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ARTICLE

The efficacy of positive psychology interventions from non-Western countries: A systematic review and meta-analysis

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Abstract: Recently, there has been a sharp increase in the number of studies of positive psychology interventions (PPIs) from non-Western countries. The aim of this study is to review and evaluate the efficacy of these PPIs. Databases, including PubMed, PsycINFO, and Scopus, were searched up to December 2017. In addition, we performed hand searches and reference checks. After removal of duplicates, 7,516 studies were screened and finally 28 randomized controlled trials (RCTs) were included in the meta-analysis. A random effects model was used to compare group effect-sizes at post-test. Results showed that PPIs from non-Western countries have a moderate effect on subjective wellbeing (g = 0.48) and psychological wellbeing (g = 0.40), and a large effect on depression (g = 0.62) and anxiety (g = 0.95). However, caution is warranted for the interpretation of the effect sizes in light of the study quality, which was assessed as low. This indicates the possibility of biases, which may explain why PPIs from non-Western countries report larger effect sizes than PPIs from Western countries.

Keywords: positive psychology interventions, wellbeing, positive mental health, cross-cultural

1. Introduction

In the past decade, there has been a rapidly growing number of studies investigating the effects of positive psychology interventions (PPIs) (Rusk & Waters, 2013). To date, it appears that consensus on the definition of PPIs has not yet been reached. Sin and Lyubomirsky (2009) introduced a broad definition, defining PPIs as all interventions that are aimed at increasing positive feelings, behaviors, and cognition. Narrower definitions were suggested by Bolier et al. (2013), who added that these interventions should have been explicitly developed in line with the theoretical tradition of positive psychology, and Parks and Biswas-Diener, who suggested that an intervention can only be regarded as a PPI if sufficient empirical evidence exists suggesting significant effects for the intervention (Parks & Biswas-Diener, 2013). Schueller and Parks (2014) argued that in addition to the (positive) aim of an intervention, the pathways through which the interventions operate is a second essential component in deciding if an intervention can be considered as a PPI. They identified the following five pathways:

(1) savoring (intensifying and prolonging momentary pleasurable experiences),
(2) expressing gratitude (through reflection and activities of expression),
(3) engaging in acts of kindness,
(4) promoting positive relationships, and
(5) promoting meaning and purpose.

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More recently, Shin and Lyobomirsky (2017) used the term "positive activity interventions" instead of PPIs, and the term " positive interventions" is also used (Gander, Proyer, Ruch & Wyss, 2013; Rashid, 2009). We define positive psychology interventions (PPIs) as interventions aiming at increasing positive feelings, behaviors and cognitions and using pathways or strategies to increase wellbeing based on theories and empirical research, following Schueller and Parks (Schueller & Parks, 2014; Schueller, Kashdan, & Parks, 2014).

The growth of the scientific output from scholars in the field of positive psychology is not only limited to publications from Western countries; since 2012, there has also been a strong increase in the number of studies originating from non-Western countries (Hendriks et al., 2018b). Previously published meta-analyses of randomized controlled trials have examined the overall effects of PPIs. A meta-analysis by Bolier et al. (2013) that included 39 trials reported small effect sizes for subjective wellbeing, psychological wellbeing, and depression. More recently, the authors of the current meta-analysis also examined the effects of 37 multi-component PPI (MPPIs) programs containing at least three positive psychology activities (Hendriks et al., 2018b). This meta-analysis found a moderate effect size for subjective wellbeing, a small to moderate effect size for psychological wellbeing, and a small effect for depression and anxiety. In addition, this study showed that the region of origin of the studies was a strong and significant moderator. More precisely, PPIs from non-Western countries had substantially larger effects than PPIs from Western countries. For example, the effect size for subjective wellbeing was large (g = 1.13) for non-Western studies, compared to small (g = 0.29) for studies from Western countries. Effect sizes for psychological wellbeing and depression also showed substantial differences. Effect sizes for non-Western studies were three to five times larger than the effect sizes for studies from Western countries. The difference was mainly attributed to the overall lower quality of non-Western studies. It should be noted that, following Gosling, Sandy, John, and Potter (2010), North America, Western Europe, Australia, Israel, and New Zealand were classified as Western countries. A risk of bias analysis was conducted to assess the quality of the studies. Findings from this analysis demonstrated that the average quality of studies from Western countries was moderate, whereas the average quality of studies from non-Western countries was low (Hendriks et al., 2018b). For example, from the eight non-Western studies, only one used an intention-to-treat analysis for the statistical data, in only one study assessment was blinded, none described the process of randomization (sequence generation) or the allocation of participants, and all studies had fewer than 50 participants per condition.

