



# Being Thankful for What You Have: A Systematic Review of Evidence for the Effect of Gratitude on Life Satisfaction

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**Background:** Many studies suggest a link between gratitude and life satisfaction, including experimental tests of gratitude interventions. This paper presents a systematic review of recent literature on the influence of gratitude on life satisfaction. The aim of this research is to better understand the nature of the relationship between gratitude and life satisfaction and to evaluate the state of literature.

**Methodology:** A systematic search was conducted using four databases (APA PsycInfo, Scopus, Web of Science, and EBSCO), targeting articles published since 2010. Correlational studies were included if they used the GQ6 measure of gratitude and the Satisfaction With Life Scale (SWLS). Intervention studies were included if they reported effects of a gratitude manipulation on SWLS scores. Forty-four articles (N = 16,529) focusing on gratitude and life satisfaction were ultimately selected. Among the selected studies, 18 employed experimental designs and 26 were cross-sectional studies. Five studies also presented cross-lagged analyses from two or more timepoints.

**Results:** The review indicated a substantial positive correlation between gratitude and life satisfaction. Various potential mediators were also identified, including meaning in life, social support, and self-esteem. Some experimental research suggested that gratitude interventions may increase life satisfaction compared to neutral control conditions, although evidence was mixed. There was stronger evidence for these effects in people from Western countries. However, there is no strong evidence that gratitude interventions outperform positively valenced control conditions. Thus, it is possible that the effects of intervention could be caused by demand- or placebo effects.

**Conclusion and Recommendation:** While it is clear that there is a link between gratitude and life satisfaction, the extent to which gratitude causes life satisfaction and the mechanism underlying that link require further exploration. We suggest that experimental work test effects of changes in gratitude that cannot be explained by placebo- or demand effects. We also encourage more interactive interventions as well as research that investigates third variables that could underlie both gratitude and life satisfaction.

**Plain Language Summary:** People who feel more gratitude tend to be more satisfied with their lives and sometimes report feeling more satisfied after performing gratitude-related tasks such as listing things they are grateful for. However, not all studies find these effects, and there is little evidence that these tasks work better than simply asking people to engage in other positive thoughts. It is also possible that people respond more positively to life satisfaction surveys after these interventions because of expectations, rather than real changes in life satisfaction.

**Keywords:** gratitude, life satisfaction, positive psychology interventions, subjective well-being

## Background

Life satisfaction and gratitude have each been linked to improved mental and physical health, increased pro-social behaviors, enhanced quality of relationships, and living a more meaningful life.<sup>1,2</sup> In 2004–2005, two major studies by Park, Seligman,

and colleagues found evidence that gratitude is strongly correlated with higher life satisfaction, and that a gratitude intervention exercise was able to increase life satisfaction.<sup>3,4</sup> Since then, a large body of research has shown a positive correlation between gratitude and life satisfaction, and several intervention studies have claimed to find support for a causal relationship such that manipulations aimed at increasing gratitude lead to corresponding increases in life-satisfaction.<sup>1,5,6</sup> If such a relationship exists, the wellbeing implications are clear: interventions which increase gratitude could help people to lead more contented, happier, and perhaps healthier lives. The current review assesses recent evidence for the causal effects of gratitude on life satisfaction and for the efficacy of gratitude interventions, while also reviewing possible mechanisms for such an effect, and highlighting methodological issues. In particular, this review aims to assess the extent to which research in the past 13 years has addressed limitations highlighted by Wood and colleagues—pertaining to the need for testing against more rigorous control conditions—in their 2010 review of the impact of gratitude on life satisfaction and other facets of subjective wellbeing.<sup>1</sup>

## Gratitude

Gratitude is among the most widely studied constructs in positive psychology.<sup>7</sup> As a dispositional trait, gratitude is understood as a virtue or characteristic, and can vary in intensity, frequency, and span.<sup>8,9</sup> People high in dispositional gratitude tend to feel more grateful following a positive emotion, and they experience gratitude more times per day and across a wider array of circumstances than those low in dispositional gratitude.<sup>8</sup> Previous studies have demonstrated that higher levels of trait gratitude are highly related to more intense experiences of state gratitude in daily life.<sup>10</sup> In one of the first studies to measure dispositional gratitude, McCullough and colleagues, defined it as “a generalized tendency to recognize and respond with grateful emotion to the roles of other people’s benevolence in the positive experiences and outcomes that one obtains”.<sup>10</sup> In the same paper, they developed the first measure of dispositional gratitude, The Gratitude Questionnaire (GQ-6), which is the most commonly used questionnaire to measure dispositional gratitude in recent literature. The present review focuses on studies using the GQ-6.

## Life Satisfaction

Life satisfaction is the cognitive component of subjective well-being and reflects the global evaluation that people make about their satisfaction with their own lives across domains such as work, relationships, and health.<sup>11</sup> The other core components are generally considered to be positive and negative affect. Life satisfaction is considered to be more stable than the affective component of subjective well-being,<sup>12,13</sup> and is associated with tangible positive outcomes, including improved health and increased longevity.<sup>14–16</sup> The dominant measure of life satisfaction is the five-item Satisfaction With Life Scale (SWLS),<sup>11</sup> with the original scale validation paper having been cited over 38,900 times on Google Scholar as of April 2023. The SWLS was originally developed by Diener, Emmons, Larsen, and Griffin, and was intended as a brief assessment of an individual’s general sense of satisfaction with their life as a whole.<sup>11</sup> Only studies that utilized the SWLS to operationalize life satisfaction were considered in this review.

## Scope and Aims of the Present Review

In 2010, Wood and colleagues conducted a review of the literature on gratitude and wellbeing, a broader construct of which life satisfaction represents one dimension. In this review, the authors critically assessed many studies of gratitude and life satisfaction.<sup>1</sup> While they found that many gratitude interventions appeared to increase life satisfaction relative to a baseline prior to the intervention, most of these studies failed to show that gratitude interventions were effective against more rigorous control groups, such as those which include other positively valenced activities with a similar amount of cognitive processing. The authors thus concluded that most existing studies used controls which were “highly unlikely” to “generate the same degree of expectancy” of wellbeing effects as the intervention condition. Consequently, these studies could not rule out the possibility that increases in wellbeing variables were caused by placebo effects.<sup>1</sup>

The present review picks up in 2010 where Wood and colleagues left off, with the intention of assessing whether progress has been made in more rigorously testing the directionality of any causal relationship between gratitude and life satisfaction, and especially the efficacy of gratitude interventions. The aim of this literature review is thus to 1) outline and critically assess evidence for the influence of gratitude on life satisfaction since 2010, 2) summarize evidence relating

to potential mediators and moderators of such effects, and 3) briefly detail some common methods employed by researchers studying these effects.

## Methodology

### Search Strategy

The literature search followed PRISMA recommendations. The review was not registered. A bibliography search was conducted using four abstracting and indexing databases: EBSCO, Scopus, Web of Science, and APA PsycInfo. The advanced search features were used to identify relevant articles by applying the complete search string “(gratitude) AND (life satisfaction)” to the title, abstract, and keywords fields of the documents indexed in the database. The search was limited to scientific articles published in peer-reviewed journals, written in English, published after 2010.

