

Are character strength-based positive interventions effective for eliciting positive behavioral outcomes? A meta-analytic review

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Abstract: Research on strengths-based positive interventions (SBPIs) has often supported their effectiveness, but these studies overwhelmingly focus on experiential outcomes such as affect and subjective well-being. Much less is known about their effectiveness for eliciting positive behavioral outcomes. The current article provides a lexicon to clarify distinctions between various types of positive interventions. This is followed by a meta-analysis of studies examining behavioral outcomes from SBPIs. Multiple databases were searched through October 2020. Out of 418 studies evaluating what could be considered SBPIs, only 48 analyses across 29 articles examined group differences in a behavioral outcome. Random-effects meta-analysis of post-test data revealed a small to medium, statistically significant effect, Hedges' $g = 0.32$. Evidence was insufficient to suggest small-study or methodological bias. SBPIs seemed effective for eliciting behavioral change relative to control conditions consistent with prior meta-analyses. However, the available data are too limited to support SBPIs as an alternative to traditional approaches that focus on direct symptom reduction.

Significance of Scholarship to the Public: Strengths-based positive interventions (SBPIs) represent an increasingly popular approach to behavior change. SBPIs work under the assumption that personal strengths can be used to improve personal functioning. However, existing research on SBPIs predominantly focuses on outcomes related to affect and well-being. The current article goes one step further, providing a statistical review of studies examining behavioral outcomes from SBPIs. Results suggested a small to medium effect. However, a great deal more research is needed to establish the effectiveness of SBPIs as methods of eliciting behavior change.

Keywords: character strengths, positive interventions, positive psychotherapy, meta-analysis, behavior change

1. Introduction

Positive psychology was founded with the goal of fostering the scientific study of the positive aspects of human functioning, as a balance to what its founders perceived as an overemphasis on dysfunction in psychologists' investigations into health (Seligman & Csikszentmihalyi, 2000). Associated with its emergence was an increased emphasis on enhancing positive human functioning, contributing to feelings of well-being, and helping individuals to flourish and thrive. The founders particularly hoped for the development of "effective interventions to build thriving in individuals, families, and communities" (p. 5). Researchers and clinicians quickly picked up

on this call, developing new approaches for improving functioning that will be referred to here as positive psychology interventions (PPIs). In the first study examining interventions inspired by positive psychology, Seligman et al. (2005) evaluated the effect of several such interventions on happiness and depression, including *gratitude visit* (writing and then delivering a letter of gratitude to someone the individual had never properly thanked) and *three good things in life* (writing down three things each evening that went well during the day and their causes).

A particularly fertile source for PPIs has been research and model-building connected with the concept of character strengths. Peterson and Seligman (2004) defined character strengths as ubiquitous traits that are valued in their own right and do not necessarily lead to instrumental outcomes. Niemiec (2018; Niemiec & Pearce, 2021) defined character strengths as positive personality qualities that reflect core identity, produce positive outcomes for oneself and others, and contribute to the common good. For the most part, character strengths do not diminish; rather, individuals high on such strengths elevate those who witness the strength, producing admiration rather than jealousy. Character strengths are valued across cultures. For example, they suggested every culture has conceptions of attributes such as kindness, spirituality, gratitude, creativity, and love.

Peterson and Seligman (2004) distinguished character strengths from other positive attributes such as talents, forms of intelligence, skills, interests, resources, and values in two ways. First, character strengths seem to be universally perceived as contributing not only to individuals but to the community as a whole. As a result, they are considered prosocial attributes of a person, and in some cases even have moral implications (e.g., kindness and fairness); and enhance the flourishing of the community while benefiting the person regardless of their culture. Second, while character strengths are stable, they are also perceived as malleable, and therefore open to intervention, while talents and resources are in general fixed. The most extensive model of these strengths is offered by the VIA Classification of Character Strengths and Virtues (Peterson & Seligman, 2004). The result of a three-year process that involved over 50 leading researchers in positive functioning, the classification includes 24 character strengths, such as creativity, gratitude, kindness, and self-regulation. Character is not viewed as a fixed state, but rather as a dynamic construct. Research on the use of the 24-character strengths has found that using one's strengths has a positive and long-lasting impact on happiness (Lavy, Littman-Ovadia, & Bareli, 2014; Proyer, Wellenzohn, Gander, & Ruch, 2014; Proyer et al., 2015). Peterson and Seligman (2004) identified ten criteria for character strengths:

- Strengths contribute to the pursuit of optimal functioning and well-being.
- Strengths are morally valued apart from any particular benefit.
- The display of a strength is beneficial to witnesses.
- Antonyms cannot be expressed as desirable.
- Strengths can be measured in one's behavior or actions.
- Strengths are distinct from one another.
- There are past and present persons who epitomize character strengths.
- Strengths can manifest to a substantial degree early in one's development.
- It is possible for a person to be devoid of certain strengths.
- Institutions have been created with a dedication to cultivating strengths and virtues (e.g. art institutions, religious institutions).

Going forward, references to strengths are intended to imply character strengths unless otherwise indicated.

1.1 Strengths-based positive interventions

One implication of the focus on character strengths is that intervention strategies intending to enhance those strengths have the potential to result in positive outcomes for the individual. Such interventions can be referred to as strength-based positive interventions (SBPIs). Ruch and colleagues (2020) have recently drawn a distinction between generic and personalized SBPIs. The former are based on the assumption that certain character strengths, such as gratitude, are particularly beneficial, and focus specifically on one or a small set of such strengths. The latter are based on the assumption that the most beneficial character strengths to enhance vary from person to person. These SBPIs usually involve some sort of assessment to identify which of a larger set of strengths are most useful as the target of intervention for each participant. The treatment may begin with participants completing the VIA Inventory of Strengths (Peterson & Seligman, 2004), a measure of the VIA Classification strengths. Based on the participant's results, a subset of the 24 strengths is chosen, and the individual is instructed to engage in some activity focusing on those strengths. For example, one of the interventions described by Seligman et al. (2005) involved using test results to identify strengths particularly central to each participant, or *signature strengths*, and instructing participants to use those strengths in a new way for the following week. Signature strengths have been defined as those character strengths that are easiest, most energizing, and most natural for an individual to express (Peterson & Seligman, 2004). They vary across individuals. Other strengths are believed to be expressed to a lesser degree or with lower frequency.

