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Using Gratitude to Promote Positive Change: A Series of Meta-Analyses Investigating the Effectiveness of Gratitude Interventions

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ABSTRACT

Gratitude interventions have been proposed as beneficial practices for improving myriad positive outcomes, and are promoted in self-help literature. The current work examined gratitude interventions' effects with meta-analytic techniques to synthesize findings of thirty-eight studies, totaling 282 effect sizes. Fifty-six separate meta-analyses examined outcome effects for: gratitude versus neutral comparison at postintervention and delayed follow-up; gratitude versus negative comparison at post and follow-up; and gratitude versus positive comparison at post and follow-up. Results show that gratitude interventions can lead to improvements for numerous outcomes, including happiness, but do not influence others. Their unique benefits may be overemphasized in the literature.

People have come to realize that a life well lived is not simply a life without depression or other negative elements. The positive psychology movement has helped put forth the idea of “flourishing”—living a life with positive emotion, engagement, good relationships, meaning and purpose, and accomplishment (e.g., Keyes & Haidt, 2003; Seligman & Csikszentmihalyi, 2000). Focusing on the positive often takes practice.

There are many self-help books aiming to assist people with this focus, in order to improve their lives. Some are written by psychology researchers and built on empirical research (e.g., Emmons, 2007, 2013; Lyubomirsky, 2007; Seligman, 2011); others are less research based. Often the books offer simple practices that can supposedly benefit individuals in terms of outcomes like well-being, positive affect, and optimism. Psychologists refer to these types of activities as *positive psychology interventions*—performing the same routine, either daily or weekly, and persisting with it for weeks or months in order to see improvements for the self. Some of these, more specifically, are called *gratitude interventions*, which target gratitude as a way to improve things like positive affect and happiness over time. Common practices include counting one's blessings in a gratitude journal and writing a thank-you letter, at times sharing it with the recipient in the form of a so-called gratitude visit. Part of what makes gratitude interventions so desirable is that they can be done individually and without cost—no materials or therapist

necessary. Gratitude is suggested as an easy way to make big life improvements, with some books making huge claims—like *Living in Gratitude: A Journey that Will Change Your Life* (Arrien, 2011), or *Gratitude ... It's Like Glitter for Your Soul!* (Holmes, 2014). With numerous people now publicizing the importance of gratitude in daily life—often citing research as “proof” that gratitude leads to positive effects, and advising others to partake in gratitude interventions—it is crucial to find out whether these interventions really are effective and how large their effects are. The current work provides a comprehensive examination of the efficacy of gratitude interventions, examining numerous outcome variables and taking into account comparison conditions.

The often-cited studies by Emmons and McCullough (2003) seem to be the basis for much of the self-help literature. By having people write down things for which they were grateful, on a daily or weekly basis, they found some evidence that their gratitude intervention increased feelings of self-reported grateful mood, optimism, physical health, and positive affect. However, over three studies, their findings were actually mixed. One found physical health differences as compared to a neutral condition, and one did not find a significant difference. One found positive affect differences as compared to a neutral condition, and another did not. Sometimes the significant differences were found only between the gratitude intervention and a negative

intervention (requiring people to write down hassles they had experienced that day)—not between the gratitude intervention and a neutral condition. Even ratings of grateful mood in one of their studies—which one might expect to show large differences—failed to be significantly different when comparing gratitude versus neutral conditions. The significant effects they did find were small. Therefore, it seems that perhaps gratitude interventions are not as effective as many would claim. However, even with these mixed findings, many researchers (and self-help authors) still cite Emmons and McCullough as evidence that gratitude interventions can have therapeutic effect. This reliance on the positive outcomes from these few studies is unfortunate.

The field of psychology is bolstered by reviews of the literature, which summarize and synthesize findings to provide more robust conclusions about areas of interest—or illustrate the disparities and inconsistencies within the topic. The present work provides an updated empirical review of gratitude intervention research. I first describe some of the previous reviews on this topic, and why the current one adds important additional information.

Previous reviews

Wood, Froh, and Geraghty (2010) called into question whether researchers are making bolder statements than they should. They posed the important question, “Effective compared to *what?*” (p. 898) and argued that researchers were ignoring the types of comparison groups being utilized in studies. Using a negative comparison condition might exaggerate the gratitude intervention’s efficacy, because findings could be due to either gratitude’s benefits or the harm from negativity, or both, maximizing differences. If the gratitude condition has no effect, but the negative intervention harms individuals, researchers could be drawing false conclusions about gratitude.

Three meta-analyses have addressed the efficacy of these types of interventions. Sin and Lyubomirsky (2009) analyzed 51 studies of positive psychology interventions more generally and found significant improvements for participants’ well-being and depression. This meta-analysis did not investigate whether different positive psychology interventions (such as a gratitude letter vs. a “best possible selves” intervention) might have different effects, so the authors could not make any claims about gratitude interventions specifically. In addition, the authors considered only well-being and depression outcomes, although numerous other outcome variables have been examined in the literature.

Similarly, the meta-analysis by Bolier et al. (2013) investigated outcomes for any positive intervention, as well as for numerous types of expressive therapies (such as hope therapy and well-being therapy), including those done as individual practices and those conducted as group therapy. Given the inclusivity and breadth of the meta-analysis, it could not speak to gratitude interventions specifically. Furthermore, it did not consider outcome variables beyond subjective well-being, psychological well-being, and depression.

The meta-analysis of Davis et al. (2016) is more similar to the current work but still lacked some useful information. They focused specifically on gratitude interventions and the outcomes for gratitude, anxiety, and psychological well-being, pooling across various measures within these categories. Gratitude included both trait and state gratitude. For well-being, they grouped life satisfaction measures with depression measures and patient health surveys to create an index; these measures seem rather disparate, and combining them creates a diffuse outcome that does not provide the most useful information. In addition, Davis and colleagues pooled across posttests: If both an immediate posttest measure was conducted, as well as a delayed follow-up measure, the two results were pooled to create a singular postmeasure. This likely minimizes some effects.

Davis et al. (2016) took the type of comparison group into account by comparing gratitude interventions to either a *measurement-only control* or an *alternative-activity condition*. A measurement-only control was described as an untreated comparison condition in which participants filled out the dependent measures only, without experiencing any actual intervention-type activity (including the “waitlist” control); an alternative-activity condition had participants engage in some type of activity, different from the gratitude intervention. When investigating outcomes for gratitude and anxiety, they drew separate conclusions for a gratitude intervention versus measurement only, and a gratitude intervention versus an alternative-activity condition. The shortcoming of this categorization is that the alternative activities could be neutral, positive, or negative in valence, producing different affective states, but were grouped together in this format. If a study compared a gratitude intervention with a negative intervention (such as instructing participants to list the hassles they had dealt with that day), that effect size was combined with an effect size from a study design comparing gratitude with a positive intervention, like performing random acts of kindness. With this meta-analytic design, effect sizes would likely vary, depending on the valence of the comparison condition, but these

differences would cancel out.¹ Similarly blurring results, for studies involving more than one comparison group, they had to aggregate across the conditions, again obscuring any differences (e.g., pooling effect sizes for both gratitude vs. neutral and gratitude vs. hassles).