A total of 850 articles were identified in the initial search. Abstracts were reviewed to assess the relevance of the papers for the purposes of this research. Any papers that did not explore the relationship between gratitude and life satisfaction specifically were discarded. This resulted in 162 remaining articles. Examinations of full-text then led to the exclusion of 121 articles meeting one or more of the following criteria: a) the paper’s main focus was not the relationship between gratitude and life satisfaction, but other related variables (eg mindfulness, wellbeing); b) a non-gratitude intervention was administered and effects on gratitude (considered as a dependent variable) were analyzed; c) gratitude was assessed as a mediator in the relationship between a related variable and life satisfaction; d) for non-intervention studies, gratitude was not measured using the GQ-6; e) life satisfaction was not measured using the SWLS; f) the paper was a meta-analysis or systematic review. [Figure 1](#) shows the article selection process. The initial search was conducted by one researcher (the second author). A second researcher (the lead author) then confirmed that the selected articles met the criteria.

In addition to the EBSCO, Scopus, Web of Science and APA PsycInfo database searches, we also considered 17 articles referenced in the selected papers for potential inclusion in the literature review. Subsequent evaluation of the full texts of these 17 articles found that only 2 passed exclusion criteria. Ultimately, 44 articles were identified, including 26 correlational and 18 experimental studies.

## Results

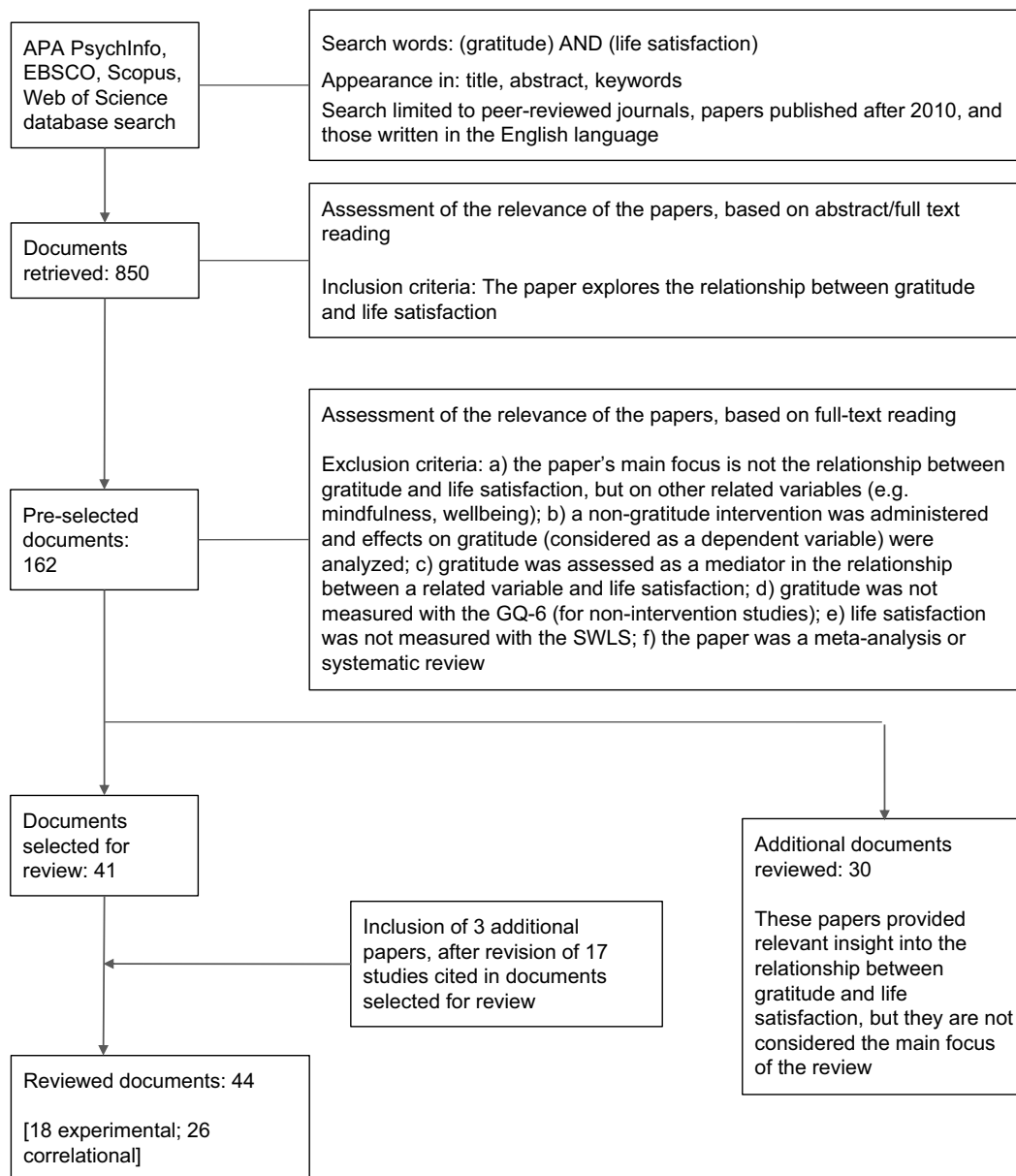
### Cross-Sectional and Longitudinal Research

There is clear evidence of a positive correlation between dispositional gratitude and life satisfaction across many countries and populations. Twenty-six correlational studies met the criteria of the present review<sup>17-42</sup> (see [Table 1](#)). Positive relationships between dispositional gratitude and life satisfaction were reported in 24 of these, including samples of adolescents from India<sup>26</sup> ( $r = 0.81$ ) and China<sup>20</sup> ( $r = 0.19$ ), adults samples from Chile ( $r$ 's between 0.49 and 0.56),<sup>21,22</sup> Switzerland<sup>37</sup> ( $r = 0.49$ ), and Italy<sup>42</sup> ( $r = 0.49$ ) and university students from China ( $r$ 's between 0.14 and 0.33),<sup>18,19,36,38</sup> Iran ( $r$ 's between 0.41 and 0.50),<sup>25</sup> Pakistan<sup>28,30</sup> ( $r$ 's 0.41-0.46), Taiwan<sup>23,31,39,40</sup> ( $r$ 's between 0.18 and 0.44), Romania<sup>24</sup> ( $r = 0.49$ ), and the Philippines<sup>17</sup> ( $r = 0.43$ ). The sole exception was a study of Spanish university students, which reported a small negative correlation ( $r = -0.17$ ).<sup>41</sup> Thus, the cross-sectional relationship between life satisfaction and dispositional gratitude is well supported and has been replicated across multiple populations.

One limitation with these findings is that these studies rely on self-report measures, which are sometimes prone to response biases that can inflate relationships.<sup>43</sup> This can especially be true when both constructs are positively valenced or highly socially desirable (such as feeling gratitude and being satisfied with one’s life). However, while accounting for these biases might lead to an attenuation of the strength of these correlations, it would be unlikely to fully explain relationships as strong as those reported in most of the individual studies detailed above.

### Mediators of the Correlation Between Gratitude and Life Satisfaction

Some of the reviewed correlational studies also explored the potential mechanisms for the relationship between gratitude and life satisfaction by examining mediating variables.<sup>18,28,32,35,40,44</sup> For example, in one cross-sectional study of 427 Chinese undergraduates, Kong and colleagues found that social support and self-esteem fully mediated the relationship between gratitude and life satisfaction; the positive coefficient from gratitude to life satisfaction ( $\beta = 0.23$ ) became



**Figure 1** Systematic process followed for reviewing empirical research.

nonsignificantly negative ( $\beta = -0.14$ ) when these mediators were added to the model.<sup>18</sup> While mediation paths in cross-sectional studies do not, in themselves, indicate the direction of causal relationships, some of these analyses suggest interesting directions for future research. For example, the path model presented in Sun and Kong's analysis suggests an interpretation such that gratitude leads to more positive and less negative affect, which in turn leads to greater life satisfaction: this hypothesized model achieved good model fit across several measures. However, the authors did not report the results of SEM models representing alternative causal explanations, meaning that several alternative explanations are possible, including the more mundane interpretation that these results could simply indicate that people who feel better become both more grateful and more satisfied with their lives.