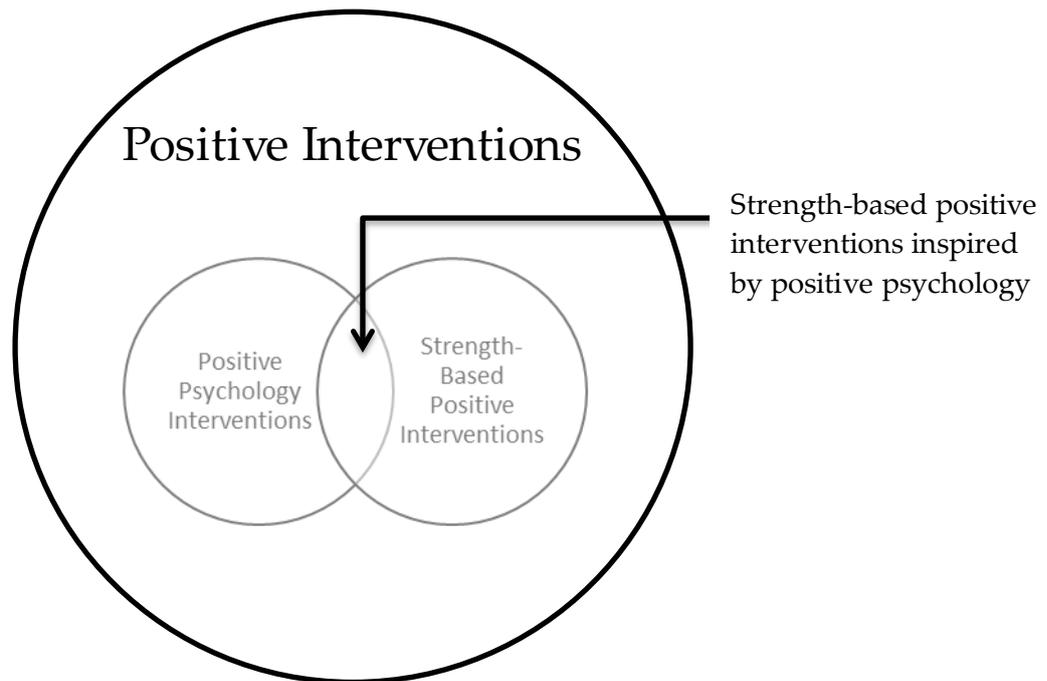
It should be noted that many positively focused interventions and SBPIs predate the positive psychology movement. Examples of the former include a program to increase happiness (Fordyce, 1983) or goal pursuit (Emmons & King, 1988); examples of earlier strategies that could be considered SBPIs include generic interventions that focus on positive attributes such as humor, forgiveness, savoring, and gratitude (Emmons & Crumpler, 2000; Enright & Fitzgibbons, 2000; Malouff & Schutte, 2016; Martin et al., 1993; Weiss et al., 2016). What these strategies have in common is a focus on enhancing positive aspects of daily functioning, with the expectation that doing so will both improve standing on desirable dimensions such as well-being and enhance the resources available to the individual for addressing personal deficits, rather than focusing directly on alleviation of symptoms. Though positive interventions preceded positive psychology, the movement has both spurred the development of and focused attention on positive interventions, SBPIs in particular, and personalized SBPIs even more so (Niemiec, 2018).

Counseling psychologists have long emphasized the use of positive based interventions. Gelso et al. (2014) included an emphasis on strengths and assets as one of the five central themes of counseling psychology, and traced this emphasis back to the 1950s. The importance of the focus on strengths reflects the historical belief among counseling psychologists that all individuals have strengths and coping abilities no matter the level of their disturbance, and that focusing on these assets rather than shame and hopelessness provides a better approach to enhancing mental health and achieving recovery. Thus, while the introduction of positive psychology has expanded the breadth and analysis of positive interventions and has attracted greater interest in such interventions, these efforts complement longstanding practices in counseling psychology.

Because of this focus on the positive rather than on diagnosis, any positive intervention is potentially applicable to a variety of problems. In particular, Sin and Lyubomirsky (2009, p. 468) clarified the concept of PPIs in an important way when they defined them as "treatment methods or intentional activities that aim to cultivate positive feelings, behaviors, or cognitions." This definition encompasses both clinically relevant interventions ("treatment methods") and more

informal strategies (“intentional activities”) that can, for example, include counseling on life problems, coaching, or self-help activities. The resulting literature therefore includes studies with both clinical and non-clinical populations. An illustration of the clinical use of positive intervention is provided by *positive psychotherapy* (Rashid & Seligman, 2018). Again, though this term precedes positive psychology (Peseschkian, 1990), the movement has brought substantial attention to the concept. Figure 1 presents the full lexicon of terms we have summarized here, as backdrop to the current study.

Figure 1. Lexicon of categories of interventions.



Note. Strength-based positive interventions can be further subdivided into *generic* and *personalized* interventions, and personalized interventions inspired by positive psychology often involve *signature strengths*. Positive interventions applied to clinical populations have been referred to as *positive psychotherapy*.

A substantial literature has since emerged evaluating the effectiveness of these types of interventions (e.g., Gander et al., 2013; Proyer et al., 2015; Seligman et al., 2005). Ten recent reviews have specifically focused on positive interventions associated with positive psychology. These are summarized in Table 1. All drew positive conclusions about the effectiveness of these interventions. However, several authors have since criticized the quality of at least the first two of these reviews. Coyne (2014a) noted that Bolier et al. (2013) under-emphasized the poor quality of the studies they included in their meta-analysis. The same author (Coyne, 2014b) also criticized Sin and Lyubomirsky (2009) for, among other issues, combining studies using random and non-random assignment, combining studies that used varying standards for depression, failing to include any evaluation of the quality of the studies they reviewed, and using relatively poor indicators of effect homogeneity and publication bias. More recently, White et al. (2019) criticized these two reviews on a number of grounds, particularly what they saw as insufficient accounting for potential small-sample bias in studies they reviewed. Using one method for correcting effect estimates for small samples resulted in substantial reductions in effect sizes. For example, where Sin and Lyubomirsky reported a mean correlation between treatment and well-being outcomes of .29, White et al. (2019) generated a mean of .08. It should be noted that small-sample bias is

frequently interpreted as evidence of selection bias, but there can be valid reasons for a relationship between sample size and effect size, e.g., if smaller samples contribute to greater experimental control (Lenth, 2001). Ghielen et al.'s (2017) literature review of 18 studies between 2011 and 2016 also noted several shortcomings in the literature, such as the file-drawer effect (i.e., negative and non-confirmatory results were not published), lack of random sampling, and the use of passive or waitlist control groups rather than active control groups.

Table 1. Prior reviews of positive intervention studies inspired by positive psychology.

Authors	Type of Review	# Studies	Time Frame	Interventions	Other Criteria	Outcomes Targeted	Primary Findings
Sin & Lyubomirsky (2009)	Meta-analysis	49	1977-2008	PPI ^a	Excluded physical interventions, mood induction studies	Well-being Depression	Mean <i>r</i> values = [.29, .31]
Bolier et al. (2013)	Meta-analysis	39	1998-2012	PPIs	Random assignment; peer-reviewed	Well-being Depression	Mean <i>d</i> values = [0.20, 0.34]
Quinlan et al. (2012) ^b	Systematic review	8	2004-2011	Personalized SBPIs	Non-clinical settings	Well-being Academic self-efficacy	Significant improvement in all studies
Ghielen et al. (2017) ^{bc}	Systematic review	18	2011-2016	Personalized SBPIs	Similar to Quinlan et al., but included clinical settings	Varied	Small to moderate effect sizes
Schutte & Malouff (2018) ^b	Meta-analysis	14	2005-2017	Personalized SBPIs with signature strengths	No other intervention included	Positive affect Depression Life satisfaction	Mean Hedge's <i>g</i> values = [0.21, 0.42]
Chakhssi et al. (2018)	Meta-analysis	30	1998-2017	PPIs	Adult clinical samples; exclusions similar to Sin & Lyubomirsky (2009)	Well-being Depression Anxiety	Mean Hedge's <i>g</i> values = [0.23, 0.36]
White et al. (2019)	Meta-analysis	136	1977-2012	PPIs	Excluded physical interventions, mood induction studies Random assignment; peer-reviewed	Well-being Subjective Psych. Depression	Mean <i>r</i> values = [.24, .25] Mean <i>r</i> values = [.17, .09, .10]
Carr et al. (2020)	Meta-analysis	347	1998-2018	PPIs	Randomization, excluded physical exercise interventions, mindfulness, and meditation interventions unless part of multi-component PPI programs	Well-being Character Strengths	Mean Hedge's <i>g</i> values = [0.39, 0.46]
Miglianico et al. (2020)	Systematic Review	27	1998-2019	Strengths interventions	Peer reviewed; Excluded strengths possession or endorsement and focus on a single strength	Work performance outcomes, job satisfaction, work engagement, well-being	Strengths use in workplace associated with well-being and work performance outcomes

Authors	Type of Review	# Studies	Time Frame	Interventions	Other Criteria	Outcomes Targeted	Primary Findings
Van Agteren et al. (2021)	Meta-analysis	72	1977-2020	Multi-component PPIs	RCTs; excluded studies comparing psychological interventions; at least one measure of mental wellbeing	Well-being Resilience	Mean Hedge's $g = 0.44$
Koydemir et al. (2021)	Meta-Analysis	68	1950-2017	PPIs	Adult non-clinical samples; random assignment; excluded physical activity interventions and positive psychotherapy; excluded studies aimed at increasing a single positive aspect	Subjective and Psychological Well-Being	$d = 0.23$

^aIncluded some studies of positive interventions that preceded positive psychology.