1.1 Present study

Since only multi-component PPIs were include in the aforementioned meta-analysis (Hendriks et al., 2018b), findings on the efficacy of studies from non-Western countries were based on a relatively small number of studies (nine out of 37 RCTs). In this meta-analysis, RCTs of single component, as well as multi-component PPIs from non-Western countries will be compared to interventions performed in Western countries. The characteristics of the studies, including study quality, will also be examined, to attempt to explain differences in effect sizes.

2. Method

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher et al., 2010; Moher, Liberati, Teztlaff, & Altman, 2009) and the recommendations of the Cochrane Back Review group (Higgins et al., 2011) were followed in the planning and the implementation of the meta-analysis. No protocol was registered.

2.1 Search strategy

A systematic literature search was conducted by the first author (TH) and second author (MS) in the following databases: PubMed, PsycINFO, and Scopus, from 1998 through 2017. PubMed and PsycINFO are recommended as databases to be used in meta-analyses in mental health research (Cuijpers, 2016). We did not include the Cochrane Central Register of Controlled Trials, since that database does not allow export of citations, which complicates the screening process. Instead, we selected Scopus, another often used database for systematic reviews and meta-analyses (Davis, Mengersen, Bennett, & Mazerolle, 2014). The search was conducted by the first and third author (TH, AH), and the last run was conducted on December, 8, 2017. Databases were searched with the following terms: "positive psycho*" OR wellbeing OR happiness OR happy OR flourishing OR "life satisfaction" OR "satisfaction with life" OR optimism OR gratitude OR strengths OR forgiveness OR compassion AND "random*". Search strings were adapted according to the database (see Appendix A). The reference lists of three meta-analyses (Bolier et al., 2013; Chakhssi, Kraiss, Sommers-Spijkerman, & Bohlmeijer, 2018; Dickens, 2017) and seven review articles on PPIs (Casellas-Grau, Font, & Vives, 2014; Ghosh & Deb, 2016; Macaskill, 2016; Rashid, 2015; Sutipan, Intarakamhang, & Macaskill, 2017; Walsh, Cassidy, & Priebe, 2016; Woodworth, O-Brien-Malone, Diamond, & Schüz, 2016) were also checked. In addition, a hand search through the websites of three known non-Western journals in the field of positive psychology was conducted, namely, the websites of the Indian Journal of Positive Psychology, the Iranian Journal of Positive Psychology, and the Middle East Journal of Positive Psychology. Preliminary findings of a study that was recently conducted by the authors of this meta-analysis (Hendriks et al., 2017) were also included.

2.2 Selection of studies

After removal of duplicates, we screened titles and abstracts. Full texts of potentially relevant articles were fully assessed. This was done by the first (TH) and third (AH) author independently. Studies were included based on the following criteria:

(1) randomized controlled trials;
(2) conducted in non-Western countries;
(3) administered to healthy adults or adults in clinical populations;
(4) published in peer reviewed journals, in the English language;
(5) validated outcome measures were used to examine the effects on subjective and psychological wellbeing, depression, or anxiety.

We excluded studies that: (1) did not provide sufficient data to calculate post-test effect sizes per condition; (2) were published in book chapters, dissertations, and studies in grey literature; (3) reported effects of mindfulness-based therapies, Acceptance and Commitment Therapy, and Compassion Focused Therapy, considering the vast number of meta-analyses on these interventions that have been published in the past decade.

2.3 Data extraction

The following data was gathered: author(s), year of publication, country of origin, study design, sample description, intervention type, delivery mode, description of control group, number of sessions, duration of session period, follow-up assessment, number or participants per condition at post-test level, mean age and standard deviation of participants, percentage of female participants, retention rate at post-test level, and the questionnaires that measured subjective wellbeing, psychological wellbeing, depression or anxiety. Means and standard deviations at

post-test were extracted. In the case of insufficient data or unclear reporting in the studies, we contacted the authors through e-mail.

2.4 Quality assessment

The quality of the studies was independently assessed by the first (TH) and third (AH) author, using the Cochrane Collaboration's tool for assessing risk of bias in randomized trials (Higgins et al., 2011). The following six criteria were assessed: random sequence generation, allocation concealment, blinding of participants and personnel, description of drop-outs, power analysis, and intention-to-treat analysis or no drop-outs. One point was appointed for each criterion that was met, as described in the studies. According to this assessment tool, the quality of a study was assessed as "high" when five or six criteria were met, "moderate" when three or four criteria were met, and "low" when fewer than three criteria were met. Disagreements between the first (TH) and third (AH) author were discussed until consensus was reached. If any disagreement persisted, the second author (MS) or fifth author (EB) were consulted.