Several further studies reported mediations by a range of variables, each of which represent plausible mechanisms for a causal relationship. One study of Taiwanese student athletes found a chain mediation by social support from coaches and teammates and subsequently by the athlete's satisfaction with their team, while another study by the same lead author, studying the same population, found the correlation to be fully mediated by perceived team cohesion.<sup>39,40</sup> Xiang

**Table 1** Cross Sectional and Longitudinal Research on the Relationship Between Gratitude and Life Satisfaction

Study	Sample	Design	Main Results
Datu & Mateo (2015) <sup>17</sup>	409 Filipino undergraduates Mage = 17.63	Cross-sectional	<ul style="list-style-type: none"> <li>Gratitude and LS positively correlated (<math>r = .43</math>)</li> <li>Presence of meaning in life was found to be a significant mediator in the relationship between gratitude and LS</li> </ul>
Kong et al (2014) <sup>18</sup>	427 Chinese undergraduates Mage = 21.01	Cross-sectional	<ul style="list-style-type: none"> <li>Gratitude and LS positively correlated (<math>r = 0.19</math>)</li> <li>Social support is a statistical mediator of the correlation between gratitude and self-esteem, and self-esteem is a mediator between social support and LS.</li> </ul>
Sun & Kong (2013) <sup>19</sup>	354 Chinese undergraduates Mage = 20.95	Cross-sectional	<ul style="list-style-type: none"> <li>Gratitude and LS positively correlated (<math>r = 0.24</math>)</li> <li>Positive affect and negative (measured with PANAS) affect each mediated the relationship between gratitude and LS.</li> </ul>
Yang et al (2021) <sup>20</sup>	494 Chinese adolescents. Mage = 13.26	Two time-points	<ul style="list-style-type: none"> <li>Cross lagged model found that T1 gratitude predicted T2 LS, but T1 LS did not predict T2 gratitude.</li> </ul>
Unanue et al (2022) <sup>21</sup>	487 Chilean adults Mage = 41.43	Longitudinal	<ul style="list-style-type: none"> <li>Strong positive correlations between gratitude and LS at all timepoints.</li> <li>Gratitude and predicts later LS, but LS does not predict later gratitude</li> </ul>
Unanue et al (2019) <sup>22</sup>	Chilean working adults. S1 Mean = 38.30 S2 Mean = 36.94 Study 1 (1 month): 725 Study 2 (3 months): 1,841	Longitudinal	<ul style="list-style-type: none"> <li>Strong positive correlations between gratitude and LS at all timepoints.</li> <li>Longitudinal analyses in both studies find evidence of a bidirectional relationship, but gratitude predicts later LS at least as well as LS predicts later gratitude.</li> </ul>
Lin (2019) <sup>23</sup>	375 Taiwanese university students. Mage = 20.40 years	Cross-sectional (SEM analyses)	<ul style="list-style-type: none"> <li>Gratitude and LS positively correlated <math>r = 0.44</math></li> <li>Partially mediated by positive emotion – somewhat more than half the total effect.</li> </ul>
Balgiu (2019) <sup>24</sup>	325 Romanian undergraduates Mage = 20.84	Cross-sectional (SEM analyses)	<ul style="list-style-type: none"> <li>Gratitude and LS positively correlated <math>r = 0.49</math></li> <li>Much of the effect was accounted for by positive affect and negative affect, although there was also a substantial direct effect.</li> </ul>
Aghababaei et al (2018) <sup>25</sup>	Study 1: 188 Iranian students Mage = 21.91 Study 2: 205 Iranian students (Mage = 23.3) and 212 Polish students (Mage = 21.9)	Cross-sectional	<ul style="list-style-type: none"> <li>Gratitude and LS positively correlated in all three samples, with <math>r</math>'s 0.41-0.50</li> </ul>
Biber and Brandenburg (2021) <sup>26</sup>	231 US college students. (Ages not reported).	Cross-sectional	<ul style="list-style-type: none"> <li>Gratitude and LS positively correlated <math>r = 0.36</math></li> </ul>
Chen et al (2017) <sup>27</sup>	190 collegiate athletes from Taiwan Mage = 21.26	Cross-sectional (plus moderation)	<ul style="list-style-type: none"> <li>Gratitude and life satisfaction positively correlated, <math>r = 0.18</math></li> <li>Relationship moderated by mindfulness (Mindfulness Awareness Attention Scale), such that the relationship is stronger in more dispositionally mindful people and non-significant at lower levels.</li> </ul>

(Continued)

Table 1 (Continued).

Study	Sample	Design	Main Results
Green et al (2020) <sup>28</sup>	779 Pakistani university students Mage = 22.3	Cross-sectional (plus mediation)	<ul style="list-style-type: none"> <li>Gratitude and LS positively correlated <math>r = 0.41</math></li> <li>Used Body–Mind–Spirit Wellness Behavior and Characteristic Inventory</li> <li>Positive indirect effects through Body, Mind, and Spirit subscales accounting for roughly half of the total effect.</li> </ul>
Shourie and Kaur (2016) <sup>29</sup>	250 16–18 year-old high school students in India	Cross-sectional	<ul style="list-style-type: none"> <li>Gratitude and LS positively correlated <math>r = 0.81</math></li> </ul>
Ramzan and Rana (2014) <sup>30</sup>	206 university teachers in Pakistan, Mage = 38.24	Cross-sectional	<ul style="list-style-type: none"> <li>Gratitude and LS positively correlated <math>r = 0.46</math></li> </ul>
Chen et al (2012) <sup>31</sup>	29 collegiate athletes in Taiwan Mage = 20.3	Longitudinal (10 one-week intervals)	<ul style="list-style-type: none"> <li>Weekly changes in gratitude within individuals were correlated with changes in life satisfaction.</li> <li>Moderated by Ambivalence over Emotional Expression (AEE), such that the positive correlation was only present at lower levels of AEE.</li> </ul>
Chang et al (2022) <sup>32</sup>	191 Spanish older adults Mage = 63.4	Cross-sectional (plus mediation and moderation)	<ul style="list-style-type: none"> <li>Gratitude and LS positively correlated <math>r = 0.36</math></li> <li>Moderated effect: gratitude-LS relationship is stronger for people better at understanding emotions of others.</li> <li>Mediation of gratitude-LS by broadening one's use of emotions.</li> </ul>
Datu (2014) <sup>33</sup>	210 Filipino university students Mage = 17.8	Cross-sectional	<ul style="list-style-type: none"> <li>Gratitude and LS positively correlated <math>r = 0.47</math></li> </ul>
Aghababaei and Tabik (2013) <sup>34</sup>	256 Iranian students Mage = 23.38	Cross-sectional	<ul style="list-style-type: none"> <li>Gratitude and LS positively correlated <math>r = 0.17</math></li> </ul>
JW Zhang (2020) <sup>35</sup>	S1a: 110 US adult volunteers Mage = 36.1 S1b: 172 US adult volunteers Mage = 39.9 S2: 392 US students Mage = 24.8 S3: 122 US students Mage = 22.3	Cross-sectional Study 3 (n=122) has two-timepoints (cross-lagged analysis)	<ul style="list-style-type: none"> <li>Gratitude at T1 predicted LS at T2</li> <li>Mediation by past positive time perspectives in both cross-sectional and cross-lagged studies.</li> </ul>
L Zhang et al (2022) <sup>36</sup>	S2: 298 Chinese college students Mage = 20.1	Two time-points (cross-lagged analysis)	<ul style="list-style-type: none"> <li>Gratitude at T1 predicted LS at T2, but not vice versa.</li> </ul>
Hill and Allemand (2011) <sup>37</sup>	962 Swiss adults Mage = 52.4	Cross-sectional	<ul style="list-style-type: none"> <li>Gratitude and LS positively correlated <math>r = 0.49</math></li> </ul>
Xiang and Yuan (2021) <sup>38</sup>	991 Chinese university students Mage = 19.1	Cross-sectional (SEM)	<ul style="list-style-type: none"> <li>Gratitude and LS positively correlated <math>r = 0.28</math></li> <li>Chain mediation of gratitude→LS by mindfulness and then benign envy and malicious envy</li> </ul>
Chen (2013) <sup>39</sup>	291 adolescent athletes in Taiwan Mage = 16.8	Cross-sectional (SEM)	<ul style="list-style-type: none"> <li>Gratitude and LS positively correlated <math>r = 0.28</math></li> <li>Chain mediation of gratitude→LS by social support from coaches and teammates and subsequently by team satisfaction.</li> </ul>
Chen et al (2015) <sup>40</sup>	300 adolescent athletes in Taiwan Mage = 16.8	Cross-sectional (SEM)	<ul style="list-style-type: none"> <li>Correlation between gratitude and LS fully mediated by perceived team cohesion.</li> </ul>