^bIncluded unpublished studies and/or studies without comparison groups.

^cConsidered an extension of the previous review.

Note. PPIs = positive psychology interventions; SBPIs = strength-based positive interventions.

Another concern one can raise about existing research on PPIs, a concern that is the focus of the present investigation, is an over-emphasis on certain classes of outcomes. Specifically, Coyne (2014a, b) criticized both Bolier et al. (2013) and Sin and Lyubomirsky (2009) for focusing exclusively on experiential variables such as self-reported depression and well-being.¹ This issue applies to several of the other reviews summarized as well. Quinlan et al. (2012) provided recommendations for improving the quality of SBPIs based exclusively on the impact of treatment on well-being. Schueller et al. (2014) even considered the improvement of well-being a definitional component of a PPI, though they explicitly acknowledged the importance of changing thoughts and behaviors for achieving that goal. Schutte and Malouff (2018) noted that future research should focus on a broader variety of outcomes, such as work-related outcomes or health-related behavioral outcomes. While several authors have suggested the importance of looking at how well PPIs and/or SBPIs influence behavior, to date no review of the literature exists focusing on this very important issue for any type of intervention.

1.2 The current study

The breadth of outcomes examined in positive intervention research is important, because the popularity of positive psychology has in part resulted from a belief that it offers a viable alternative to established therapies focused on correcting deficiencies. For example, the meta-analyses cited earlier imply the potential for positive psychology interventions to be used as freestanding treatments (also see Chaves et al., 2018), as does the existence of material discussing positive psychotherapy as a treatment option (e.g., Rashid & Seligman, 2018). Meyers and colleagues (2015) found interventions focusing on one's personal growth initiative (PGI), particularly strengths interventions, showed better outcomes than an intervention focusing on individual deficiencies. Specifically, there was a short-term increase in PGI for the strengths intervention but no effect on PGI for the deficiency intervention (Meyers et al., 2015). Since behavior change is an essential ingredient in many treatment contexts (behavioral activation,

¹ Conceptually, depression has both affective/experiential and behavioral components. When represented by a single score, though, it is unclear the extent to which scores on depression measures reflect both elements of the construct. Prior studies have reported substantial correlations ($> .50$) between measures of depression and measures of well-being and happiness, for example (Ryff & Keyes, 1995; Watson & Naragon-Gainey, 2009).

smoking or drug use cessation, increased exercise, increasing sleep duration, medication compliance, etc.), this belief cannot be valid if PPIs are only effective at changing self-perceptions. The purpose of the present meta-analysis was to synthesize evidence concerning SBPIs as contributors to behavior change as opposed to emotional and affective perceptions.

In taking on such a project, several decisions had to be made about its scope. The first was the decision to limit inclusion to SBPIs rather than PPIs in general. This decision was made because the availability of strength lists inspired by positive psychology simplified the process of identifying relevant interventions. It provided a good boundary condition between interventions relevant to positive psychology versus positive interventions in general.

A second decision had to do with whether to limit the review to literature that clearly emerged under the influence of the positive psychology movement. For example, Schueller et al. (2014) criticized Bolier et al.'s (2013) review for excluding studies that did not explicitly reference positive psychology as an inspiration. Doing so, they suggested, created an arbitrary boundary to inclusion, with studies evaluating the same intervention included or excluded primarily based on what the authors chose to state. The current review included studies that focused on strength enhancement regardless of reference to the positive psychology movement.

Third, the review was not limited to studies examining what could be considered clinical interventions. As noted earlier, use of PPIs has explicitly been encouraged in counseling or coaching as well as clinical work (Sin & Lyubomirsky, 2009), and a substantial literature has emerged from these settings (e.g., Linley & Harrington, 2005; Park & Peterson, 2008). To summarize, the meta-analysis focused on the use of SBPIs, broadly conceived, to enhance outcomes likely to be indicative of behavioral functioning across both clinical and non-clinical settings.