Not taking valence of the comparison intervention into account is a shortcoming of the Davis et al. (2016) review, as the valence of the comparison group is likely to influence the magnitude of the effect sizes. It is, furthermore, important to separate the neutral comparisons from both positive and negative comparison groups in order to determine the unique efficacy of gratitude interventions and to investigate if large effects are mainly found when a gratitude condition is compared to a condition involving some kind of negative behavior. Although different types of neutral control conditions should be assessed—in terms of being actively engaged versus measurement only—these can be assessed in a moderator analysis.

The current work

The current meta-analysis is organized in a way that allows more distinctions to be made in terms of both outcome variables and comparison conditions. It considers all outcome variables analyzed in at least two samples (described next), avoiding the need to pool across conceptually different variables, and it clarifies the efficacy of gratitude interventions by separating effect sizes by comparison group. In addition, this work incorporates more studies than those analyzed in past work, including more recent studies, providing a complete quantitative analysis of the current state of the literature.² Do gratitude interventions lead to improvements for the individual, and are these positive outcomes greater after a gratitude intervention, as opposed to a neutral, positive, or negative intervention? Are effect sizes greatest when comparing with a negative intervention condition? If so, how should we interpret these effects?

In addition, to investigate how lasting the effects of these interventions are, I looked at comparisons at post (immediately following the interventions) and delayed follow-up (ranging from 1 week to 6 months after the conclusion of the intervention) in separate meta-analyses, rather than pooling these measures, as Davis and colleagues did. Can short-term gratitude interventions provide benefits that last over time? Outcomes that were considered in at least one meta-analysis are well-being, happiness, life satisfaction, grateful mood, grateful disposition, positive affect, negative affect, depression, physical health, sleep,

exercise, prosocial behaviors, stress, optimism, quality of relationships, and self-esteem.

Method

Literature search procedure

Online literature searches were conducted using PsycINFO, Google Scholar, and simple Google searches, encompassing all years up until March 2016. Search terms were as follows, along with related wildcard extensions: *gratitude*, *appreciation*, *gratefulness*, *intervention*, *positive intervention*, *thankful*, and *blessings*. Reference sections of relevant literature were also searched. Last, inquiries were sent to researchers with three or more relevant articles.

Inclusion criteria

Study designs

Studies were included when they randomly or quasi-randomly (e.g., by school classroom) assigned participants to at least two conditions that included a gratitude intervention condition and a nongratitude comparison condition. Studies that investigated changes only from preintervention to postintervention, with no separate comparison group, were excluded, as were those comparing two gratitude interventions (Chan, 2010, 2011; Chen 2011; Killen & Macaskill, 2014; Silberman, 2007). Gratitude had to be mentioned in the text in order for the study to be included; if the intervention was not called a gratitude intervention by name, and if gratitude was not mentioned within the article, the study was not included (e.g., a “pleasure” condition that involved writing about good things: Giannopoulos & Vella-Brodrick, 2011; a “savoring” condition where people focused on positive things as they occurred: Hurley & Kwon, 2012).

Studies were included when participants engaged in the intervention for at least 1 week; studies in which the intervention was a one-time occurrence (meaning participants wrote down their blessings only one time and postmeasures were conducted immediately following) or studies in which the intervention lasted 3 days or less were excluded, as this was not thought to be a very strong or comparable manipulation³ (e.g., Gilek, 2010; Huffman et al., 2014; McIntosh, 2008; Ozimkowski, 2007). Similarly, studies investigating daily gratitude journals and their effects on other daily measures were left out, as again, findings might not be representative of strong, lasting effects of the intervention but rather temporary and time-sensitive

outcomes⁴ (Harbaugh & Vasey, 2014; Krejtz, Nezlek, Michnicka, Holas, & Rusanowska, 2014).

If participants were exposed to numerous types of interventions or trainings over the course of the study, the study was left out—as any improvements could not be confidently attributed to gratitude interventions alone. As illustration, numerous studies included several positive psychology interventions, switching from one intervention to another throughout the intervention period (e.g., Ho, Yeung, & Kwok, 2014; Lambert D’raven, Moliver, & Thompson, 2015; Layous, Lee, Choi, & Lyubomirsky, 2013; Proyer, Gander, Wellenzohn, & Ruch, 2014; Schueller, 2010, 2011; Schueller & Parks, 2012). Others involved training workshops on numerous positive intervention strategies, such as training on autobiographical memory, forgiveness, and gratitude, as in Ramirez, Ortega, Chamorro, and Colmenero (2014). Studies looking at grateful processing of, or coping with, stressful or negative memories (e.g., Watkins, Cruz, Holben, & Kolts, 2008) were excluded from analyses, as their gratitude was specifically focused on the negative event (rather than gratitude in general), which was quite different from other study methodologies. Others looked at gratitude expressed within couples, toward relationship partners (Roland, 2009), but this was deemed too dissimilar to the other incorporated studies (which did not include a relational component). All of these were excluded.

Studies that utilized an educational component, with one or more teacher- or therapist-led group sessions going beyond the simple gratitude induction (e.g., Callaghan, 2015; Froh et al., 2014; Henderson, 2010; Rye et al., 2012) were left out, as I focused on individual-led interventions that could be generally completed by any person, without significant training—as much of the appeal of gratitude interventions is how easy they are to practice.

Study conditions

If a gratitude condition was compared with two control conditions, where one was more actively involved in the study (e.g., keeping daily events diaries vs. waitlist condition; Henrie, 2006), comparisons were made with the active control group, to draw more conservative estimates of gratitude intervention efficacy and specificity.

Other studies involved typical gratitude conditions (counting blessings, gratitude letters) as well as atypical conditions that were unlike any other study’s conditions. For example, one condition might count blessings (a typical condition) and an atypical condition might wear a “gratitude bracelet” as a reminder to count blessings each day (Chen, 2011), or one condition would write blessings (a typical condition) and an

atypical condition would write blessings and share them with another person twice a week (Lambert et al., 2013). For studies that included a typical gratitude condition and an atypical gratitude condition, only results from the typical condition were used.

Similarly, if there were two gratitude intervention conditions, one providing rationale for the study to the participants (that the practice should improve well-being) and one not, I used the one that did not—as it could well be assumed that knowledge of the intervention’s effects might produce either a placebo effect independent of the actual intervention (where people assume they will feel better and so they do) or create demand characteristics (where participants might express larger improvements than they actually experience, to please the researchers). Because either of these issues might result in greater effect sizes than one might see for studies where the hypothesis was unknown, I chose to include samples blind to study rationale, when possible⁵ (e.g., Harbaugh & Vasey, 2014).