(Continued)



**Table 1** (Continued).

Study	Sample	Design	Main Results
Salvador-Ferrer (2017) <sup>41</sup>	309 Spanish university students Mage = 21.9	Cross-sectional	• Gratitude and LS significantly negatively correlated $r = -0.19$
Szcześniak and Soares (2011) <sup>42</sup>	338 Italian adults Mage = 32.1	Cross-sectional	• Gratitude and LS positively correlated $r = 0.49$

**Abbreviations:** SD, Standard Deviation; LS, life satisfaction.

and Yuan identify a chain mediation in which mindfulness leads increases in benign and malicious envy, which in turn lead to increased life satisfaction.<sup>38</sup> Chang and colleagues found the relationship to be mediated by an individual's broadened use of emotions.<sup>32</sup>

Meanwhile, Sun and Kong also found that positive and negative affect fully mediated the correlation between gratitude and life satisfaction in another group of Chinese undergraduates.<sup>19</sup> Indirect effects through positive affect and negative affect. In another cross-sectional study of undergraduate students in the Philippines, Datu and Mateo found that meaning in life statistically mediated the relationship between gratitude and life satisfaction, although the indirect effect accounted for less than half of the total effect,<sup>17</sup> while Green and colleagues found the Body, Mind, and Spirit subscales of the Body–Mind–Spirit Wellness Behavior and Characteristic Inventory mediated the relationship, accounting for roughly half of the total effect.<sup>28</sup> JW Zhang found the correlation to be mediated by past positive time perspectives (assessed by questions like “On balance, there is much more good to recall than bad in my past”) in both cross-sectional and cross-lagged studies.<sup>35</sup>

These studies provide some ideas about possible mechanisms, but a clear limitation is that this cross-sectional work cannot distinguish between-subjects from within-subjects effects. The multitude of psychological mediators that have been identified also points to another issue: there are likely to be many positively- and negatively valenced variables that correlate with each other and also with gratitude and life satisfaction in such a way that a statistically significant indirect effect can be detected in one direction or the other. When these various mediators are measured in isolation, it can be difficult to preclude the possibility of confounding between highly correlated constructs.

### Moderators of the Relationship Between Gratitude and Life Satisfaction

Several studies also identified moderating variables. In a sample of Spanish adults, Chang and colleagues found that correlations were stronger for people better at understanding emotions of others (a subscale of the Wong and Law Emotional Intelligence Scale).<sup>32</sup> Somewhat consistent with this findings, a small ( $n = 29$ ) study of Taiwanese college athletes by Chen and colleagues found a moderation by Ambivalence over Emotional Expression (AEE, which include items such as “Often I find that I am not able to tell others how much they really mean to me”), such that the positive correlation was only present at lower levels of AEE.<sup>31</sup> In another, larger, study of Taiwanese athletes, Chen and colleagues found that the correlation between gratitude and life satisfaction moderated by mindfulness (measured with the Mindfulness Awareness Attention Scale), such that the relationship was stronger in more dispositionally mindful people and nonsignificant at lower levels.<sup>27</sup> These three interactions might be crudely summarized as showing that the correlation between gratitude and life satisfaction is stronger among people who report being more reflective and emotionally intelligent.

### Longitudinal Evidence for Effects of Gratitude on Life Satisfaction

Six of the 26 non-intervention articles reviewed here also included cross-lagged analyses of data spanning at least two time-points.<sup>20–22,31,36</sup> All six of these studies found evidence that gratitude at earlier timepoints predicted life satisfaction at later timepoints. Two of these articles—which included a total of three studies—were conducted by Unanue and colleagues and focused on Chilean adult participants. In the earlier of these two papers there was also evidence that life satisfaction predicted later scores on gratitude, such that there was a bidirectional relationship, while the later paper only found evidence that gratitude influenced life satisfaction.<sup>21</sup> In a 2021 study focusing on Chinese adolescents ( $n = 494$ ),

Yang and colleagues<sup>20</sup> measured gratitude and life satisfaction at two timepoints. Cross-lagged panel models (CLPMs) found evidence that gratitude predicted later life satisfaction, but not vice versa.

Thus, this longitudinal work suggests that gratitude predicts later life satisfaction at least as well as life satisfaction predicts later levels of gratitude. However, it should be noted that CLPMs such as the ones used in the two longitudinal studies are prone to biases when estimating within-subject effects, such that they tend to overestimate autoregressive effects when two variables are substantially correlated at the trait level. Thus, while this longitudinal work is certainly *consistent* with the causal hypothesis that gratitude leads to life satisfaction, further research may seek to replicate these findings using more conservative statistical models which better account for the shortcomings of CLPMs.

## Effects of Gratitude Interventions on Life Satisfaction

### Samples and Methods

Eighteen articles were identified that evaluated the effects of gratitude interventions on life satisfaction (Table 2 outlines sample characteristics, design, and main findings for each study).<sup>44–62</sup> The samples consisted of high school students, college students, and adults, with representation from the United States,<sup>45,46,48,50,52,57,59,60</sup> Canada,<sup>61</sup> Brazil,<sup>47</sup> Hong Kong,<sup>49</sup> Israel,<sup>53,58</sup> Spain,<sup>54</sup> China,<sup>55</sup> Japan,<sup>56</sup> India,<sup>44,51</sup> and Malaysia.<sup>62</sup> Each of the studies included pre-post comparisons, and twelve also measured life satisfaction at a subsequent follow-up, ranging from 14 days<sup>47</sup> to 3 months<sup>45,47</sup> later.