2.5 Data analysis

Data analysis was conducted with the program Comprehensive Meta-Analysis (CMA, version 3.3.070, Biostat, Inc.). Means, standard deviations, and sample sizes for each study were used to calculate the effect sizes. For each comparison between a PPI and a control group, we calculated the Hedges' adjusted *g* because Hedges' *g* is more accurate than Cohen's *d* when sample sizes of the studies are small (Cuijpers, 2016). Effect sizes indicate the difference between the two groups at post-test and were calculated by subtracting the average score of the PPI group from the average score of the comparison group (both at post-test) and dividing the result by the pooled standard deviations of the two groups. Effect sizes of 0 to 0.32 can be considered as small, effect sizes of 0.33 to 0.55 as moderate, and effect sizes of 0.56 to 1.2 as large (Lipsey & Wilson, 1993). If more than one measure was used for a similar outcome, we pooled the means and the standard deviations, so that each study outcome had one effect size (Thalheimer & Cook, 2002). If more than one experimental group was compared to another active control group and a non-active control condition in a particular study, we used data from the active control group. Standardized mean differences (SMD) with 95% confidence intervals (CI) were calculated as the differences in means between groups divided by the pooled standard deviation using Hedges' *g*. A positive SMD was defined as an indicator of beneficial effects for the PPI compared with the control condition. Intention-to-treat samples were used if possible. For the calculation of effect sizes for subjective wellbeing, we used instruments that explicitly indicated that they measured emotional wellbeing, as defined by Keyes (2007). These were the Mental Health Short Form - subjective wellbeing subscale (Keyes, 2005), the Oxford Happiness Inventory (Hills & Argyle, 2002), the WHOQOL-BREF Psychological Health Scale (WhoqolGroup, 1998), the Subjective Happiness Scale (Lyubomirsky & Lepper, 1999), the Subjective Well-being Questionnaire (Molavi, Torkan, Soltani, & Palahang, 2010), the Life Satisfaction Index/Scale (Adams, 1969), the Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985), the Enright Forgiveness Inventory - positive affect subscale (Enright & Rique, 2004), the Index of Well-Being & Index of General Affect (Campbell, Converse, & Rodgers, 1976), the Multiple Mood Scale - positive emotions (Terasaki, Kishimoto, & Koga, 1992), the Positive and Negative Affect Schedule, and the Scale of Positive and Negative Experience (Watson, Clark, & Tellegen, 1988). For psychological wellbeing, we used instruments that explicitly measured psychological wellbeing, as defined by Keyes (2007). These were the Flourishing Scale (Diener et al., 2010), the Mental Health Short Form - psychological wellbeing subscale (Keyes, 2005), Well-being/Ill-being Scale (Kitwood & Bredin,

1997), the Ego Resilience Scale (Block & Kremen, 1996), the Self Compassion Scale (Neff, 2003), the Symptom Checklist-90 Revised - inverted score (Derogatis & Unger, 2010), and two unnamed scales measuring empowerment and organizational commitment (Im, Cho, Kim & Heo, 2016). For depression and anxiety, we used instruments that explicitly measured depression and anxiety. These were the Beck Depression Index (Beck, Steer, & Brown, 1996), the Center for Epidemiological Studies - Depression Scale (Andresen, Malmgren, Carter, & Patrick, 1994), the Depression Anxiety Stress Scale (Lovibond & Lovibond, 1995), the Geriatric Depression Scale (Lee, Chiu, & Kwong, 1994), the Beck Anxiety Inventory (Beck & Steer, 1990), Death Anxiety Scale (Templer, 1970), and the State-Trait Anxiety Inventory (Spielberger, 2010). If more than one measure for a specific outcome was reported, a variance-weighted average of effect sizes from the scales within each study was used to calculate one effect size (Marín-Martínez & Sánchez-Meca, 1999). When follow-up data was available, between-group effect sizes (Hedges' *g*) at these time points were calculated.