Outcome variables

All outcome variables that related in any way to self-improvement and positive outcomes due to gratitude interventions were included. Any outcome that was investigated in at least two samples was included. Studies that measured unique dependent variables were left out (e.g., “family happiness” and “family health”; Zhou et al., 2016), along with studies using the same participants as earlier published studies already included in the meta-analyses (e.g., Seear & Vella-Brodrick, 2013). Given the inclusion criteria, the resulting outcome variables that were included here were well-being, happiness, life satisfaction, grateful mood, grateful disposition, positive affect, negative affect, depression, physical health, sleep, exercise, prosocial behaviors, stress, optimism, quality of relationships, and self-esteem. Last, studies were excluded when relevant data (necessary for these analyses) were not provided, or if researchers could not supply the appropriate information (e.g., Lyubomirsky, Tkach, & Sheldon, 2004; Seligman, Steen, Park, & Peterson, 2005; Sergeant & Mongrain, 2011); however, if studies lacked data but said there were “no significant differences” within the text, I imputed zeros for Cohen’s *d* and conducted analyses with and without these assumed zeros.

Organization of meta-analyses

Gratitude comparisons fell into three types based on the nature of the comparison group: neutral conditions, negative intervention conditions, and positive intervention conditions (see Table 1 for specific types of interventions). Each of these comparisons could be

Table 1. Types of interventions included in studies.

Gratitude interventions
Daily/weekly gratitude journal
Gratitude letter [and visit]
Gratitude journal related to work
Journal about something good that happened/will be happening
Gratitude journal and mental imagery
Draw a picture of something one's thankful for (for children)
Neutral/Control comparisons
List of daily/weekly activities
List of interesting things
List of yesterday's activities and associated feelings
Sharing school lessons with a partner
List of the week's tasks
List of early memories
Draw something done today (for children)
List of memorable events
Mood-monitoring daily diary
Measures-only control
Negative interventions
List of daily/weekly hassles
List of hassles related to work
Coping intervention: thinking about the week's misfortunes and what was learned
Constructive worry: dealing with worries before bed
Positive interventions
Best possible selves: imagining and writing about future ideal selves
Performing random acts of kindness
List of daily acts of kindness
Identifying and using signature strengths
Imagery distraction: thinking of positive thoughts
Daily relaxation (tensing muscles and releasing)
Stress-management techniques: deep breathing, muscle relaxation, guided imagery, positive self-talk
Downward social comparisons: how are you better off than most?
Reading about how to increase happiness
Reading about & increasing social connectedness at work
Mindfulness diary and meditation
Draw a picture of one's best possible self (for children)
Proud blessings: list of things that went well/make you above average

examined at both postintervention (immediately following intervention) and later follow-up. Depending on the information reported and analyzed by the researchers, some effect sizes took into account baseline ratings, whereas others did not. Therefore, some effects were comparisons between groups at post or at follow-up. Because effect sizes that take into account pretest ratings tend to be larger due to reduction in between-participants variance, the type of effect size (controlling for baseline vs. between-group comparisons without baseline) was coded as a moderator (see next).

The foregoing categorizations produced six sets of meta-analyses (Type of Comparison Group \times Time Point of Outcome Measurement). The next set of distinctions was based on the nature of the outcome variables (e.g., positive affect, well-being, optimism), and these were considered separately for both methodological and theoretical reasons: first so that the effect sizes analyzed in each meta-analysis would be independent, and second so that conclusions could be formed about specific positive outcomes, rather than positive outcomes in general. It is important to remember, however, that the meta-analyses within each of the

six sets are not fully independent of one another—as they often involve some of the same samples. Although this process resulted in low numbers of studies in each meta-analysis, it provided comprehensive results that go beyond previous meta-analyses. Altogether, there were 56 separate meta-analyses investigating all group comparisons and outcome variables studied in the literature in at least two independent samples.

Recorded variables

Coding procedure

All studies were coded by two independent coders (the author and one of two undergraduate coders, trained in the task) for the following list: (a) publication status (master's thesis, doctoral dissertation, or published article), (b) age of sample (children/adolescents up to 17 years old, college students, or adults), (c) if participants knew study aims (yes, no, unclear), (d) type of neutral condition (no-treatment, active comparison), (e) duration of the intervention (in weeks),⁶ (f) gender proportions of the sample, (g) nationality of sample (United States/Canada, Europe, Asia, Australia, or a combination), (h) health status of participants (healthy, physical health issue, clinical health issue), (i) type of gratitude intervention (counting blessings, gratitude letter/visit, other), (j) duration of follow-up period (in weeks), and (k) type of effect size calculation (controlling for baseline, between-group comparisons without baseline). Coder agreement was high, and any discrepancies in coding were reviewed together, and one code was agreed upon.

Summary of characteristics

Out of 71 potential studies, 38 studies had calculable effect sizes; publication year ranged from 2003 through March 2016. In total, there were 282 effect sizes distributed across the 56 separate meta-analyses, analyzing 5,223 participants. Sample sizes ranged from 35 to 458 participants, with a mean of 137. Nine master's theses and doctoral dissertations were included, along with 29 published studies. Three studies tested children (elementary to high school), 16 studied mainly college-age participants, and 19 used a wider range of adult ages. Across most studies, the majority of participants were women, with percentages of female participants ranging from 24% to 100% ($M = 71\%$). Twenty-six of the studies were from the United States or Canada, five were from Asia, four from Europe, two from Australia, and one study was conducted in both the United States and Asia. In 20 studies, participants were aware of study aims (viz., that the study was related to well-being or self-improvement). Thirty-three studies were

completed with healthy participants (recruited from schools or the community), two with a clinical population (clinical outpatient population, depression), and three with physical health problems (sleep problems, neuromuscular disease, high blood pressure). Seventeen studies were conducted over a 1-week or 2-week intervention period, 11 ranged from 3 to 5 weeks, and 10 studies examined interventions lasting 6 to 12 weeks. Thirty studies used either a daily or weekly counting blessings induction, five used a gratitude letter (some with a related gratitude visit), and the remainder involved some other kind of grateful thinking or writing induction. Follow-ups ranged from a 1-week delay to 6-month delay (if multiple follow-up assessments were included, I used the one closest to a 1-month delay, as this was overwhelmingly most common).

The following outcome variables were considered in at least one meta-analysis: (a) well-being,⁷ (b) happiness, (c) life satisfaction, (d) grateful mood, (e) grateful disposition, (f) positive affect (PA), (g) negative affect⁸ (NA), (h) depression, (i) physical health, (j) sleep,⁹ (k) exercise, (l) prosocial behaviors, (m) stress, (n) optimism, (o) quality of relationships,¹⁰ and (p) self-esteem. All except physical health were measured solely as self-report measures. For physical health, only one study used physiological measures (blood pressure; Shipon, 2007) and one used self-reported absences from school/work due to illness as a proxy for health (Kaplan et al., 2014); most, however, simply asked for self-reported health symptoms. See Table 2 for the full list of studies and which meta-analyses each was included in.