All but one of the 18 intervention studies used exercises in which people reflected on or wrote about things or people that they could feel grateful for in their lives. Several of the studies used grateful listing or journaling exercises.<sup>44,47–49,51,56,58,59</sup> These typically involve participants keep a daily list or journal, in which they list or reflect upon things they are grateful for.

**Table 2** Intervention Research on How Gratitude Influences Life Satisfaction 2010–2022

Study	Sample	Intervention Type	Design Groups	Time of Measure	Main Results
Armenta et al (2020) <sup>45</sup>	1017 students in the United States $M_{\text{age}} = 15.1$	4-week intervention	EG: Gratitude letter writing CG: Listing daily activities (described as an organizational task)	Pre/post/ 3-month follow-up	No absolute increase in LS. Relative increase compared to CG at post-test and 3-month follow-up. Effect partially mediated by increases in feelings of elevation and indebtedness.
Renshaw & Rock (2018) <sup>46</sup>	97 college students in the United States $M_{\text{age}} = 20.0$	2-week intervention	EG: Grateful reflection (no writing) CG: Reflect on something recently learned	Pre/post/ No follow-up	Overall main effect of Time. Unclear if increase in EG is significant. No effect of gratitude intervention on LS compared to the control condition.
Cunha et al (2019) <sup>47</sup>	410 adults in Brazil $M_{\text{age}} = 32.7$	2-week intervention	EG: Grateful listing CG 1: Listing hassles CG 2: Listing daily activities	Pre/post/ 14-day follow-up	Increase in LS relative to baseline. No difference in LS between EG and either control condition.
Boehm et al (2011) <sup>48</sup>	220 adults in the United States $M_{\text{age}} = 35.6$	6-week intervention	EG 1: Grateful Letter Writing EG 2: Practicing optimism (Write about best possible life) CG: Listing past weeks' experiences (described as an organizational task)	Pre/post/1-month follow-up	Increase vs baseline in EG (unclear if significant). Gratitude group reported increased LS at post-test compared to the CG. No increase relative to optimism group. Anglo Americans benefited more from the intervention than did predominantly foreign-born Asian Americans.

(Continued)



Table 2 (Continued).

Study	Sample	Intervention Type	Design Groups	Time of Measure	Main Results
Iqbal & Dar (2021) <sup>44</sup>	385 school students in India $M_{\text{age}} = 16.7$	2-week intervention	- EG 1: Grateful listing (Counting Blessings) - EG 2: Visualizing Best Possible Selves (BPS) - CG (Neutral): Listing daily activities	Pre/post/ 1-month follow-up	No significant increase in LS relative to CG. Moderation: Participants with low baseline self-esteem in the gratitude condition experienced an increase in LS at post-intervention and follow-up versus CG.
Chan (2011) <sup>49</sup>	96 Hong-Kong teachers, $M_{\text{age}} = 33.1$	8-week intervention	EG: Grateful listing exercise No control group	Pre/post No follow-up	Post-intervention increases in life satisfaction relative to baseline.
Toepfer et al (2012) <sup>50</sup>	184 US college students $M_{\text{age}} = 25.7$	3-week intervention	EG: Writing letters CG(Neutral): No activity	3 weeks Pre/post	Pre-test to post-test improvement in LS for EG but not CG. Unclear if interaction is significant.
Khanna et al (2021) <sup>51</sup>	238 Indian school students $M_{\text{age}} = 12.3$	8-week intervention	EG1: Gratitude journaling EG2: Stress management EG3: Gratitude and stress combined Control: No activity	Pre/post	Nonsignificant decrease in LS in gratitude condition. No relative increase versus control.
Gabana et al (2019) <sup>52</sup>	51 US college athletes $M_{\text{age}} = 19.8$	90-minute workshop	Mini-lecture and discussion, then writing activity. No control condition	Pre/post + 4-week follow-up	No increase in LS from pre-intervention.
Atad & Russo-Netzer (2022) <sup>53</sup>	448 Israeli College students who took a positive psychology course. $M_{\text{age}} = 28.5$	1-week writing intervention.	EG: Wrote and hand-delivered a letter of gratitude + brief reflection exercise. CG: Participants journaled about early memories every night for a week.	Pre/post/+1 week/ +1 month/+3 months	Increase in LS versus baseline. Overall EG vs CG effects post-test and after 1 week and 1 month, but not at 3 months. Three-way interaction: effects were strongest among people who scored high on prioritizing positivity and prioritizing meaning measures. Participants in CG also experienced small increase at post-test.
Salces-Cubero et al (2019) <sup>54</sup>	124 older adults in Spain. $M_{\text{age}} = 69.1$	Workshop at day-center.	EG1: Gratitude presentation and discussion. EG2: Savoring presentation and discussion. EG3: Optimism presentation and discussion. CG: No change from usual activities	Pre/post + one month follow-up.	LS increased relative to baseline in gratitude and savoring groups, while no increase was observed in the optimism and control groups. Effect was present at one-month follow-up.
Koay et al (2020) <sup>55</sup>	33 Chinese college students $M_{\text{age}} = 21.8$	1-week social media intervention	EG: Post one picture with gratitude caption on Instagram. CG: Post pictures related to color.	Pre/post	No increase in LS in EG No effects of EG vs CG. Intervention did cause increase in gratitude.

(Continued)

Table 2 (Continued).

Study	Sample	Intervention Type	Design Groups	Time of Measure	Main Results
Nawa and Yamagishi (2021) <sup>56</sup>	80 university students in Japan. $M_{\text{age}} = 22.0$	2-week daily online intervention with mixed tasks.	EG: Gratitude journaling CG: No task	Pre/mid/post	Overall effect of time but increase in LS in the CG appears nonsignificant. No effects of gratitude intervention vs control.
Booker and Dunsmore (2017) <sup>57</sup>	101 undergraduate students in USA $M_{\text{age}} = 18.7$	1-week intervention	EG1: Gratitude-focused writing EG2: Emotion-disclosing writing CG: No activity	Pre/post + 1-month follow-up	Overall increase in LS across all conditions. Increase in LS relative to CG. No increase relative to emotion-disclosing writing.
Berger et al (2019) <sup>58</sup>	$N=150$ . Mixed sample of adults recruited through Facebook and undergraduate students from Israel. $M_{\text{age}} = 26.7$	3-week intervention, multiple methods	EG1: Interpersonal grat. list EG2: Non-interpersonal grat list EG3: Interpersonal grat letter EG4: Interpersonal letter + interpersonal list CG: Daily writing about pos and neg incidents.	Pre/post + 3-month follow-up	LS increased at post-test versus baseline. No effects of any condition above control on either life satisfaction or gratitude.
Timmons and Ekas (2018) <sup>59</sup>	67 mothers of children with autistic spectrum disorder, based in USA. $M = 39.70$ years	8-week intervention	EG1: Gratitude writing EG2: Child-specific gratitude CG: Neutral life event writing task	Pre/post + 1-month follow-up	No effects of either condition on life satisfaction
Uher et al (2017) <sup>60</sup>	$N=56$ volunteers from small-town Church congregations in USA. $M_{\text{age}} = 51.9$	4-week intervention	EG: Gratitude-related sermons. Participants also received a book on gratitude and weekly emails with links to videos. CG: No activity (wait-list) Note: groups not randomly assigned (EG and CG were two congregations).	Pre/post + 4-week follow-up.	Increase in LS over time, but also in control. No group*time interaction.
Rash et al (2011) <sup>61</sup>	44 Canadian adults $M_{\text{age}} = 22.5$	4-week intervention	EG: Twice-weekly gratitude reflection and journaling exercise. CG: (Neutral) Reflection and journaling about a memorable event.	Pre/post	Increase in LS in the EG, nonsignificant decrease in the CG. Unclear if group*time interaction is tested. Moderation by pre-test levels of gratitude (high/low) such that effects only present for low gratitude group.
Noor et al (2018) <sup>62</sup>	59 undergraduate students in Malaysia $M_{\text{age}} = 23.8$	2-week intervention	Grateful listing (3 good things) No control condition	Pre/post	Increase in life satisfaction relative to baseline. No comparison group.

