Emmons and McCullough (2003) and Sheldon and Lyubomirsky (2006):

You have been randomly assigned to try to cultivate a sense of gratitude now, and during the next few weeks. There are many things in our lives, both large and small, that we might be grateful about. These might include particular supportive relationships, sacrifices or contributions that others have made for you, facts about your life such as your advantages and opportunities, or even gratitude for life itself, and the world that we live in. Think back over the past day and, on the lines below, type up to five things in your life that you are grateful or thankful for.

GE participants were also shown a beneficial finding about gratitude on each of their questionnaires, immediately before they made their gratitude list. Some of the beneficial findings included: "*Undergraduates who practiced gratitude had higher expectations for the upcoming week (Emmons & McCullough, 2003, Study 1)" and "Gratitude contemplation can decrease body dissatisfaction and increase body esteem (Wolfe & Patterson, 2017)".*

Participants in the events condition were given the following instructions:

You have been randomly assigned to write about your daily events now and over the next two weeks. Throughout a day, we may engage in many different events. These might include classes you had today, conversations you had, or activities you engaged in such as studying for a test or eating a meal. Many events happen throughout a day. Think back over your activities today and, in the space below, type up to five things or events you remember from today.

Measures

Demographic characteristics. Demographic variables - age, sex race, year in school, major, relaitonship status, and family income - were assessed at baseline.

Primary outcomes. Hedonic well-being, eudaimonic well-being, and overall well-being were assessed at baseline and post-intervention. Well-being was measured with the Mental Health Continuum-Short Form (MHC-SF; Keyes, 2009). Participants rated how often they felt 14 different emotions or statements, such as "happy" and "satisfied with life". Items are rated on a 6-point likert scale (0 = *never*, 5 = *everyday*), with higher numbers indicating greater well-being. This measure assesses both hedonic and eudaimonic well-being. The MHC-SF is both reliable and valid for use with young adults (Robitschek & Keyes, 2009) .

Secondary outcomes. Positive affect, sleep quality, sleep quantity, gratitude, and the greatest reductions in stress and depressive symptoms were assessed at baseline and post-intervention.

Statistical Analysis Plan

Differences in demographic variables were assessed using one-way Analysis of Variance (ANOVA) and chi-squared tests to examine baseline differences between groups. Next, for each primary (i.e., well-being) and secondary outcome (i.e., positive affect, sleep quality) we ran separate repeated measures ANOVAs using SPSS. Differences in change over time between groups were assessed using the time-by-condition interaction term, which tells us whether groups differed over time for each outcome. Post hoc analyses were then conducted to further investigate any significant interactions. Finally, to test if completing the gratitude exercises improved well-being, we combined the GE and GNE conditions to create a combined gratitude (CG) group which we compared to the control condition. To do this, we ran separate repeated measures ANOVAs comparing the CG group to the control condition, looking at the time-by-condition interaction term for each outcome.