2.6 Heterogeneity

Statistical heterogeneity between studies was tested using the I^2 statistic. This is a measure that indicates study-to-study dispersion due to real differences, over and above random sampling error (Higgins & Thompson, 2002). A randomized effects model with a 95% confidence interval and a two-tailed test were performed for the heterogeneity analyses. The I^2 statistic was used to estimate the percentage of heterogeneity across the studies not attributable to random sampling error alone. A value of 0% indicated no heterogeneity. Values of 75%, 50% and 25% reflected high, moderate, and low degrees of heterogeneity, respectively (Higgins & Thompson, 2002). Significant heterogeneity was indicated by a significant Q statistic ($p \leq 0.05$), meaning that one or more variables were present that moderated the observed effect size. All studies were included, outliers were not removed.

2.7 Subgroup analyses

Explanatory subgroup analyses were conducted to examine moderating effects of seven possible moderators. These moderators were:

(1) study population: clinical or non-clinical;
(2) mode of delivery of the PPI: group or self-help;
(3) intervention type: single component or multi-component;
(4) type of control group: active/placebo or non-active/waitlist;
(5) duration of the intervention: ≤ 8 weeks or > 8 weeks;
(6) cultural adaptation of the PPI: yes or no;
(7) quality rating of the study: low, moderate, or high.

2.8 Publication bias

Publication bias was assessed in the following ways. First, a funnel plot was created by plotting the overall mean effect size against study size. Absence of publication bias is present when there is a symmetrical distribution of studies around the effect size (Sterne, Egger, & Moher, 2008). Second, a fail-safe N was calculated for each analysis to test the asymmetry of each funnel plot. The fail-safe N indicates the number of unpublished non-significant studies that would be required to lower the overall effect size below significance (Egger, Smith, Schneider, & Minder, 1997; Orwin, 1983). Findings were considered robust if the fail-safe N ≥ 5k + 10, where k is the number of studies (Rosenberg, 2005). Third, the Trim and Fill method (Duval & Tweedie, 2000)

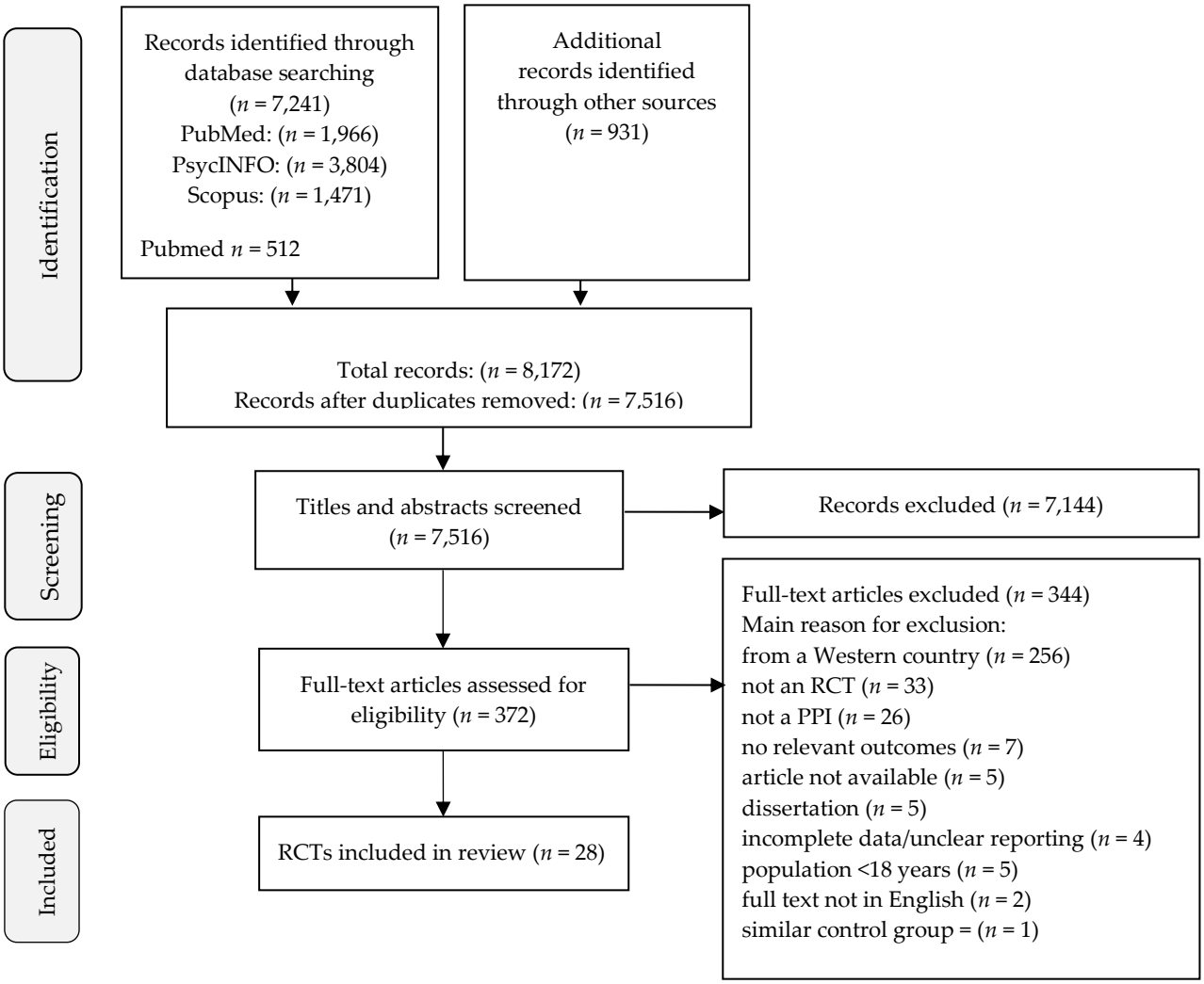
was used. This procedure imputes the effect sizes of missing studies and produces an adjusted effect size accounting for the missing studies.