2. Method

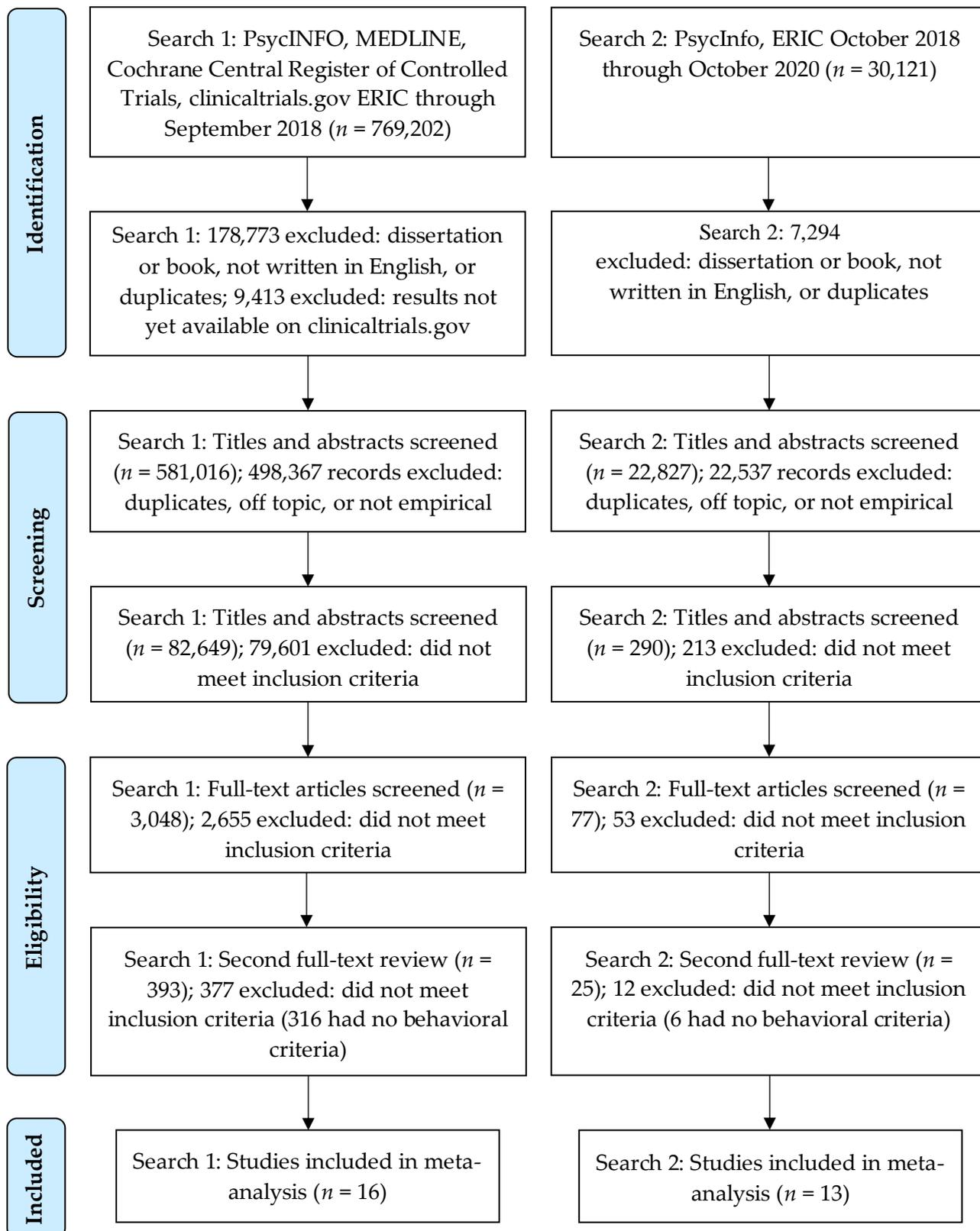
2.1 Search strategy

The first search proceeded as follows. A lengthy list of terms that could potentially indicate a character strength was developed through a review of literature and discussion among contributors to the study (see Appendix A). Once this list was compiled, a systematic literature search was conducted using the PsycINFO, Medline, ERIC, clinicaltrials.gov, and Cochrane Central Register of Controlled Trials databases spanning all records from initiation of the database until February 2018. Identified studies had to include one or more terms in Appendix A plus one or more of the following terms: *therapy, psychotherapy, treatment, intervention, or trial*. The initial search generated 769,202 references (see Figure 2).

The following criteria for inclusion were adopted:

- (1) The reference was published in a peer-reviewed, English-language venue.
- (2) The study included an intervention that focused on at least one of the strengths listed in Appendix A.
- (3) The study included a comparison condition. Random assignment was not required.
- (4) At least one outcome measure reflected a change in participant behavior rather than an emotional experience or attitude. This included both self-reported and independently observed behavior changes.
- (5) Sufficient statistics were reported to enable the calculation of at least one standardized mean difference between the active and comparison conditions at posttest, or study authors were able to provide sufficient statistics upon request.

Figure 2. PRISMA flow diagram.



Of the final 393 that were thought to be potential candidates for inclusion, 316 included no behavioral criteria. Thus, almost all studies done on SBPIs relied exclusively on experiential outcomes. The final pool consisted of only 16 articles.

Given the small sample, the search was repeated (search 2) from February 2018 to October 2020. This time the search was limited to the PsycINFO and ERIC databases because all studies generated from the prior search were present in one of those two sources. Identified studies had to include one or more terms in Appendix A plus one or more of the following terms: *therapy, psychotherapy, treatment, intervention, or trial*. The initial search generated 30,121 references, of which only 13 met the criteria. Again, the primary cause of exclusion was the absence of behavioral outcomes.

2.2 Data extraction

Two doctoral students independently extracted data from each article and disagreements were resolved by one of the first two authors. Across the 29 articles, 48 analyses were available that examined group differences in what was deemed a behavioral outcome at posttest. We provided results for several potentially important and intuitively compelling candidates for moderators of effect size. Accordingly, the following variables were extracted:

- Age: child, adolescent/emerging adult, or adult
- Population: pre-college students, college students, adults, or clinical
- Setting: academic, community sample, or clinical sample
- Delivery system: live versus on-line intervention
- Monitoring: self-guided versus therapist-guided intervention
- Clustering: group versus individual intervention
- Basis for participation: volunteered to participate versus enrolled as a group (e.g., children in a classroom)
- Assignment: random versus non-random assignment to condition
- Type of control: waitlist versus active control

We had hoped to evaluate recipient ethnicity as a potential moderator, but this information was absent from most of the studies.

In addition, two doctoral students independently evaluated each study for risk of bias. Seven potential contributors to bias were evaluated based on guidelines provided by the Cochrane Collaboration's tool for assessing risk of bias (Higgins et al., 2011): random sequence generation, allocation concealment, blinding of participants and personnel, blinding of neurocognitive outcome assessment, blinding of behavioral outcome assessment, incomplete outcome data, and selective reporting. A detailed explanation of each of these can be found in Appendix B. Raters evaluated each study on each of the seven contributors as low, unclear, or high risk of bias.

2.3 Statistical analyses

Statistics were computed using Comprehensive Meta-Analysis, Version 3.0 (Borenstein et al., 2013). Given variations in the populations, interventions, and outcome variables, results from the random-effects model are reported (Borenstein et al., 2010). Estimates of heterogeneity and small-sample bias were also generated. As noted previously, exploratory meta-regression analyses were conducted recognizing the results could only be considered preliminary.

3. Results

3.1 Global findings

Table 2 provides a summary of the articles. The average length of the intervention was 8.48 weeks ($SD = 7.47$, median = 7.00, range = [2, 32]). The average sample size was 229.07 post-test participants (median = 82; range = [20, 2517]). There were 24 studies in which participants were randomly assigned to treatment. In the remaining studies, either the method of assignment was not adequately described, or assignment was non-random.

Table 2. Summary of data across analyses.

Study	Intervention	Length	Targeted Strength(s)	Behavioral Measure	Sample	Setting	Live?	Self-guided?	Group?	Self-Selected?	Assign-ment	Control
Abbott et al. (2009)	Resilience Online (ROL)	10 weeks	Empathy, Hope	Work performance	53 sales managers	Community	Online	Supervised	Individual	No	Random	Waitlist
Akhtar & Boniwell (2010)	PPI for alcoholism	8 weeks	Gratitude	Alcohol consumption	20 mental health/"substance misuse"	Clinical	Live	Supervised	Group	No	Unclear	Waitlist
Annesi (2019)	Self-regulation treatment	6 months, 6 meetings, 45 minutes each	Self-regulation	Exercise self-regulation; Eating self-regulation	109 adults	Community	Live	Supervised	Both	Yes	Random	Active
Armenta et al. (2020)	Classroom-based gratitude letter writing	10 minutes weekly, 4 weeks	Gratitude	Academic performance (GPA)	1,079 adolescents/emerging adults	Academic	Online	Supervised	Individual	Yes	Random	Active
Bagès et al. (2020)	RPGs group intervention	3 weeks, 3 sessions, 60 minutes each	Empathy	Aggressive behavior; Bullying	86 adolescents	Academic	Live	Supervised	Group	No	Random	Active
da Costa Rolo & Gould (2007)	Fostering hope	6 weeks, 12 sessions	Hope	Athletic performance; Academic performance	43 college student athletes	Academic	Live	Supervised	Individual	Yes	Random	Waitlist
Engbretson et al. (2020)	Cognitively-based Compassion training (CBCT)	20 hours over 10 weeks	Compassion	Child prosocial acts; Child self-referential behaviors; Child self-distress	38 adults/children	Community	Live	Supervised	Group	Yes	Random	Waitlist
Frie et al. (2020)	Self-regulation intervention (PREVAIL)	8 weeks	Self-regulation	Weight change	93 adults	Community	Online	Both	Individual	Yes	Random	Active
Grant et al. (2009)	Coaching	10 weeks	Leadership	Global Attainment Scale	82 executives/managers	Community	Live	Supervised	both	No	Random	Waitlist
Kadir et al. (2018)	Dual approach Instruction	3 weeks, 7 sessions, 1 hour	Fidelity	Engagement; Self-regulation	426 children	Academic	Live	Supervised	Group	No	Random	Passive
Littman-Ovadia et al. (2014)	Strengths Based Career Counseling (SBCC)	4 sessions, appeared to be weekly	Hope	Career Exploration Scale	61 unemployed adults	Community	Live	Supervised	Individual	No	Quasi-random	Active
Maratos & Sheffield (2020)	Compassion-d-focused imagery	2 sessions, 1 week apart	Compassion	Pain tolerance	68 adults	Academic	Live	Supervised	Individual	Yes	Random	Active
McGonagle et al. (2020)	Coaching	12 weeks, 6 sessions	Gratitude, Knowledge	Work engagement	50 adults	Clinical	Both	Supervised	Individual	Yes	Random	Waitlist
Mitchell et al. (2009)	Internet strengths intervention	3 weeks	Gratitude, Knowledge	Orientation to Happiness Scale (OTH) – engagement	40 adults	Community	Online	Supervised	Individual	Yes	Random	Active