Moderators

The moderators of greatest interest were age, gender composition of the sample, the type of neutral condition (if applicable), and the duration of the follow-up period. Although I was interested in numerous other potential moderators, for various reasons (explained in the results), no other analyses could be conducted.

Age. Only Sin and Lyubomirsky (2009) examined this as a moderator. They grouped studies into children up to age 17, young adults 18–35, middle adults 36–59, and older adults 60 and older, and they found that there were larger benefits as age increased. However, many of the present included studies report wide age ranges, so it was not possible to subdivide as Sin and Lyubomirsky did. Instead, I grouped samples into three categories: children up to age 17, majority college-age students, and majority adults. It would seem likely that children—who are not as aware of gratitude or feelings of morality—would not benefit as much as older individuals. In addition, it could be hypothesized that college students, who are typically convenience samples

recruited into studies to fulfill course requirements, might not benefit very much if they are not engaged with the practice or taking it seriously. Older adults, on the other hand, are likely to volunteer for these studies, and perhaps are more seriously engaged with the intervention.

Gender. No previous meta-analysis on gratitude's effects has looked at gender as a possible moderator, and indeed, most individual studies do not investigate gender's possible influence. Of those studies that do address gender differences, the majority have not found differences with gratitude interventions (e.g., Flinchbaugh, Moore, Chang, & May, 2012; but see also Watkins, Uher, & Pichinevskiy, 2015).

Neutral comparison conditions. Davis et al. (2016) examined whether there were different effects when comparing with no-treatment groups versus more active comparison conditions. However, they did not consider the valence of the comparison condition. Here, I investigated no-treatment versus active comparison condition solely for neutral comparisons—as both positive and negative comparison conditions were always actively engaging. With neutral comparison conditions, some were inactive, no-treatment controls or waitlist controls; others were active groups, generally engaging in similar list-creating activities that were more comparable with the gratitude intervention (such as a list of the day's activities). This distinction was examined in a moderator analysis. Sin and Lyubomirsky (2009) also looked at this as a moderator and found some evidence for differences in well-being (with greatest effects found when compared with a no-treatment control group), but they did not find any differences for depression.

Duration of follow-up period. Studies widely differed in the time that elapsed between posttest and follow-up tests. The shortest window was 1 week after the intervention ended; the longest spanned 6 months. Obviously the duration of the window could have an influence on the magnitude of the observed effects. An intervention may provide a boost in happiness, for example, that lasts for 1 month but subsides after 3 months. To investigate this question, I coded the duration of the follow-up period in weeks in order to test it as a continuous moderator variable through meta-regression. Previous meta-analyses either did not consider follow-up effects (Sin & Lyubomirsky, 2009), aggregated across posttest and follow-up tests (Davis et al., 2016), or did not consider duration of the follow-up period as a moderator (Bolier et al., 2013).

Overall examination into type of comparison group. As mentioned previously, the structure of this project involved a large number of separate meta-analyses that were used both to ensure independence of effects and to provide specific information about

Table 2. List of studies included in which meta-analyses, for which outcome variables.

Reference	N	Included in	Outcome variables
Baker (2011)	165	A	Life Satisfaction, Grateful Disposition, Positive Affect, Negative Affect
Boehm, Lyubomirsky, and Sheldon (2011)	220	A	Life Satisfaction
Chan (2013)	78	C	Life Satisfaction, Grateful Mood, Positive Affect, Negative Affect
Cheng, Tsui, and Lam (2014)	102	C	Depression, Stress
Digdon and Koble (2011)	41	CE	Sleep
Dossett (2011)	64	AB	Happiness, Life Satisfaction, Grateful Disposition, Positive Affect, Negative Affect
Emmons and McCullough (2003), Study 1	192	AC	Grateful Mood, Positive Affect, Negative Affect, Physical Health, Exercise, Optimism
Emmons and McCullough (2003), Study 2	157	ACE	Grateful Mood, Positive Affect, Negative Affect, Physical Health, Prosocial Behaviors, Sleep
Emmons and McCullough (2003), Study 3	65	A	Life Satisfaction, Grateful Mood, Positive Affect, Negative Affect, Physical Health, Exercise, Sleep, Optimism, Quality of Relationships
Flinchbaugh, Moore, Chang, and May (2012)	117	AE	Life Satisfaction, Stress
Froh, Kashdan, Ozimkowski, and Miller (2009)	89	AB	Grateful Mood, Positive Affect, Negative Affect
Froh, Sefick, and Emmons (2008)	221	ABCDE	Life Satisfaction, Grateful Mood, Positive Affect, Negative Affect, Physical Health, Prosocial Behaviors, Optimism
Ganser (2012)	89	ABEF	Happiness, Life Satisfaction, Positive Affect, Negative Affect
Gavian (2012)	271	ABEF	Life Satisfaction, Grateful Disposition, Positive Affect, Negative Affect, Physical Health, Depression, Stress
Harbaugh and Vasey (2014)	164	A	Happiness, Grateful Disposition, Depression
Henrie (2006)	136	AE	Life Satisfaction
Kaplan et al. (2014)	67	EF	Grateful Mood, Positive Affect, Negative Affect, Physical Health, Quality of Relationships
Kerr, O'Donovan, and Pepping (2014)	48	AE	Depression, Stress
Ki (2009)	161	C	Life Satisfaction, Grateful Disposition, Positive Affect, Negative Affect, Depression, Stress
Lambert et al. (2013)	158	A	Happiness, Life Satisfaction, Positive Affect
Lyubomirsky, Dickerhoof, Boehm, and Sheldon (2011)	330	AEF	Well-being
Manthey, Vehreschild, and Renner (2016)	458	ABEF	Life Satisfaction, Positive Affect, Negative Affect, Depression
Martínez-Martí et al. (2010)	105	ABCD	Grateful Mood, Positive Affect, Quality of Relationships
Mongrain and Anselmo-Matthews (2012)	344	BF	Happiness, Depression
Odou and Vella-Brodrick (2013)	210	ABEF	Well-being, Positive Affect, Negative Affect
O'Leary and Dockray (2015)	62	AE	Happiness, Depression, Stress
Otsuka, Hori, and Kawahito (2012)	38	AB	Happiness, Life Satisfaction, Grateful Mood, Positive Affect
Owens and Patterson (2013)	62	AE	Life Satisfaction, Positive Affect, Negative Affect, Self-Esteem
Peters, Meevissen, and Hanssen (2013)	82	ABEF	Life Satisfaction, Optimism
Rash, Matsuba, and Prkachin (2011)	56	E	Life Satisfaction, Self-Esteem
Senf and Liao (2013)	122	AB	Happiness, Depression
Sheldon and Lyubomirsky (2006)	67	ABEF	Positive Affect, Negative Affect
Shipon (2007)	82	A	Grateful Disposition, Physical Health
Smullen (2012)	35	A	Life Satisfaction, Positive Affect, Negative Affect, Depression
Toepfer and Walker (2009)	219	A	Happiness, Life Satisfaction, Grateful Disposition
Toepfer, Cichy, and Peters (2012)	85	A	Happiness, Life Satisfaction, Grateful Disposition, Depression
Tricarico (2013)	132	AB	Life Satisfaction, Grateful Mood, Grateful Disposition, Positive Affect, Negative Affect, Quality of Relationships
Watkins, Uehder, and Pichinevskiy (2015)	129	ABEF	Well-being, Depression