3. Results

3.1 Study selection

We identified a total of 8,172 records. After removal of duplicates, 7,516 records remained. These records were screened, after which 372 records remained. These articles were assessed for eligibility, and finally 28 studies were included in the meta-analysis, which were published in 29 articles. The complete selection process is shown in Figure 1.

Figure 1. Flow diagram of the selection process of RCTs on PPIs from non-Western countries



3.2 Study characteristics

The RCTs were published between 2012 and December 2017. Seven studies (25%) were conducted among clinical populations and 21 studies (75%) among non-clinical populations. Delivery modes were group based (n = 21, 75%) and self-help (n = 7, 25%). Eleven studies (39%) had an active control group and 17 studies (61%) had a non-active control group (waiting-list, n = 1; no intervention, n = 16). The studies included a total of 3,009 participants.

Sample sizes from the intervention groups ranged from nine to 828, with a mean of 25.7 participants (excluding the cluster randomized controlled trial). Fourteen studies (50%) had fewer than 20 participants in the intervention group, ten (36%) had between 20-40 participants in the intervention group, three (11%) had between 40-60 participants in the intervention group, and there was one (4%) cluster randomized controlled trial with 828 participants in the intervention group. Twelve (43%) studies were from China (five from mainland China, seven from Hong Kong), six (21%) from Iran, three (11%) from Taiwan, two (7%) from Japan, two (7%) from South Korea, and Malaysia, Suriname, and Turkey each accounted for one study. One of the self-help-based interventions was an online intervention. Twenty-five studies reported the percentage of female participants, which was 67% (n = 2,010). Excluding one cluster randomized controlled trial lowered the percentage of female participants to 61% (n = 1,817). Twenty-one studies measured subjective wellbeing (SWB), eight studies measured psychological wellbeing (PWB), 13 studies measured depression, and five studies reported on anxiety. All main characteristics of the studies are presented in Table 1 (below).

3.3 Quality assessment

In total, the six quality criteria were assessed for 28 studies. The lowest score was 0 (five studies), the highest score was 6 (two studies). The overall study quality was low, with a mean score of 1.79 (SD = 1.67). Three studies (11%) were rated with a high quality, two (7%) with a moderate quality, and 23 (82%) with a low quality. The description of the method that was used to generate the allocation sequence (sequence generation) was reported in 10 studies (36%). Description of the method used to conceal the allocation sequence (allocation concealment) was reported in only five studies (18%). Blinding of main outcome assessment was described in only three studies (11%). In 19 studies (68%) it was clearly described how many drop-outs there were during the intervention period. A power-analysis was conducted in seven studies (25%). Five studies (18%) used an intention-to-treat analysis, and one study (4%) reported zero drop-outs. The outcome of the quality assessment is shown in Table 2 (below).

3.4 Post-test treatment effects

The random effects model showed that PPIs were significantly more effective for all outcome measures compared to the control conditions. The main results are presented in Table 3 (below) and explained below. Effect sizes of the individual studies are plotted in Figures 2, 3, and 4 (below).