Study	Intervention	Length	Targeted Strength(s)	Behavioral Measure	Sample	Setting	Live?	Self-guided?	Group?	Self-Selected?	Assignment	Control
Mori & Cigala (2019)	Perspective-taking intervention	15 days, 9 sessions, 45 minutes each	Perspective	Prosocial behavior	206 children	Academic	Live	Supervised	Group	No	Random	Waitlist
Ouweneel et al. (2013)	PPI: self-enhancement intervention	8 weeks	Meaning, Resourcefulness	Utrecht Work Engagement Scale	311 adults	Community	Online	Supervised	Individual	Yes	Unclear	Active
Ouweneel et al. (2014)	Thoughts of Gratitude	5 weeks	Gratitude	Utrecht Work Engagement Scale-Student: academic engagement	50 college students	Academic	Online	Supervised	Individual	Yes	Random	Active
Ouweneel et al. (2014)	Acts of Kindness	5 weeks	Kindness	Utrecht Work Engagement Scale-Student: academic engagement	50 college students	Academic	Online	Supervised	Individual	Yes	Random	Active
Pang & Ruch (2019)	Mindfulness-Based Strengths Practice	8 weeks, 1 session, 120 minutes each	Peterson and Seligman's character strengths	Task Performance	63 adults	Community	Live	Supervised	Group	Yes	Random	Waitlist
Peters et al. (2017)	Internet PPI	7 weeks	Compassion	Fibromyalgia impact	126 adults with chronic pain	Clinical	Online	Supervised	Individual	Yes	Random	Waitlist
Quinlan et al. (2014)	Strengths-based program	6 weekly sessions	Perspective	Classroom engagement	187 children	Academic	Live	Supervised	Group	No	Non-random	Waitlist
Roth et al. (2017)	PPI	10 weeks, 50min/weekly	Gratitude, Hope, Kindness	Externalizing problems	42 children	Academic	Live	Supervised	Group	No	Random	Waitlist
Sergeant & Mongrain (2014)	Optimism-based PPI	3 weeks	Meaning	Orientation to Happiness Scale (OTH) – engagement	166 adults interested in becoming happier	Community	Online	Self-guided	Individual	Yes	Random	Active
Shoshani & Slone (2017)	Maytiv Preschool Program	32 weeks, 5 activities/week	Empathy, Kindness, Gratitude, Self-regulation,	Approaches to Learning Scale	315 children	Academic	Live	Supervised	Group	No	Random	Waitlist
Shoshani & Slone (2017)	Maytiv Preschool Program	32 weeks, 5 activities/week	Empathy, Kindness, Gratitude, Self-regulation, Pro-sociality	Prosocial behavior	315 children	Academic	Live	Supervised	Group	No	Random	Waitlist
Shoshani et al. (2016)	Maytiv Program	30 weeks, 15 2-hour sessions	Meaning, Gratitude, Perseverance, Hope, Tolerance	School attendance; Grade point average; Behavioral engagement-child report; Behavioral engagement-teacher report	2517 children	Academic	Live	Supervised	Group	No	Random	Waitlist
Style & Boniwell (2010)	Group life coaching	6 weeks, 6 sessions	Hope, Meaning, Self-acceptance	Orientation to Happiness Scale (OTH) – engagement	31 adults	Community	Live	Supervised	Group	Yes	Random	Active
Timmons & Ekas (2018)	General writing-based gratitude intervention	8 weeks	Gratitude	Child behaviors	43 adults	Community	Online	Supervised	Individual	Yes	Random	Active
Timmons & Ekas (2018)	Child-specific writing-based gratitude intervention	8 weeks	Gratitude	Child behaviors	45 adults	Community	Online	Supervised	Individual	Yes	Random	Active

Study	Intervention	Length	Targeted Strength(s)	Behavioral Measure	Sample	Setting	Live?	Self-guided?	Group?	Self-Selected?	Assignment	Control
Timmons & Ekas (2018)	General-specific writing-based gratitude intervention	8 weeks	Gratitude	Relationship quality (adult coping behaviors)	45 adults	Community	Online	Supervised	Individual	Yes	Random	Active
Timmons & Ekas (2018)	Child-specific writing-based gratitude intervention	8 weeks	Gratitude	Relationship quality (adult coping behaviors)	43 adults	Community	Online	Supervised	Individual	Yes	Random	Active
Walker & Lampropoulos (2014)	PP homework-volunteering	2 weeks, 4 hours	Meaning	Behavioral Activation for Depression Scale	43 college students with mild depression	Academic	Live	Self-guided	Individual	Yes	Random	Waitlist
Wingert et al. (2020)	Mindfulness-based strengths practice	8 weeks	Mental focus on VIA character strengths	Student engagement	50 adults	Academic	Live	Supervised	Group	Yes	Random	Passive
Wittleder et al. (2019)	Mental Contrasting with Implementation Intentions	4 weeks	Self-regulation	Drinking days per weeks, (AUDIT <8); Drinking days per weeks, (AUDIT ≥ 8); Drinks per week, (AUDIT <8); Drinks per week, (AUDIT ≥ 8); Drinking-related problems, (AUDIT < 8); Drinking-related problems,, (AUDIT ≥ 8)	200 adults	Community	Online	Self-guided	Individual	Yes	Random	Active

Note. PP = positive psychology; PPI = positive psychology intervention

Pre-test data was assessed for all groups. An analysis of pre-test data suggested that there was a small difference between groups, mean Hedges' $g = 0.07$, 95% CI = [0.02, 0.12]. In all but two cases where the authors provided Cohen's d values only, effect sizes were estimated from means and standard deviations. For 24 of 48 analyses, the total sample size for the comparison was < 50, so Hedges' g was used as an unbiased estimator of the standardized mean difference in small samples (Hedges, 1981). Using the Knapp-Hartung-Sidik-Jonkman method, which has been found superior to the standard DerSimonian-Laird method (IntHout et al., 2014), the studies on average yielded a small, statistically significant effect size at posttest, $g = 0.32$, 95% CI = [0.19, 0.46], $p = .0001$. Table 3 (below) provides effect sizes by study; note that only three 95% CIs do not include 0. Though the aggregation of data across studies supported the conclusion of a positive mean effect at the population level, the individual studies generally tended to be of insufficient size to identify a significant positive mean effect. In fact, the prediction interval (IntHout et al., 2016) was [-0.25, 0.90], suggesting the potential for substantial variability in the value of SBPIs depending on the context.