Note: A = gratitude versus neutral at post; B = gratitude versus neutral at follow-up; C = gratitude versus negative at post; D = gratitude versus negative at follow-up; E = gratitude versus positive at post; F = gratitude versus positive at follow-up.

various outcome measures that have not been analyzed in previous meta-analyses. Given the organization of the current work, I was able to inspect overall differences in effect sizes, depending on comparison group, in order to investigate if the comparison group—neutral, negative, or positive—impacted the size of the witnessed effects. That is, for instance, do we see larger effects in the meta-analyses comparing gratitude and negative intervention groups, as compared to those comparing gratitude and positive intervention groups? Of course, it is important to remember that this is not a moderator analysis in the statistical sense, as these effect sizes are not completely independent of one another; however, these comparisons provide similar, useful information.

Determination of effect sizes

For all studies, Cohen's d , the standardized mean difference, was calculated. A positive d value indicates that the gratitude condition had better outcomes than its neutral, negative, or positive comparison group. If the opposite was true, effect sizes were recorded as negative. Often, a study had many effect sizes, both for different comparison groups and for different outcome variables. According to Cohen (1988), the magnitude of the effect is considered "small" if $d = .2$, "medium" if $d = .5$, and "large" if $d = .8$.

If it was unclear how many participants were in each condition, I assumed conditions contained equal

numbers of participants (e.g., Lambert et al., 2013). For studies reporting no significant differences between conditions in the text—but providing no data—I assumed Cohen's $d = 0$ to be conservative, but I additionally performed the analysis, if possible, leaving these out, and mention any discrepancies in the text.¹¹ If not specifically addressed, the meta-analysis did not contain any assumed/imputed zeros. In some cases, these supplemental analyses were not possible, as removing the imputed zeros reduced k to 1. These are also mentioned.

All data were analyzed with both the fixed effects and random effects methods using Comprehensive Meta-Analysis (Biostat, 2005), which provided weighted (by sample size) and unweighted values for Cohen's d . Fixed effects testing, though limited in generalizability to only the studies directly evaluated, provides more statistical power and is deemed appropriate for use with small sample analyses (Rosenthal, 1995), so I focus attention mainly on the fixed analyses.

Statistical analysis

Statistics are reported for each meta-analysis. I include the number of effect sizes (k), total number of participants (N), and both the weighted Cohen's d (weighted by sample size) and unweighted Cohen's d .

Results

Gratitude versus neutral condition

Postintervention

Comparing the gratitude intervention condition with the neutral condition at postintervention revealed evident differences for well-being, happiness, life satisfaction, grateful mood, grateful disposition, PA, depression, optimism, and quality of relationships (see Table 3). Compared to the neutral group, the gratitude intervention group had notably higher scores for the positive variables, and lower scores for depression. No substantial differences were found for NA (with and without imputed zeros for unknown effect sizes), physical health (with and without zeros), exercise, or stress (with and without zeros). Exercise could not be reexamined without the imputed zeros, due to a reduction in k to 1.

Delayed follow-up

Comparing the gratitude intervention condition with a neutral condition at delayed follow-up revealed differences worth noting for well-being, happiness, and depression (see Table 4). Gratitude condition

Table 3. Effect sizes for outcome variables comparing gratitude and neutral conditions at post.

Outcome	k	N	d_w	d_{un}
Quality of relationships	4	332	.51	.74
Grateful mood	9	845	.31	.35
Life satisfaction	19	2,084	.17	.18
Positive affect	19	1,884	.18	.22
Happiness	9	839	.25	.25
Grateful disposition	8	922	.23	.25
Well-being	3	350	.30	.30
Optimism	5	484	.22	.27
Depression	9	1,026	.13	.13
Negative affect	15	1,572	.05	.10
Exercise	2	257	.10	.12
Physical health	5	588	.06	.06
Stress	4	319	.04	.04

Note. k = number of studies in the analysis; N = total number of participants across all studies included in the analysis; Cohen's $d = d_w$ (weighted) and d_{un} (unweighted).

participants had higher reported well-being and happiness at a delayed follow-up than neutral condition participants, and lower depression scores. A small difference was found for PA (with and without zeros). Negligible differences were found for life satisfaction (with and without zeros), NA, physical health, optimism, grateful mood, grateful disposition, and quality of relationships. Physical health, optimism, and quality of relationships were not reexamined without imputed zeros, as k became 1 after removal.

Gratitude versus negative intervention condition

Postintervention

Comparing the gratitude intervention condition with the negative intervention condition at postintervention revealed notable differences for measures of life satisfaction, PA, NA, depression, optimism, grateful mood, and stress (see Table 5). The gratitude intervention led to higher ratings of positive outcome variables and lower levels of the negative variables. Only small differences were found for physical health, prosocial behavior,

Table 4. Effect sizes for outcome variables comparing gratitude and neutral conditions at follow-up.

Outcome	k	N	d_w	d_{un}
Happiness	5	459	.31	.31
Depression	5	831	.21	.25
Well-being	2	111	.55	.55
Positive affect	11	1,114	.10	.16
Grateful disposition	3	343	.13	.19
Negative affect	9	1,080	.07	.10
Grateful mood	5	553	.07	.07
Quality of relationships	2	206	.09	.09
Life satisfaction	8	936	.01	.02
Optimism	2	275	.02	.02
Physical health	2	289	.00	.00

Note. k = number of studies in the analysis; N = total number of participants across all studies included in the analysis; Cohen's $d = d_w$ (weighted) and d_{un} (unweighted).

Table 5. Effect sizes for outcome variables comparing gratitude and negative conditions at postintervention.

Outcome	<i>k</i>	<i>N</i>	<i>d_w</i>	<i>d_{un}</i>
Stress	2	229	1.23	1.23
Grateful mood	5	567	.54	.54
Positive affect	6	728	.47	.47
Depression	2	229	.85	.85
Life satisfaction	3	395	.54	.52
Negative affect	5	623	.42	.39
Optimism	2	348	.23	.24
Prosocial Behavior	2	377	.12	.14
Physical health	3	449	.03	.03
Sleep	2	120	-.03	-.03

Note. *k* = number of studies in the analysis; *N* = total number of participants across all studies included in the analysis; Cohen's *d* = *d_w* (weighted) and *d_{un}* (unweighted).

and sleep, and none could be reexamined without zeros because *k* reduced to 1.