**Abbreviations:** RCT, Randomized Controlled Trial; EG, Experimental Group; CG, Control Group; LS, Life Satisfaction.

A further four studies used a grateful letter writing exercise, in which participants write a letter, usually once a week or over the course of a week, expressing their gratitude to a particular person and, in some cases, deliver and read the letter to the target person.<sup>45,48,50,53</sup> In one of these studies,<sup>53</sup> participants were also asked to hand-deliver these letters,

before engaging in a reflection exercise. In one further study, conducted by Renshaw and Rock,<sup>46</sup> participants were not asked to write anything, but spent five minutes each day over the course of two weeks thinking about something they were grateful for.

Two studies used lectures or spoken presentations as a part of the intervention. A methodological exception was a small study of churchgoers by Usher and colleagues,<sup>60</sup> in which one church group received sermons on the topic of gratitude, while another received sermons on another topic. Participants in the gratitude group also received emails with links to gratitude-related motivational videos and other materials. Another study by Gabana and colleagues<sup>52</sup> used a workshop approach consisting of a lecture-style presentation followed by group discussion.

Some of the studies also distinguished between more specific categories of gratitude intervention. For example, Timmons and Ekas<sup>59</sup> who were specifically examining effects in mothers of children with autism spectrum disorder— included both a standard gratitude condition and a child-specific gratitude condition. Another study by Berger and colleagues aimed to distinguish between effects of a gratitude exercise that focused on interpersonal gratitude (ie, feeling grateful to somebody) and non-interpersonal gratitude (feeling grateful for something material or related to one's circumstances).

The reviewed studies also varied in terms of comparison groups. Two of the studies did not use a control condition and simply reported levels of life satisfaction before and after the intervention (one of which found an increase, while the other did not). Sixteen of the reviewed studies compared a gratitude condition to a neutrally valenced control condition. As outlined in the introduction, these differences in comparison groups may be highly consequential, so we report the results of intervention studies below according to the comparison groups used.

### Effects of Gratitude Interventions versus Neutral and Negative Controls

When comparing the pre-post improvements in life satisfaction between the gratitude group and control groups, the findings varied. Of the 16 studies that compared to neutral control conditions, seven reported significant group-by-time interaction effects of the gratitude intervention.<sup>45,48,50,53,54,57,61</sup> In at least one of these studies,<sup>45</sup> the effect was driven by a decrease in the control condition, rather than an increase after the intervention. While the authors interpreted this result as supporting the efficacy of gratitude interventions and attributed the decrease in life satisfaction to more general trends in motivation across the school semester, there are other plausible explanations for this result. Given that the control condition involved engaging in a mundane, potentially boring activity (listing daily activities and reflecting on obstacles and benefits), it is possible that the control group had a negative effect on life satisfaction, while the gratitude group had no effect.

Of the six studies that found significant effects relative to both baseline and a neutral control group, by far the most well powered was a study by Atad and Russo-Netzer<sup>53</sup> ( $n = 448$ ) which used a 1-week letter writing intervention, with follow-ups one month later and three months later. It should be noted, though, that this study was conducted among students in a positive psychology class, which may have increased the likelihood of expectancy effects, especially because students in different conditions could have spoken with each other about the study.

In sum, the results here find somewhat mixed evidence for the effects of gratitude interventions relative to neutral control conditions. It should be noted, though, that the absence of statistically significant effects in most of these studies does not necessarily indicate a lack of true effects at the population level. Many of these studies had modest sample sizes (8 of 17 studies with control conditions had fewer than 125 participants, and some of these had more than two conditions), meaning that if population effect sizes were real but small, several null findings would be statistically likely.

### Mediators and Moderators of Experimental Effects

Several studies also explored the mechanism through which gratitude influences life satisfaction.<sup>44–46,53</sup> Armenta and colleagues found that the sustained relative increase in life satisfaction for the gratitude intervention group was partially mediated by increases in feelings of elevation and indebtedness.<sup>45</sup> Expressing gratitude predicted greater elevation throughout the study, and elevation predicted greater life satisfaction at the posttest. The indirect effect of elevation extended to the 3-month follow up, as expressing gratitude again predicted greater average elevation, and this increased elevation then predicted greater life satisfaction at the 3-month follow up. Additionally, expressing gratitude predicted greater average indebtedness, and indebtedness predicted greater life satisfaction at the posttest. This effect also extended

to the 3-month follow up, such that expressing gratitude led to greater indebtedness throughout the study, and average indebtedness predicted greater life satisfaction at the 3-month follow-up.

Three studies also found preliminary evidence that intervention effects were stronger in some groups. Atad and Russo-Netzer<sup>53</sup> found main effects of a letter-writing intervention but also found that these were qualified by a three-way interaction, such that effects were strongest among people who scored high on prioritizing positivity and prioritizing meaning measures. In people who were high in both, effects of the intervention on life satisfaction were still present 3 months later. Meanwhile, Rash and colleagues<sup>61</sup> found evidence of effects of a 4-week journaling and reflection intervention only among people who were lower in gratitude at baseline. Somewhat similarly, Iqbal and Dar<sup>44</sup> did not find main effects of a gratitude intervention on life satisfaction, but found some evidence of experimental effects among participants who were lower in self-esteem.

### Effects of Gratitude Interventions versus Positive or Active Conditions

Only 7 of the 18 intervention studies contained conditions in which participants performed a positively valenced or plausibly psychologically active task.<sup>44,46,48,51,54,57,60</sup> Boehm and colleagues included an optimism condition, which showed comparable increases on life-satisfaction to the gratitude condition.<sup>48</sup> Similarly, in a 2021 study focusing on 11th and 12th grade students in India ( $n=385$ ), Iqbal and Dar did not find clear evidence that a gratitude exercise (counting your blessings) performed significantly better at increasing life satisfaction than an exercise in which participants imagined their best possible selves.<sup>44</sup> Likewise, Khanna and colleagues<sup>51</sup> found null effects of a gratitude intervention in Indian high schoolers, both relative to a stress-management condition and a neutral control (indeed, participants in the gratitude condition saw a non-significant decrease in absolute levels of life satisfaction).

Arguably, a study by Uhder and colleagues<sup>60</sup> qualifies as having a positive control, in that the control group received sermons that were not gratitude focused. However, participants in this control group were church attendants, anyway, and they did not receive additional emails and messaging, while the experimental group did (alongside their gratitude-focused sermons). Further, it was not clear from the results section of this article whether members of the gratitude group scored higher on life satisfaction than controls – only that they reported an increase from baseline.