3.2 Evaluation of bias

Increasingly, it is considered important in meta-analyses to consider the possibility that authors selectively reported results, and to test for this possibility. A number of such tests are now available. Tests of selection bias produced somewhat inconsistent results. Figure 3 (below) provides the funnel plot, which demonstrates some asymmetry. The Begg and Mazumdar rank

correlation ($\tau = .04$ with continuity correction) did not differ significantly from 0 ($p = .37$), but Egger's more powerful test of the regression intercept (1.38) was significant at $p = .02$. The trim-and-fill procedure suggested a point estimate of $g = 0.10$ [-0.03, .24], i.e., the effect was no longer significant. However, this last method must be interpreted with some caution due to consistent evidence of a tendency to detect bias even when absent, i.e., an excessive Type I error rate (Peters et al., 2007; Terrin et al., 2003). In contrast, the Vevea and Hedges' (1995) likelihood test of selection bias was not significant, $\chi^2(1) = 2.31, p = .13$. Taken as a set, these findings do not provide strong support for small-study bias, though it is uncertain to what extent this reflects the relatively limited set of studies.

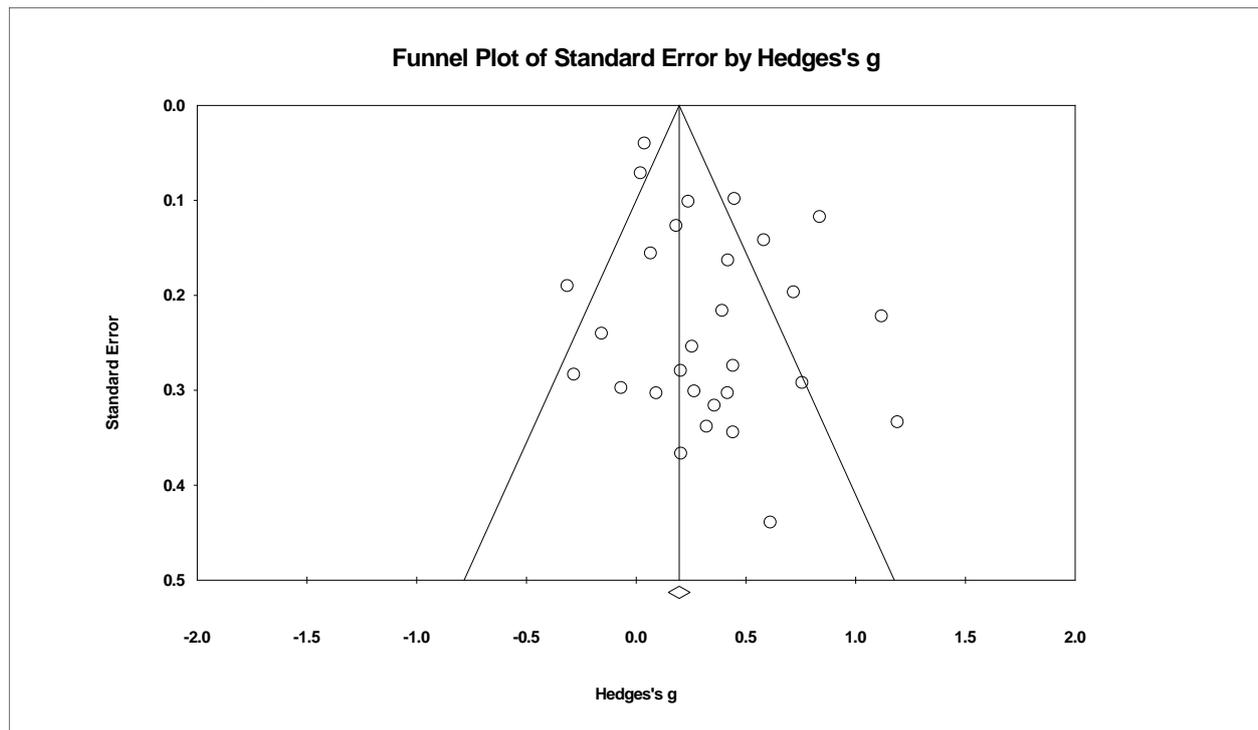
Table 3. Summary of study effects.

Study	<i>g</i>	<i>SE</i>	95% Confidence Interval
Abbott et al. (2009)	0.44	0.27	[-0.10, 0.98]
Akhtar & Boniwell (2010)	0.61	0.44	[-0.25, 1.47]
Annesi (2019)	0.72	0.20	[0.33, 1.10]
Armenta et al. (2020)	0.02	0.07	[-0.12, 0.16]
Bagès et al. (2020)	0.39	0.22	[-0.03, 0.82]
da Costa Rolo & Gould (2007)	0.26	0.30	[-0.33, 0.85]
Engbretson et al. (2020)	0.32	0.34	[-0.34, 0.98]
Frie et al. (2020)	1.12	0.22	[0.68, 1.55]
Grant et al. (2009)	1.19	0.33	[0.54, 1.84]
Kadir et al. (2018)	0.45	0.10	[0.26, 0.64]
Littman-Ovadia (2014)	0.25	0.25	[-0.24, 0.75]
Maratos & Sheffield (2020)	-0.16	0.24	[-0.63, 0.31]
McGonagle et al. (2020)	0.20	0.28	[-0.35, 0.75]
Mitchell et al. (2009)	0.36	0.32	[-0.26, 0.98]
Mori & Cigala (2019)	0.58	0.14	[0.30, 0.86]
Ouweneel et al. (2013)	0.18	0.13	[-0.07, 0.43]
Ouweneel et al. (2014)	-0.28	0.28	[-0.84, 0.27]
Pang & Ruch (2019)	0.44	0.34	[-0.23, 1.12]
Peters et al. (2017)	-0.31	0.19	[-0.69, 0.06]
Quinlan et al. (2014)	0.42	0.16	[0.10, 0.74]
Roth et al. (2017)	0.09	0.30	[-0.50, 0.69]
Sergeant & Mongrain (2014)	0.07	0.16	[-0.24, 0.37]
Shoshani & Slone (2017)	0.84	0.12	[0.61, 1.07]
Shoshani et al. (2016)	0.04	0.04	[-0.04, 0.12]
Style & Boniwell (2010)	0.20	0.37	[-0.51, 0.92]
Timmons & Ekas (2018)	-0.07	0.30	[-0.65, 0.51]
Walker & Lampropoulos (2014)	0.42	0.30	[-0.18, 1.01]
Wingert et al. (2020)	0.76	0.29	[0.18, 1.33]
Wittleder et al. (2019)	0.24	0.10	[0.04, 0.44]
Overall	0.32	0.07	[0.18, 0.46]

Note. The Overall estimates are based on the Knapp-Hartung-Sidik-Jonkman method.

There was significant evidence of heterogeneity across studies, $Q(28) = 122.33, p < .001$. $I^2 = 77.11$, suggesting 23% of variability across study mean effects was due to sampling error. However, the standard deviation of the population effects was $\tau = 0.27$, which is slightly less than the typical variability in meta-analyses as reported by Linden and Hönekopp (2021).

Figure 3. Funnel plot.