Table 1a. Study characteristics of RCTs on PPI from non-Western countries

First author/ year/country	Design	Sample	Intervention	Delivery	Control group	Sessions, duration	Follow up	N (post)	Mean /SD	% Female	Retention rate (post)	Outcome measures
Al-Seheel, 2016, Iran	RCT	Students	Gratitude, Islamic-based	Self-help	PPI + Placebo	2w	-	Ne = 19 Nc1 = 20 Nc2 = 21	21.9 (1.2)	85%	Nt = 95%	SWB: SPANE, SWLS
Arimitsu, 2016, Japan	RCT	Healthy adults	Self-compassion	Group	Wait-list	7, 7w	3m	Ne = 16 Nc = 12	23.3	85%	Ne = 80% Nc = 60%	SWB: MMS, PWB: SCS Dep: BDI, Anx: STAI
Asgharipoor, 2012, Iran	RCT	Patients with major depression	PPT	Group	CBT	6, 12w	-	Ne = 9 Nc = 9	26.4 (5.9)	72%	Ne = 100% Nc = 100%	SWB: OHI PWB: SWS-PWB subscale Dep: BDI
Asl, 2014, 2016, Iran	RCT	Infertile women	PPT	Group	Wait-list	6, 6w	-	Ne = 15 Nc = 16	30.5 (5.7)	100%	Ne = 83% Nc = 89%	SWB: OHI Dep: BDI
Chan, 2013, China, HK	RCT	Students	Counting blessings	Self-help	Placebo	1, 8w	-	Ne = 40 Nc = 41	33.7 (7.2)	81%	Nt = 97%	SWB: SWLS
Cheng, 2015, China, HK	RCT	Healthy adults	Gratitude	Self-help	Placebo	4w	3m	Ne = 34 Nc1 = 34	-	55%		Dep: CES-D
Chiang, 2008, Taiwan	RCT	Elderly	Life review	Group	Wait-list	8, 8w	-	Ne = 36 Nc = 39	78.1 (3.7)	100%	Nt = 71%	SWB: LISA
Chiang, 2010, Taiwan	RCT	Elderly	Reminiscence	Group	Wait-list	8, 8w	3m	Ne = 45 Nc = 47	77.2 (4.0)	100%	Nt = 75%	PWB: SCL-90R Dep: BDI
Choy, 2016, China, HK	RCT	Elderly	Reminiscence	Group	Wait-list	6, 6w	6w	Ne = 39 Nc = 42	78.0 (7.1)	67%	Ne = 85% Nc = 62%	SWB: LSS Dep: GDS
Deng, China, 2016	RCT	Healthy adults	Gratitude	Group	No intervention	5w	-	Ne = 36 Nc = 29	35.7 (9.4)	0%	_	SWB: SWBQ
Dowlatabadi, 2016, Iran	RCT	Women with breast cancer	PPT	Group	No intervention	10, 10w	-	Ne = 17 Nt = 17	36.6 (5.5)	100%	Ne = 76% Nc = 81%	SWB: OHI Dep: BDI
Guo, 2016, China, HK	RCT	Students	PPT	Group	No intervention	8, 8w	3m	Ne = 34 Nc = 42	20.4 (1.2)	95%	Ne = 81% Nc = 98%	Dep: BDI
Hendriks, 2017, Suriname	RCT	Healthy adults	MPPI	Group	Wait-list	7,7w	-	Ne = 80 N1 = 72	36.3 (9.6)	60%	Ne = 91% Nc = 91%	SWB, PWB: MHSF Dep, Anx, Stress: DASS-21