Delayed follow-up

The only effect at a delayed follow-up was for grateful mood (*d* = .28), with the gratitude condition experiencing somewhat larger effects. The only other outcome variable studied was PA; there was no mentionable difference between the gratitude intervention group and a negative comparison group at delayed follow-up for PA. This could not, however, be reexamined without imputed zeros because *k* became 1.

Gratitude versus positive intervention condition

Postintervention

As shown in Table 6, the only substantive difference between gratitude and positive intervention conditions was for well-being, with grateful participants reporting higher levels of well-being at postintervention. No noteworthy differences were found for happiness, life satisfaction, grateful mood, PA (with or without zeros), NA (with or without zeros), physical health, sleep,

Table 6. Effect sizes for outcome variables comparing gratitude and positive conditions at postintervention.

Outcome	<i>k</i>	<i>N</i>	<i>d_w</i>	<i>d_{un}</i>
Well-being	3	569	.17	.17
Grateful mood	3	206	.23	.22
Positive affect	9	839	.10	.10
Negative affect	8	808	.04	.04
Life satisfaction	9	872	.03	.03
Depression	5	585	.02	.02
Self-esteem	2	90	.03	.03
Quality of relationships	2	98	.00	.00
Optimism	2	85	.00	.00
Happiness	2	87	.00	-.10
Stress	4	315	-.03	-.03
Sleep	2	129	-.07	-.07
Physical health	3	314	-.16	-.16

Note. *k* = number of studies in the analysis; *N* = total number of participants across all studies included in the analysis; Cohen's *d* = *d_w* (weighted) and *d_{un}* (unweighted).

depression (with or without zeros), optimism, stress (with or without zeros), quality of relationships, or self-esteem. Prosocial behavior, sleep, optimism, and quality of relationships could not be reexamined due to *k* becoming 1. This suggests that gratitude interventions are no better or worse than other types of positive interventions, like performing acts of kindness, imagining one's best possible self, or using signature strengths.

Delayed follow-up

There was only a small difference for well-being at follow-up (*d* = .24). Differences for happiness, life satisfaction (with or without zeros), PA, NA, physical health, and depression were not notable.

Overall pattern of effects across types of comparisons

By examining effect sizes for the different comparison groups against one another, it is possible to get an understanding of the broader pattern of effects. Table 7 provides both the number of samples tested with each comparison group and the average effect sizes. Figure 1 provides a useful visualization (as suggested in Valentine, Aloe, & Lau, 2015), showing clearly that for most outcome variables assessed for all comparison groups at postintervention—such as grateful mood, PA, and life satisfaction—the difference between the gratitude intervention group and its comparison group on these measures was largest when the comparison group was a negative intervention, smaller when it was a neutral comparison, and nonexistent when it was a positive intervention. Certain outcome variables

Table 7. Summary of effect sizes for outcome variables across comparison groups at post.

Outcome	Comparison Group					
	Negative		Neutral		Positive	
	<i>k</i>	<i>d</i>	<i>k</i>	<i>d</i>	<i>k</i>	<i>d</i>
Stress	2	1.23	4	.04	4	-.03
Depression	2	.85	9	.13	5	.02
Grateful mood	5	.54	9	.31	3	.23
Life satisfaction	3	.54	19	.17	9	.03
Positive affect	6	.47	19	.18	9	.10
Negative affect	5	.42	15	.05	8	.04
Optimism	2	.23	5	.22	2	.00
Physical health	3	.03	5	.06	3	-.16
Quality of relationships	—	—	4	.51	2	.00
Happiness	—	—	9	.25	2	.00
Well-being	—	—	3	.30	3	.17
Sleep	2	-.03	—	—	2	-.07
Grateful disposition	—	—	8	.23	—	—
Exercise	—	—	2	.10	—	—
Prosocial behavior	2	.12	—	—	—	—
Self-esteem	—	—	—	—	2	.03

The *d* columns indicate fixed effects (weighted Cohen's *d*).

— indicates outcome variable not analyzed in current meta-analyses.

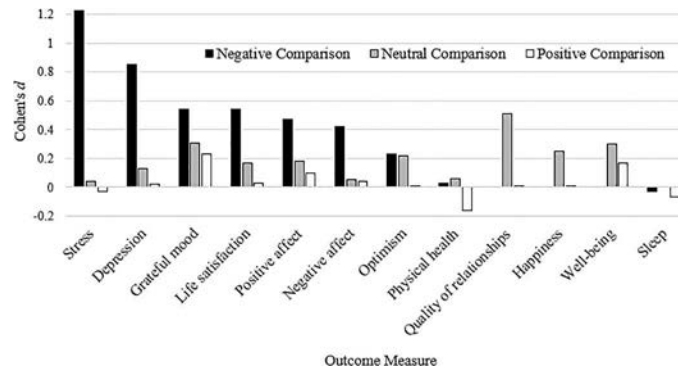


Figure 1. Overall pattern of effect sizes (given in weighted Cohen's *d*) across all meta-analyses, illustrating the size of the effects found when comparing the gratitude intervention condition with the negative, neutral, or positive comparison group. *Note.* The outcomes for quality of relationships and happiness were considered only against neutral and positive comparison groups. For the positive comparisons on these outcomes, the calculated Cohen's *d* was 0.

showed greater differences in magnitude. For instance, when stress outcomes were compared with a negative comparison group, the effect size was the largest of any found in the present meta-analyses, at $d = 1.23$; when compared with a neutral group, d dropped to .04; when positive, $d = -.03$. When outcome variables were only examined against neutral and positive comparison groups (as was the case for quality of relationships, happiness, and well-being), effects were always greater for neutral comparisons than for positive intervention comparisons.

The fact that the effect for physical health was examined against each comparison group, and was never seen, suggests that gratitude interventions may not be effective in this realm. Similarly, sleep was examined against both a negative and positive condition and did not show differences, indicating that interventions do not strongly influence sleep. No effects were seen for exercise and prosocial behavior—only compared with neutral. Neither were there effects for self-esteem, although it must be noted that this was only compared with positive conditions, where effects are rarely seen. Perhaps self-esteem is influenced by gratitude interventions, but no more so than by other positive interventions. With these findings in mind, although Emmons and McCullough (2003) did find benefits for several of these outcome variables, the greater literature does not lend much support for the interventions' efficacy in these domains. However, it should be noted that the number of studies examining these outcomes was quite small ($ks = 2-5$), so caution should be taken.

The overall pattern of findings is important to note, as studies using only one comparison group might underestimate or overestimate the general effectiveness of a gratitude intervention. If a study only compares a gratitude intervention with a negative intervention condition, researchers might see large differences and

conclude that gratitude interventions are very beneficial; had they only compared gratitude with a neutral or a positive intervention condition, they might have failed to see differences, and formed the conclusion that gratitude interventions are not beneficial. The comparison group matters and influences the conceptual meaning of the findings. Effect sizes for neutral group comparisons ranged roughly from 0 to .56, negative group comparisons ranged from $-.03$ to 1.23, and positive comparisons from $-.16$ to .23. Gratitude interventions, overall, are seen as most effective with a negative comparison group.