A qualitative assessment of risk of methodological bias was conducted using the Cochrane Collaboration's tool for assessing risk of bias from version 5.1 of the Handbook for Systematic Reviews of Interventions (Higgins & Green, 2011). The resulting summary table is presented in Table 4 (below). Selection bias has to do with method of assignment (which in this case was coded as random vs non-random), and with bias arising from a systematic difference in how participants are assigned to treatment groups and comparison groups. Performance bias results from problems in the measures used to blind study participants and treatment personnel, while detection bias results from problems in the measures used to blind outcome assessors from knowledge of which intervention a participant received. Attrition bias is a systematic error caused by incorrect handling of incomplete data due to attrition. Lastly, reporting *bias* arises from the selective revelation of outcome data. If insufficient information was provided to judge whether a certain source of bias was present, it was labeled "unclear," and if it was not applicable to the study it was labeled "N/A."

Most studies were adequately blinded, with the majority randomizing appropriately. A high risk of performance bias was identified in three studies. Detection bias was largely not applicable, though two studies were deemed high risk. The risk of attrition bias was either low or unclear, and the risk of reporting bias was largely unclear, though it was high for one study and low for three studies. It should be noted that the Cochrane standards are quite stringent. They require that double-blind procedures be used, and that authors report enough information to determine the degree to which allocation assignment could have been foreseen at any time during the study, which is often not a requirement for publication. Overall, the results likely did not provide evidence for a substantial amount of methodological bias in these studies, though it should be noted that some of the descriptions were insufficient for judging bias.

Table 4. Qualitative assessment of risk of bias.

Study	Selection Bias	Concealment Bias	Performance Bias	Detection Bias	Attrition Bias	Reporting Bias
Abbott et al., (2009)	low	low	unclear	N/A	low	high
Akhtar & Boniwell (2010)	unclear	unclear	high	high	unclear	unclear
Annesi (2019)	low	low	low	unclear	low	unclear
Armenta et al. (2020)	low	low	low	unclear	unclear	unclear
Bagès et al. (2020)	low	low	unclear	unclear	low	unclear
da Costa Rolo & Gould (2007)	low	low	high	N/A	unclear	unclear
Engbretson et al. (2020)	low	unclear	low	unclear	low	low
Frie et al. (2020)	low	low	low	unclear	low	unclear
Grant et al., (2009)	low	low	unclear	N/A	low	unclear
Kadir et al. (2018)	high	high	unclear	low	unclear	unclear
Littman-Ovadia et al., (2014)	high	low	low	N/A	unclear	unclear
Maratos & Sheffield (2020)	low	low	unclear	unclear	unclear	low
McGonagle et al. (2020)	low	low	low	unclear	low	low
Mitchell et al., (2009)	low	low	low	N/A	low	unclear
Mori & Cigala (2019)	low	unclear	unclear	low	low	unclear
Ouweneel et al. (2014)	low	low	low	N/A	unclear	unclear
Ouweneel et al., (2013)	unclear	low	low	N/A	low	unclear
Pang & Ruch (2019)	low	low	unclear	unclear	low	unclear
Peters et al. (2017)	low	low	low	N/A	low	unclear
Quinlan et al. (2014)	high	unclear	unclear	N/A	low	unclear
Roth et al. (2017)	low	low	low	unclear	unclear	unclear
Sergeant & Mongrain (2014)	low	low	low	N/A	low	unclear
Shoshani & Slone (2017)	low	low	unclear	unclear	low	unclear
Shoshani et al. (2016)	low	high	high	high	low	unclear
Style & Boniwell (2010)	low	low	low	N/A	unclear	unclear
Timmons & Ekas (2018)	low	unclear	unclear	unclear	low	unclear
Walker & Lampropoulos (2014)	low	low	low	N/A	low	unclear
Wingert et al. (2020)	low	low	unclear	unclear	low	unclear
Wittleder et al. (2019)	low	low	low	unclear	low	unclear

3.3 Moderating variables

A simple meta-regression was conducted for each potential moderator (age group, population, setting, live vs on-line, self-guided vs supervised, group vs individual intervention, voluntary vs group participation, random vs non-random assignment, and type of control group) individually since simultaneous regression results would be particularly unreliable. Consistent with the relatively low level of heterogeneity in effects, none of the regression analyses were significant at $p < .05$, and effects were small.

4. Discussion

Across 29 studies, SBPIs had a small, statistically significant effect on behavioral outcomes, with a mean effect size of $g = 0.32$. It is noteworthy that this level is consistent with results from other meta-analyses that focused on similar behavior change variables. For example, Knight et al. (2017) found a mean g for interventions targeting work engagement of 0.29. Tanner-Smith and Risser (2016) reported a mean g for brief alcohol interventions and reductions in self-reported alcohol use among adolescents of 0.25. Durlak et al. (2011) found a mean g of 0.27 for school-based interventions used to enhance academic performance. Though Stein et al. (in press) reported a substantially larger mean effect for one of the most directly behavioral interventions in common use, behavioral activation (0.37-0.64), these effects disappeared when compared with active control conditions. Thus, the associations between SBPIs and behavioral outcomes

observed in the current meta-analysis are consistent with results for other intervention approaches. Correcting for small-sample bias suggested the effect could be smaller, but there is insufficient evidence at this time to justify implementing such a correction. Evaluation of bias was problematic given the number of instances in which insufficient information was provided to make a judgment. This is a matter of some concern given, for example, Cuijper et al.'s (2010) finding that psychotherapy for depression seems to be much less effective in high-quality studies. With these caveats in mind, effects seem consistent with more established approaches to behaviour change.

Perhaps the single most important challenge raised by this meta-analysis is the need for broader research into PPIs, and SBPIs in particular. Positive interventions and PPIs have been touted as an alternative or supplement to symptom-based techniques. The results of our meta-analysis are consistent with this assertion, as are other recent studies that have directly compared positive interventions with symptom-focused interventions (e.g., Cheavens et al., 2012; Craske et al., 2019; Dolev-Amit, 2020). These findings also raise the intriguing possibility that positive interventions could provide a useful adjunct to more problem-centered solutions. We did not review the extent to which the current articles were present in previous meta-analyses examining interventions in positive psychology. Even if they were, the authors of those reviews, which focused exclusively on well-being and related measures, would have excluded the analyses examined in the present review.

5. Limitations

At the same time, the tendency among researchers examining the value of SBPIs to focus on a small set of outcomes means a great deal more work is needed on this topic. While 418 articles were identified that seemed to be on-topic, 322 were excluded due to the absence of any criterion reflecting behavioral change. Most studies focused exclusively on affective and experiential variables such as depression, subjective well-being, and psychological well-being. Ultimately, with a pool of 29 studies, there is currently insufficient basis for drawing firm conclusions regarding when, and for whom, SBPIs may be the most appropriate behavior change techniques. Practitioners and researchers interested in PPIs would be well-served to consider broadening the set of outcome measures they examine if the goal is to demonstrate focusing on the positive is as valuable as focusing on the negative. The studies generally also provided insufficient information about the training and expertise of the treatment providers. Future research reports on PPIs would benefit from increased attention to detailed description of the circumstances of treatment.

Research has consistently supported interventions that focus on strengths as contributors to well-being, and counseling psychologists, clinical psychologists, school psychologists, and coaches all value enhancing the sense of well-being in the populations with which they work. However, long-term change requires behavior change. We recommend that future research on the effectiveness of positive interventions always include behavioral as well as emotional and affective outcomes. More research is needed to support the ability of positive interventions to directly influence behavior. This meta-analysis should encourage existing training for counseling psychologists and other mental health professionals to further explore the benefits of SBPIs on behavioral outcomes.

Conflict of interest statement

Robert McGrath is a Senior Scientist for the VIA Institute on Character. Ryan Niemiec is an employee of the VIA Institute on Character.