Renshaw and Rock used a control activity which involved reflecting on something recently learned.<sup>46</sup> While this is not explicitly positively valenced, this type of activity may represent a stronger control than some in that it could evoke similar demand expectations to the experimental intervention; participants were being asked to perform a task that may plausibly have had psychological benefits (as compared to, for example, listing hassles, which is not something that most people would expect to make them happier). Again, though, this study found no significant difference between the experimental group and this control group. Similarly, a study by Booker and Dunsmore also included a comparison condition that involved an activity that could more plausibly lead to psychological changes (and therefore is similarly likely to induce expectancy effects).<sup>57</sup> This condition involved a writing task in which participants made emotional disclosures. While the researchers found effects of the gratitude condition relative to a neutral control, they found no evidence of effects relative to this emotional disclosure condition.

The only included study that found clear evidence of a gratitude intervention outperforming any positively valenced or psychologically active comparison condition comes from a small ( $n = 124$ , 36 of whom received the gratitude intervention) study of older Spanish adults by Salces-Cubero and colleagues.<sup>54</sup> In this study, participants in the gratitude condition and a savoring condition (in which participants were asked to bring in a personal object associated with positive memories and to reflect on why they picked it and the good memories and feelings associated with it) both scored significantly higher than participants in both a control group and an optimism condition (which consisted of participants thinking of things they hoped would happen, and planning how to achieve their goals) although effects in the gratitude condition were not shown to be stronger than for the savoring condition. The effect size reported in this study is remarkable: participants in the gratitude condition reported an increase of more than seven standard deviations in life satisfaction, jumping from  $M = 21.8$  ( $SD = 0.99$ ) to  $M = 29.39$  ( $SD = 0.64$ ) at post-test and  $29.11$  ( $SD = 0.82$ ) at a follow-up, one month later. The highest possible score on the version of this scale used in the study is 35 (five items scored 1–7). It is worth noting that there were also some striking changes in other variables: eg, scores on depression dropped from  $M = 4.11$  ( $SD = 0.43$ ) at pre-test (on a 0–5 scale) to  $M = 1.11$  ( $SD = 0.27$ ) at the one-month follow-up. While very large

effect sizes are in some ways encouraging and desirable, they should also be treated with caution, especially in studies with small sample sizes. A legitimate question is as follows: can some brief reflection exercises genuinely increase people's experienced life satisfaction by seven standard deviations or is it possible that the results reflect an expectancy- or demand effect, or some unintentional bias in the experimental design or procedure? Of course, the reality could reflect a combination of true effects and some of these additional factors, but the extreme size of these effects suggests the need for direct replication with a larger sample.

Taken together, these seven studies do not provide convincing support for the effects of gratitude interventions on life satisfaction compared to positively valenced or psychologically active controls. However, one of the studies,<sup>54</sup> which found very large effects in a small group of older adults, may warrant replication to test whether similar effects can be found consistently in larger samples.

## Cross-Cultural Differences

Five<sup>45,48,50,54,57</sup> of the six the studies that demonstrated significant differences in effects on life satisfaction between the gratitude intervention group and a control group were conducted in Western countries (United States, Canada, and Spain), with the other was conducted in Israel<sup>53</sup> (which is generally considered to have both Western and Eastern cultural characteristics). None of the four intervention studies conducted in Eastern cultures (China, India, or Japan) found effects relative to control conditions. Further, in a study of US participants with either Anglo or Asian heritage, Boehm and colleagues found that Anglo Americans benefited more from the gratitude intervention than did predominantly foreign-born Asian Americans, despite the fact that both groups started with equivalent levels of life satisfaction and, based on ratings from independent judges, seemed to write about comparable topics during the intervention.<sup>48</sup>

One possible explanation for this comes from a related study (which did not meet our inclusion criteria) that focused explicitly on cross-cultural differences in the efficacy of gratitude interventions in simply increasing self-reported gratitude (rather than life satisfaction). Shin and colleagues<sup>63</sup> randomly assigned participants from India, Taiwan, and the US to a gratitude experimental condition or to a neutral control condition. It was found that only the US participants who expressed gratitude reported a greater state of gratitude relative to the controls, which led the authors to suggest that gratitude interventions do not "elicit felt gratitude in collectivist cultures". However, another possibility is that this is because the link between gratitude and life satisfaction varies cross-culturally; a major meta-analysis by Dickens and colleagues<sup>64</sup> found that the cross-sectional relationship between these variables was substantially smaller in non-Western countries. A third possibility is that expectancy effects are weaker in some countries, and that these contribute to the observed effects in some studies involving Western participants.

## Implications and Recommendations for Future Research

This review finds a substantial and widely-replicated positive cross-sectional correlation between gratitude and life satisfaction, consistent with other reviews and meta-analyses.<sup>1,64</sup> Additionally, we reviewed several studies that used longitudinal methods<sup>20–22,31,36</sup> or gratitude interventions<sup>44–61</sup> to explore causal relationships. We found mixed evidence, such that while some studies appeared to support a causal relationship, others indicated reasons for caution and the need for more stringent methodologies.

The causal hypothesis that increases in gratitude lead to corresponding increases in life satisfaction found its strongest support from five longitudinal studies which used cross-lagged panel designs to test temporal precedence.<sup>20–22,31,36</sup> Although the evidence in all of the longitudinal studies reported here supported this causal hypothesis, the analyses used in these studies are prone to overestimating within-subject effects, sometimes in ways that can cause false positives.<sup>43</sup> Thus, while these results are encouraging, there is a need for further longitudinal work using more conservative analyses which better separate within-subject effects from between-subjects differences (eg, random-intercepts cross-lagged panel models).

A review of experimental research on the effect of gratitude interventions on life satisfaction revealed mixed findings. While some studies indicated that participants assigned to gratitude interventions reported somewhat greater life satisfaction than they did at baseline, and in some cases better than in neutral control conditions,<sup>45,48,50,53,54,57,61</sup> the literature reviewed here did not support the hypothesis that gratitude interventions perform better than positively

valenced or psychologically active controls (ie, conditions in which participants perform a cognitive task that might plausibly be expected to increase wellbeing). This finding is consistent with a review of self-directed interventions to promote psychological well-being, in which Lyubomirsky and Layous<sup>65</sup> concluded that engaging in any regular activities involving self-discipline seems to promote psychological well-being. Thus, it is still unclear that gratitude interventions lead to increases in life satisfaction that cannot be explained by a more general mechanism whereby doing a certain amount of (any) positive cognitive processing leads to more positive affect and hence to more positive survey responses. Similarly, the fact that positively valenced interventions are likely to make participants more expectant of wellbeing improvements means that it is difficult to rule out the influence of demand- or placebo effects in these studies.