Because previous meta-analyses aggregated across different comparison groups, their observed effects are likely less informative. It is very possible that positive intervention comparisons and negative intervention comparisons canceled each other out, overall, or if not, that their observed effects were more reflective of the comparison group being represented more frequently in the data. The current project, therefore, is a more elucidating summary of the field's findings.

Moderators

Because the number of studies for many of these meta-analyses was low, moderator analyses were not performed on all comparisons and should be accepted with some caution. I looked only at moderators for the comparison between the gratitude condition and a neutral condition at postintervention and follow-up, and only for those analyses involving at least five effect sizes. Several predicted moderators—knowledge of study aims, peer-reviewed versus other types of work, type of gratitude intervention, culture, frequency of intervention (daily vs. weekly), the duration of the intervention, type of effect size calculation—could not be examined, as the number of effect sizes was

sometimes too small, and at times there was no variability within certain meta-analyses. Here, I present findings for age group, gender composition of the sample, the type of neutral comparison group, and the duration of the follow-up period.

Age

Studies were coded into three age groups: children, college age, and adult. Adult participants—compared to both children and college-age participants—showed bigger differences between gratitude condition and neutral condition at postintervention for life satisfaction (with and without zeros) and for grateful mood. For both, adults showed the largest effect ($d = .26$, $d = .58$, respectively), followed by college-age students ($d = .11$ or $.16$ without zeros, $d = .26$), and negative or null effects for children ($d = -.26$, $d = .09$). There were no differences for happiness, grateful mood, grateful disposition, or positive affect (with or without zeros), although the overall trend was for adults to show larger effects than the other two groups. These findings suggest that gratitude interventions might be too advanced for children. It seems likely that they are too young to fully understand the emotion of gratitude (and perhaps too young to routinely practice a self-help activity). Of course, these findings are based on only three studies involving children, so conclusions must be drawn with caution. As for college students in contrast with adults, it seems logical that perhaps college students are less invested in the practice, as they are likely receiving only course credit for their participation. For adults, perhaps they are more self-motivated or self-selecting—volunteering for these interventions with the goal of self-improvement in mind.

Gender composition

Meta-regressions were performed with proportion of female participants predicting outcome variables for gratitude versus neutral comparison at post (happiness, grateful mood, grateful disposition, life satisfaction, positive affect, depression, optimism), with and without zeros when appropriate. Findings indicated that the gender makeup of the sample did not appear to influence the magnitude of the effects.

Type of neutral comparison group

For studies that used a neutral comparison group, the neutral condition was categorized as no treatment/measurement-only control, or an active control condition. As actively engaging in a practice over the course of several weeks is a much more similar comparison condition to a gratitude intervention, I coded these in contrast to the no-treatment groups, expecting that

the efficacy of gratitude interventions might be greater when compared with a no-treatment condition. For PA, larger effects were seen for no treatment comparisons ($d = .34$ or $.46$ without zeros) than for active control ($d = .11$ or $.13$ without zeros). For happiness and depression (with and without zeros), there were somewhat larger effects found when in comparison to no-treatment controls. For life satisfaction (with or without zeros), grateful mood, and grateful disposition, there were no differences. These findings suggest that the type of neutral comparison group, more often than not, fails to have an impact on the size of effects.

Duration of the follow-up period

For comparisons between the gratitude and neutral groups at delayed follow-ups, four out of the five studies investigating depression used 1-month follow-up periods, making it impossible to test different durations of the follow-up period as a moderator. Only two studies examined well-being, and therefore follow-up period was again untestable. For happiness and positive affect, time since completion (ranging from 2 weeks to 6 months) did not appear to relate to effect size, as tested by meta-regression (using the number of weeks as a continuous variable).

Discussion

These meta-analyses examined the effectiveness of gratitude interventions in contrast to another comparison group—neutral, negative, or positive intervention—at both postintervention and delayed follow-up for a number of different outcome variables. To maintain independence of effect sizes within a given analysis, the meta-analyses were broken up by comparison group and outcome variable, resulting in 56 separate meta-analyses. This project expands on past meta-analytic work investigating interventions in numerous ways. It focuses in on the efficacy of gratitude specifically, rather than positive interventions more generally, and it includes all outcome variables appearing in the literature at least twice—greatly expanding on the outcomes previously analyzed. Finally, it considers not only postintervention and delayed follow-up effects but also effects in contrast to different comparison groups (neutral, negative, and positive). In this way, the current work provides a comprehensive report on gratitude interventions, going well beyond previous meta-analyses.

Most effects were small to medium in magnitude, by Cohen's standards. In general, the largest effects were seen for gratitude conditions compared to negative intervention conditions at post. Overall, the results

suggest that gratitude interventions can have positive benefits for people in terms of their well-being, happiness, life satisfaction, grateful mood, grateful disposition, and positive affect, and they can result in decreases in depressive symptoms. There were mixed findings for negative affect and stress, which showed notable differences only when compared with negative conditions, not neutral or positive—potentially signifying only minor improvements due to the gratitude intervention. No substantive differences were seen for physical health, sleep, exercise, prosocial behavior, or self-esteem—although self-esteem was compared only with positive conditions (possibly hiding gratitude's benefits). Although there were differences when comparing with a neutral condition, differences were generally largest when comparing with a negative intervention condition. Only one notable difference was found when comparing with a positive intervention condition (for well-being), suggesting that gratitude interventions are not necessarily unique in their positive outcomes and should not necessarily be promoted above other types of positive interventions.

Although the effects tended to be larger with a negative comparison group, the actual research question (e.g., “Does a gratitude intervention focusing on counting one's blessings have better outcomes for PA than a negative intervention focusing on counting one's hassles?”) seems uninformative when trying to assess the effectiveness of an intervention. One would surely hope that a gratitude intervention would be better at raising PA as compared to dwelling on life's stresses. It is difficult to know whether the gratitude intervention is improving outcomes, or whether thinking about hassles hurts outcomes, below a neutral or typical level. It seems more telling to be able to say that a gratitude intervention makes a difference when compared to a neutral activity condition. This was the case for many of the outcome variables, but the effects tended to be smaller than for the gratitude-versus-negative comparisons. Furthermore, the lack of differences between gratitude and positive intervention conditions certainly challenges the uniqueness of gratitude interventions. If gratitude interventions rarely prove preferable to other positive interventions, they should not be singled out as particularly effective practices but rather offered as one of numerous intervention options that might be beneficial to individuals. Given the fact that different people may be more responsive or have an easier time contemplating gratitude, optimism, or kindness—just to name a few areas of intervention—it seems that perhaps tailoring interventions to individuals may be the best way to inspire positive intrapersonal change. Lyubomirsky (2007) discussed the idea of “person-

activity fit”—that not everyone will react to each positive psychology intervention in the same way. Some people might have trouble feeling comfortable writing or sharing gratitude letters, for instance, and therefore will not see the same benefits from such an activity. Understanding what works best for any given individual may maximize positive change.