Funding

This research was funded in part by the VIA Institute on Character, the copyright holder for the VIA Classification referenced in this article.

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Acknowledgments

We are grateful to Ashley Hall-Simmonds, Keith Johnson, Kylin Peck, Dana Serino, Norah Wallace, Alec Twibell, Alyssa Cangemi, Bina Westrich, and Maram Barakat for their help with ratings and data extraction for this study.

Publishing Timeline

Received 3 January 2022
Revised version received 14 July 2022
Accepted 19 July 2022
Published 1 October 2022

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Appendices

Appendix A. Character strength terms.

General Terms:

- *positive psychology*
- *virtue*
- *character strength*

Peterson and Seligman (2004):

- | | | |
|----------------------|-----------------------|------------------------------|
| • <i>beauty</i> | • <i>hope</i> | • <i>perspective</i> |
| • <i>bravery</i> | • <i>humility</i> | • <i>prudence</i> |
| • <i>creativity</i> | • <i>humor</i> | • <i>self-regulation</i> |
| • <i>curiosity</i> | • <i>judgment</i> | • <i>social intelligence</i> |
| • <i>fairness</i> | • <i>Kindness</i> | • <i>spirituality</i> |
| • <i>forgiveness</i> | • <i>Leadership</i> | • <i>teamwork</i> |
| • <i>gratitude</i> | • <i>love</i> | • <i>zest</i> |
| • <i>honesty</i> | • <i>learning</i> | • <i>temperance</i> |
| • <i>wisdom</i> | • <i>humanity</i> | • <i>transcendence</i> |
| • <i>knowledge</i> | • <i>justice</i> | |
| • <i>courage</i> | • <i>perseverance</i> | |

Kesebir and Kesebir (2008):

- | | | |
|------------------------|-------------------------|--------------------------|
| • <i>character</i> | • <i>humility</i> | • <i>benevolence</i> |
| • <i>conscience</i> | • <i>faithfulness</i> | • <i>fortitude</i> |
| • <i>decency</i> | • <i>charity</i> | • <i>purity</i> |
| • <i>dignity</i> | • <i>humbleness</i> | • <i>temperance</i> |
| • <i>ethics</i> | • <i>bravery</i> | • <i>faith</i> |
| • <i>morality</i> | • <i>thoughtfulness</i> | • <i>hospitality</i> |
| • <i>rectitude</i> | • <i>grace</i> | • <i>appreciation</i> |
| • <i>righteousness</i> | • <i>helpfulness</i> | • <i>compassion</i> |
| • <i>uprightness</i> | • <i>courtesy</i> | • <i>integrity</i> |
| • <i>virtue</i> | • <i>love</i> | • <i>fairness</i> |
| • <i>honesty</i> | • <i>perseverance</i> | • <i>tolerance</i> |
| • <i>patience</i> | • <i>modesty</i> | • <i>selflessness</i> |
| • <i>honor</i> | • <i>politeness</i> | • <i>discipline</i> |
| • <i>truthfulness</i> | • <i>fidelity</i> | • <i>dependability</i> |
| • <i>kindness</i> | • <i>justice</i> | • <i>reliability</i> |
| • <i>sincerity</i> | • <i>gratitude</i> | • <i>loyalty</i> |
| • <i>courage</i> | • <i>diligence</i> | • <i>trustworthiness</i> |
| • <i>generosity</i> | • <i>thankfulness</i> | • <i>forgiveness</i> |
| • <i>mercy</i> | • <i>gentleness</i> | • <i>respect</i> |
| • <i>wisdom</i> | • <i>sacrifice</i> | • <i>determination</i> |

Cawley, Martin, and Johnson (2000):

- | | | |
|------------------|-------------------|--------------------------|
| • <i>empathy</i> | • <i>serenity</i> | • <i>resourcefulness</i> |
| • <i>order</i> | | |

Franklin (1928):

- *silence*
- *resolution*
- *frugality*
- *moderation*
- *chastity*

Comte-Sponville (2001):

- *politeness*
- *fidelity*
- *prudence*
- *temperance*
- *courage*
- *justice*
- *generosity*
- *compassion*
- *mercy*
- *gratitude*
- *humility*
- *simplicity*
- *tolerance*
- *purity*
- *gentleness*
- *good faith*
- *humor*
- *love*

Bennett (1995):

- *responsibility*

Niemiec (2018; personal communication, October 16, 2014):

- *divergent thinking*
- *originality*
- *empathy*
- *altruism*
- *prosocial*
- *equity*
- *conscientiousness*
- *elevation*
- *meaning*
- *goodness*

Rashid (personal communication, October 29, 2014)

- *abidance*
- *accepting*
- *amiability*
- *contentment*
- *duty*
- *equanimity*
- *finesse*
- *flexibility*
- *harmony*
- *introspection*
- *intuition*
- *mellowness*
- *nimbleness*
- *pacifism*
- *piety*
- *quaintness*
- *rhythm*
- *salubriousness*
- *savoir-faire*
- *social tactfulness*
- *self-acceptance*
- *serendipity*
- *soulfulness*
- *tolerance*

Appendix B. Risk of bias assessment.

<p><u>Selection bias: Random sequence generation</u> Describe the method used to generate the allocation sequence in sufficient detail to allow an assessment of whether it should produce comparable groups.</p>	H	High risk of bias: Non-random assignment
	U	Unclear risk of bias: Method of assignment not adequately described
	L	Low risk of bias: Random assignment
<p><u>Selection bias: Allocation concealment</u> Describe the method used to conceal the allocation sequence in sufficient detail to determine whether intervention allocations could have been foreseen in advance of, or during, enrollment.</p>	H	High risk of bias: Participant would have known before which treatment they would receive
	U	Unclear risk of bias: Issue not addressed
	L	Low risk of bias: Participant did not know treatment before study enrollment
<p><u>Performance bias: Blinding of Participant</u> Describe all measures used, if any, to blind study participants and Participant from knowledge of which intervention a participant received. Provide any information relating to whether the intended blinding was effective. Assessments should be made for each main outcome.</p>	H	High <i>risk</i> of bias: Participant aware of treatment group
	U	Unclear risk of bias: Issue not addressed
	L	Low risk of bias: Participant unaware of treatment group
<p><u>Detection bias: Blinding of outcome assessment</u> Describe all measures used, if any, to blind outcome assessors from knowledge of which intervention a participant received. Provide any information relating to whether the intended blinding was effective. Assessments should be made for each main outcome.</p>	H	High risk of bias: Individuals completing measures (teachers, parents, participant) aware of treatment group
	U	Unclear risk of bias: Issue not addressed
	L	Low risk of bias: Individuals completing measures unaware of treatment group
<p><u>Attrition bias: Incomplete outcome data addressed</u> Describe the completeness of outcome data for each main outcome, including attrition and exclusions from the analysis. State whether attrition and exclusions were reported, reasons for attrition/exclusions where reported, and any re-inclusions in analyses performed by the review authors. Assessments should be made for each main outcome.</p>	H	High risk of bias: Differential rates of incomplete data across groups ignored in data analysis
	U	Unclear risk of bias: Incomplete data not discussed
	L	Low risk of bias: Effect of incomplete data addressed in some way
<p><u>Reporting bias: Selective reporting</u> State how the possibility of selective outcome reporting was examined by the review authors, and what was found.</p>	H	High risk of bias: Clear evidence that some results (groups, measures) were not reported
	U	Unclear risk of bias: Issue not addressed
	L	Low risk of bias: Authors indicate all groups and measures are included