These results are also largely consistent with the results of two meta-analyses which occurred since Wood's paper (and which had somewhat different foci from the present review). In a 2017 meta-analysis of 38 gratitude intervention studies, Dickens<sup>64</sup> reported that participants assigned to gratitude interventions reported somewhat greater life satisfaction than those assigned to neutral control conditions ( $d = 0.17$ ,  $k = 19$  studies – although note that the authors did not test or adjust for publication bias which has elsewhere been shown to be present in research on positive psychology interventions).<sup>66</sup> For studies with a negative control condition, such as listing hassles, effects were substantial ( $d = 0.54$ ,  $k = 3$ ), but for studies with a positively valenced control condition effects were not significantly different from zero ( $d = 0.03$ ,  $k = 9$ ). This is also consistent with a conceptually broader 2016 meta-analysis of the effects of gratitude interventions, in which Davis and colleagues<sup>67</sup> found that gratitude interventions performed better than neutral controls but no better than other psychologically active conditions across a range of different outcome variables. In sum, both our own review and overlapping meta-analyses have found that the case for the effects of gratitude interventions on life satisfaction has not become substantially stronger since Wood and colleagues concluded in 2010 that gratitude interventions were yet to convincingly demonstrate differences from “true controls” (ie, positive and psychologically active).<sup>1</sup>

On a practical level, it could be argued that this does not matter: placebo effects can be beneficial regardless of whether they provide theoretical support for a causal model. Nonetheless, to advance a scientific understanding of the forces that shape life satisfaction, more rigorous research is needed to show that gratitude manipulations actually increase life satisfaction, and that this is a consequence of increased feelings of gratitude or grateful behaviors. Further, even from a practical viewpoint, research needs to show more convincingly that interventions do not just produce demand effects, since these might simply reflect differences in how people answer surveys, rather than actual changes in life satisfaction.

Several cross-sectional studies also identified statistical mediators,<sup>18,28,32,35,40</sup> including social support, self-esteem, positive and negative affect, and meaning in life. While this work is useful in suggesting possible mechanisms, it is not possible to make strong conclusions regarding causality and cognitive and mechanisms based on cross-sectional mediations. It is also worth noting that many constructs measured in positive psychology studies share considerable variance, so it would be beneficial to study potential mediators simultaneously in order to parse the effects of conceptually overlapping variables. Thus, ideally, future research could test multiple mediators against each other longitudinally to more precisely identify cognitive mechanisms involved in any changes.

## Recommendations

If interested in demonstrating a causal link or establishing a widely usable intervention that can confer wellbeing benefits to many people, we recommend future gratitude intervention studies rigorously test gratitude interventions against control conditions that are positively valenced and which are equally plausible sources of improvement (one could test this latter criterion by having a separate group of participants rate the plausibility that the experimental and control conditions could cause increases in life satisfaction).

While such methodological improvements are important, more rigorous testing compared to controls may not be the most promising pursuit, given that several studies have failed to find substantial effects in such cases. If gratitude-based interventions are to be successful in meaningfully increasing life satisfaction, it is possible that more interactive interventions are necessary that go beyond making lists and writing letters. Ideally, this might be achieved with interpersonal interactions with trained professionals. However, given that most people do not have a therapist on hand to interact with every day, one possible approach would be to utilize rapidly-improving artificial intelligence technology



(eg, large language models such as Chat GPT) to develop more interactive interventions that push people towards deeper, more emotive, processing of gratitude-related thoughts.

For the best chances of success, we also recommend that these studies focus on adults, or perhaps more importantly, people who are intrinsically motivated to participate. One meta-analysis<sup>64</sup> found that effects of interventions (relative to neutral controls) were larger among older adults, and noted that this could relate to the fact that adult samples were more often intrinsically motivated volunteers, as opposed to students participating to get study credit. Consistent with this theory, in their 2010 review, Wood and colleagues noted that the study that came closest to showing effects relative to true controls was the original intervention study on this topic by Seligman and colleagues,<sup>4</sup> which used adult participants who volunteered through a website dedicated to positive psychology (and were therefore intrinsically motivated to participate). Among the papers reviewed here, the only study which found effects of a gratitude intervention above any positively valenced comparison group was also a study with unpaid older adults as participants.<sup>54</sup> It is possible, therefore, that real effects of gratitude interventions exist, but only among more motivated participants who fully engage with interventions. Beyond changing sample characteristics (which might not always be practical), it could be valuable to measure how enthusiastic subjects are about participating and how much they report engaging with interventions, such that this could be tested as a potential moderator of intervention effects. For example, recent studies in social psychology have found marked differences in experimental effects between participants who were highly engaged with manipulations and those who were not.<sup>68,69</sup> This approach would be especially useful in studies where not all participants are volunteers, and in studies with large enough samples to reliably detect moderation effects.

Another possibility is that directly targeting gratitude may not be the best way to increase life satisfaction. For this reason, work investigating additional variables may be more fruitful. One approach would be to target variables that have been identified as mediators of the relationship between gratitude and life satisfaction. For example, if gratitude only increases life satisfaction to the extent that it increases positive affect and decreases negative affect, then it might make more sense to target positive and negative affect directly, rather than focusing on gratitude specifically. Thus, perhaps interventions that simply involve taking a few minutes to do a pleasurable thing (eg, eating or sitting in the sun) while being highly focused on the affective experience might be more effective in changing life satisfaction.

Alternatively, researchers could target third variables which might underlie both gratitude and life satisfaction such as ‘primal world beliefs’; basic beliefs about the nature of the world and its contents (eg, *the world is dangerous*).<sup>70</sup> If people vary in the extent to which they see the world as a wonderful place or a terrible place, there may be many psychological consequences, including differences in both gratitude and life satisfaction. Some specific primal world beliefs correlate strongly with both variables and are theorized to influence them.<sup>71</sup> In one sample of 524 Americans, for example, ridge regression models selected predictors atheoretically among all 26 primal world beliefs and an extensive set of 19 demographic variables and found belief that the world is Enticing (ie, a beautiful and interesting place, as opposed to ugly, boring, and barren) to be uniquely related to gratitude. The pairwise correlation between Enticing and gratitude ( $r = 0.71$ ) was stronger than even that between Good world belief and optimism. Meanwhile, the correlation between Enticing world belief and life satisfaction was also substantial ( $r = 0.48$ ) and has replicated across six samples.<sup>72</sup> Thus, researchers interested in increasing gratitude and life satisfaction might also consider primal world beliefs as a possible avenue for investigation.

## Limitations

A limitation of the current review is that the inclusion criteria were somewhat restrictive and thus not all relevant articles were included in the review. These narrow criteria were chosen partly for consistency (to avoid “comparing apples to oranges”) and partly to serve the narrow focus of the review. Importantly, though, the main findings of our review were largely consistent with several reviews and meta-analyses which collectively examined a large number of articles using diverse measures.<sup>1,64,73,74</sup> Further, re-examining the full list of articles that explored the relationship between gratitude and life satisfaction (prior to exclusions based on measures used and the main focus of the article) did not change our main conclusions regarding the overall correlations between gratitude and life satisfaction and the efficacy of gratitude interventions.

A further limitation is that the original literature search was conducted by only one researcher, meaning that some subjectivity could have entered into the selection process. However, the person who conducted the search was a junior researcher with no prior publications on this topic and was not go into the research with an opinion about the state of this area of literature. Thus, it is unlikely that a theoretical bias influenced the selection of articles.

## Conclusions

In 2010, Wood and colleagues conducted a review and concluded that the existing literature could not rule out the possibility that increases in wellbeing variables as a result of gratitude interventions were caused by demand- or placebo effects.<sup>1</sup> Unfortunately, this remains the case. Our review found strong evidence for a correlation between gratitude and life satisfaction and there was also some mixed support for the effects of gratitude interventions on life satisfaction compared to neutral or negative control activities. However, the balance of evidence did not support effects of gratitude interventions beyond positively valenced or psychologically active control conditions. Thus, there is still a need for longitudinal and intervention research that more rigorously tests causal relationships and rules out the possibility that gratitude interventions can be explained by placebo- or demand-effects. Simultaneously, researchers may aim to target more powerful interventions and examine third variables that could underlie both gratitude and life satisfaction.

## Disclosure

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