Indeed, some work has begun to address how individual differences matter when it comes to positive psychology interventions. The current work suggests that it is very likely that some people might be more impacted than others by the practice of gratitude, specifically. Adults seem most affected by the simple practice, compared to college students and children. Researchers have started investigating other individual differences that might alter the efficacy of these interventions, such as trait gratitude (Harbaugh & Vasey, 2014; Rash, Matsuba, & Prkachin, 2011), extraversion and openness (Senf & Liao, 2013), positive emotionality (Froh, Kashdan, Ozimkowski, & Miller, 2009; Rash et al., 2011), depression (Harbaugh & Vasey, 2014; Sergeant & Mongrain, 2011), self-criticism (Sergeant & Mongrain, 2011), and motivation to engage in the activities (Lyubomirsky et al., 2011). Researchers have shown an interest in trying to determine how to format such interventions (e.g., daily vs. weekly, 5 min vs. 15, written vs. shared activities, self-selected vs. randomly assigned) to optimize utility, although it seems likely that there is not a “one size fits all” method for all gratitude interventions (or positive interventions, more generally).

Only a handful of studies used study designs comparing gratitude, neutral, and negative conditions. Two (Cheng, Tsui, & Lam, 2014; Martínez-Martí, Avia, & Hernández-Lloreda, 2010) reported means and standard deviations at post and follow-up that suggest neutral was often an intermediate data point, between negative and gratitude; another (Froh, Sefick, & Emmons, 2008) found neutral and gratitude to be most often at similar levels at post and follow-up, with the negative condition showing a unique detriment. Only one of the studies by Emmons and McCullough (2003; Study 1) examined all three conditions. They found a unique advantage to the gratitude condition, with negative and neutral being rather equivalent, for three of their outcome variables, but only significant differences from the hassles condition (and not neutral) for two others. The field is left with a wide-open question as to what has more strength: a gratitude intervention's positive influence or a negative intervention's detriment? This is essential to examine in the future. Studies should consider using neutral comparison groups as the simplest way to test the efficacy of interventions, as negative comparisons may exaggerate effects and positive comparisons may

hide effects. By comparing to neutral, one is able to ask the question, “How does gratitude improve personal outcomes?” without being distracted by the detrimental effects of negative interventions or the comparable effects of other positive interventions.

The fact that effect sizes tended to be small or medium in magnitude, and the fact that there were few differences at a delayed follow-up, further raises the question, Are gratitude interventions worth doing, or should other activities that inspire positive outcomes (exercise; e.g., see Stathopoulou, Powers, Berry, Smits, & Otto, 2006) be emphasized more in the self-help literature? Of course, it seems that there is no downside to practicing gratitude interventions (or other positive interventions)—which are free and easy for anyone to engage in—so such behavior is not a bad practice. However, those expecting huge and lasting gains, or “life-changing” outcomes from the activity, are likely to be disappointed, especially depending on what outcome variable they are interested in improving. Although I believe psychologists may understand that small effects are likely, I am not sure if self-help authors or writers in popular magazines communicate this to their audiences but rather tout gratitude as an easy fix.

Because of the way the data were split by both comparison group and outcome variable, each meta-analysis involved only two to 19 effect sizes. Although meta-analyses can be conducted on as few as two studies, one must do so with caution. Future work could attempt to replicate some of the less explored outcomes.

All things considered, it would seem that engaging in any sort of positive intervention—gratitude or otherwise—might be helpful for adults wishing to make improvements in their lives. If a simple and free practice, done for 5 min every day, can help with things like positive affect and life satisfaction, there seems to be no good reason not to do it. Questions do remain, however, about the extent of the benefits for each individual, the range of outcome variables influenced by gratitude interventions, and how effective these practices may be over long periods. For now, these meta-analyses provide some insight into the usefulness of gratitude interventions overall. Additional work can always be done to further clarify the picture and optimize human flourishing in the world at large.

Notes

1. To further focus their comparisons for psychological well-being, under the umbrella term of *alternative-activity*, they considered both *matched-activities* and

psychologically active conditions. Matched-activities had participants engage in a matched listing activity, paralleling the gratitude condition, but where they listed either neutral events (describing what they did that day), negative events (describing what hassles they dealt with that day), or positive events (describing kind acts they had performed). Psychologically active conditions had participants do an activity that presumably could increase well-being, such as the actual practice of acts of kindness or meditating. With this designation, this would still result in ambiguity between neutral, negative, and positive conditions.

2. Davis and colleagues left out numerous studies from their analyses without explanation, despite mentioning them in their introduction (Flinchbaugh, Moore, Chang, & May, 2012; Owens & Patterson, 2013; Sheldon & Lyubomirsky, 2006), and as a more minor note, they included the same sample as two independent samples (Dickerhoof, 2007; Lyubomirsky, Dickerhoof, Boehm, & Sheldon, 2011).
3. The Davis et al. meta-analysis, in contrast, included the studies by Gilek (2010) and Ozimkowski (2007).
4. Analyses using composite affect measures (average levels of affect over the duration of the entire intervention) were included if no other data were supplied (e.g., Emmons & McCullough, 2003; Harbaugh & Vasey, 2014).
5. However, in Lyubomirsky et al. (2011), the reported data pooled both those who had self-selected into a study about happiness and those who were not given rationale; therefore, both types of participants were left in.
6. Some studies clarified how much time per week was spent on the practice; others did not. Therefore, I used the overall duration of the intervention as a proxy for time investment. Future work would do well to clearly outline the time/effort expended.
7. At times, this was a straightforward well-being measure such as Ryff's Psychological Well-Being Scale (Ryff, 1995) or the Warwick-Edinburgh Mental Well-Being Scale (Tennant et al., 2007). If researchers provided well-being composites (generally consisting of satisfaction with life, positive affect, and reverse-coded negative affect), that composite was used. If the individual elements could be broken apart, the study was not included in the well-being meta-analysis, but rather in the appropriate, more specific meta-analyses.
8. Some studies used measures that combined positive and negative affect into one score and could not be separated (Killen & Macaskill, 2014). These were left out of the current analyses.
9. Following Emmons and McCullough's (2003) variable, only the amount of sleep was analyzed, to maintain consistency.
10. This variable included measures such as Child-Parent Relationship Scale (Pianta, 1995) and the Teacher-Student Relationship Inventory (Ang, 2005), as well as brief questionnaires similar to those found in Emmons and McCullough (2003).
11. Important to note, the proportion of imputed zeros did not differ dramatically across the three types of comparison groups and did not bias findings against the positive intervention condition. The highest proportion of imputed zeros (.25) actually occurred in the negative comparison condition (positive: .22, neutral: .10).

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