Table 1b. Study characteristics of RCTs on PPI from non-Western countries

First author/ year/country	Design	Sample	Intervention	Delivery	Control group	Sessions, duration	Follow up	N (post)	Mean /SD	% Female	Retention rate (post)	Outcome measures
Ho, 2016, China, HK	CRCT	Healthy families	MPPI	Group Self-help	Placebo	2, 4w	12w	Ne1 = 828 Ne2 = 433	-	75%	Ne = 71% Nc = 83%	SWB: SHS
Hwang, 2016, China*	RCT	Student	PPT	Group	No active control	10, 5w	4m	Ne = 8 Nc1 = 8 Nc2 = 8	22.7 (2.3)	67%	Ne = 72% Nc 1/2 = 80.0%	SWB: SPANE PWB: FS
Im, 2016, Korea	RCT	Nurses	MPPI	Group	No intervention	4, 9w	-	Ne = 25 Nc = 24	25.6 (2.7)	82%	Ne = 100% Nc = 96%	PWB: ERS, empowerment, work commitment
Ji, 2016, China	RCT	Students	Forgiveness	Group	Wait-list	10, 10w		Ne = 16 Nc = 12	20.2 (1.4)	89%	Nt = 78%	SWB: EFI Anx: STAI
Khayatan, 2014, Iran	RCT	Women with MS	PPT	Group	No intervention	6, 6w		Ne = 15 Nc = 15	31.1 (6.5)	100%	Ne = 100% Nc = 100%	Dep: BDI
Koydemir, 2015, Turkey*	RCT	Students	Strength-based intervention	Self-help (online)	Wait-list	5, 8w		Ne = 44 Nc = 36	18.7 (1.0)	48%	-	SWB: SHS, SWLS, PHS
Lai, 2004, China	RCT	Elderly	Reminiscence	Group	Active control	6, 6w	6w	Ne = 36 Nc1 = 30	85.6 (7.0)	68%	Nt = 85%	PWB: WIB
Lau, 2011, China	RCT	Elderly	Gratitude	Group	Active control, No intervention	1		Ne = 29 Nc1 = 25 Nc2 = 29	62.5 (7.1)	60%	-	ANX: Das
Lü, 2013, China	RCT	Students	MPPI	Group	No intervention	8, 8w		Ne = 16 Nc = 18	20.0 (4.3)	57%	Ne = 84% Nc =100%	SWB: PANAS
Nikrahan, 2016, Iran	RCT	Healthy adults	MPPI	Group	3 x PPI, Wait-list	6, 6w	15w	Ne1 = 13 Ne2 = 13 Ne3 = 15 Nc = 14	56.6 (8.7)	24%	Nt = 100%	SWB: OHI Dep: BDI
Otsuka, 2012 Japan	RCT	Healthy adults	Gratitude	Self-help	Placebo	4w	1m	Ne = 19 Nc = 19	48.5 (5.1)	28%	Nt = 50%	SWB: SHS

Table 1c. Study characteristics of RCTs on PPI from non-Western countries

First author/ year/country	Design	Sample	Intervention	Delivery	Control group	Sessions, duration	Follow up	N (post)	Mean /SD	% Female	Retention rate (post)	Outcome measures
Wong, 2016, China	RCT	Students	Self-compassion writing	Self-help	Placebo	3d, 3m		Ne = 33 Nc = 32	20.5 (1.4)	54%	Nt = 100%	Dep: CES-D
Wu, 2016, Taiwan	RCT	Patients with dementia	Spiritual reminiscence	Group	No intervention	6,6 w		Ne = 50 Nc = 53	73.6 (7.4)	69%	Ne = 100% Nc = 94%	SWB: LISA
Yousefi, 2015, Iran	RCT	Elderly women	Reminiscence	Group	Active control	6, 3w	1m	Ne = 14 Nc = 14	65.2 (6.4)	100%	Ne = 93% Nc = 88%	SWB: OHQ
Zhang, 2014, China	RCT	Students	Forgiveness	Group	No intervention	1	4w	Ne=10 Nc1=11	22.1 (1.0)	100%	Nt = 100%	SWB: IWB/IGA Dep: BDI Anx: BAI

CRCT: cluster randomized controlled trial; HK: Hong Kong; MPPI: multi-component positive psychology intervention; PPT: positive psychotherapy.

Subjective wellbeing - EFI: Enright Forgiveness Inventory - positive affect subscale; IWB/IGA: Index of Well-Being & Index of General Affect; LSS: Life Satisfaction Scale; LISA: Life Satisfaction Index; MHC-SF: Mental Health Continuum Short Form - subjective well-being subscale; MMS: Multiple Mood Scale; OHI: Oxford Happiness Index; OHQ: Oxford Happiness Questionnaire; PANAS: Positive and Negative Affect Schedule ; PHS: WHOQOL-BREF Psychological Health Scale; SHS: Subjective Happiness Scale; SPANE: Scale of Positive and Negative Experience; SWBQ: Subjective Well-being Questionnaire; SWLS: Satisfaction With Life Scale; SWS: Subjective Wellbeing Scale
Psychological wellbeing - ERS: Ego Resilience Scale; FS: Flourishing Scale; MHC-SF: Mental Health Continuum Short Form - psychological well-being subscale; SCL-90R: Symptom Checklist-90 Revised (inverted score); SCS: Self Compassion Scale; SWS: Subjective Wellbeing Scale; pwb subscale; WIB: Well-being/Ill-being Scale and two unnamed scales measuring empowerment and organizational commitment
Depression - BDI: Beck Depression Index; CES-D: Center for Epidemiological Studies - Depression Scale; DASS-21: Depression Anxiety Stress Scale; GDS-15: Geriatric Depression Scale
Anxiety - BAI: Beck Anxiety Inventory; DAS: Death Anxiety Scale; DASS-21: Depression Anxiety Stress Scales; STAI: State- Trait Anxiety Inventory

Table 2. Quality assessment of RCTs on PPIs in non-Western countries

Studies	SG	AC	BOA	DDO	N>50 PA	ITT/ 0 DO	Total Score	Quality Rating
Al-Seheel, 2016	0	0	0	1	0	1	**2**	**Low**
Arimitsu, 2016	0	0	0	1	0	0	**1**	**Low**
Asgharipoor, 2012	0	0	0	0	0	0	**0**	**Low**
Asl, 2014, 2016	0	0	0	1	0	0	**1**	**Low**
Chan, 2013	0	0	1	1	0	0	**2**	**Low**
Cheng, 2015	1	1	1	1	1	1	**6**	**High**
Chiang, 2008	1	0	0	0	0	0	**1**	**Low**
Chiang, 2010	1	0	0	1	0	0	**2**	**Low**
Choy, 2015	0	0	0	0	0	1	**1**	**Low**
Deng, 2016	0	0	0	0	0	0	**0**	**Low**
Dowlatabadi, 2016	0	0	0	1	0	0	**1**	**Low**
Guo, 2016	0	0	0	1	1	0	**2**	**Low**
Hendriks, 2017	1	1	1	1	1	1	**6**	**High**
Ho, 2016	1	1	0	1	1	1	**5**	**High**
Hwang, 2016	1	0	0	1	0	0	**2**	**Low**
Im, 2016	1	0	0	1	1	0	**3**	**Moderate**
Ji, 2016	0	0	0	1	0	0	**1**	**Low**
Khayatan, 2014	0	0	0	0	0	0	**0**	**Low**
Koydemir, 2015	0	0	0	0	0	0	**0**	**Low**
Lai, 2004	0	0	0	1	0	1	**2**	**Low**
Lau, 2011	0	0	0	0	1	0	**1**	**Low**
Lü, 2013	0	0	0	1	0	0	**1**	**Low**
Nikrahan, 2016	1	1	0	1	0	1	**4**	**Moderate**
Otsuka, 2006	0	0	0	1	0	0	**1**	**Low**
Wong, 2016	0	1	0	1	0	0	**2**	**Low**
Wu, 2016	1	0	0	0	0	0	**1**	**Low**
Yousefi, 2015	1	0	0	1	0	0	**2**	**Low**
Zhang, 2014	0	0	0	0	0	0	**0**	**Low**

SG = Sequence generation; AC = Allocation concealment; BOA = Blinding of main outcome assessment; DDO = Description of drop-outs; N>50, PA = N>50 or power analysis; ITT = Intention-to-treat analysis or 0 drop-outs

3.4.1 Effects on subjective wellbeing

For subjective wellbeing, a significant moderate to large effect was observed from 21 comparisons at post-test ($g = 0.48$, 95% CI: 0.24 to 0.72, $p < 0.001$). The effect sizes of the studies ranged from 0.34 to 2.22. Heterogeneity analysis revealed a significant and high level of heterogeneity ($I^2 = 80.69$, Q: 103.60, $p < 0.001$). Removing four outliers reduced the effect size to $g = 0.36$ (95% CI: 0.18 to 0.53, $p < 0.001$). The heterogeneity was moderate after outliers were removed ($I^2 = 44.22$, Q = 28.69, $p < 0.001$), which means that there may be methodological issues which could lead to a high risk of bias. The forest plot in Figure 2 (below) displays the post-treatment effects, including outliers.

Table 3. Between-group effects

Outcome measures	Ncomp	Hedges' *g*	95%CI	Z	Heterogeneity		Fail-safe N
					Q value	I^2	
All studies post-treatment							
Subjective wellbeing	21	0.48	(0.24 - 0.72)	3.97***	103.60***	80.69	272
Psychological wellbeing	8	0.40	(-0.03 - 0.83)	1.81**	35.26***	80.15	29
Depression	13	0.62	(0.19 -1.05)	2.81**	94.87***	87.35	202
Anxiety	5	0.95	(0.28 - 1.61)	2.77**	22.95***	82.57	41
Studies post-treatment, excl. outliers							
Subjective wellbeing	17	0.36	(0.18 - 0.53)	4.01***	28.69***	44.22	-
Psychological wellbeing	7	0.22	(-0.05 - 0.49)	1.61ns	9.74ns	38.37	-
Depression	10	0.69	(0.38 -0.99)	4.44***	26.55***	66.11	-
Follow-up effects, excl. outliers							
Subjective wellbeing	8	0.43	(0.08 - 0.77)	2.45*	21.61**	67.60	-
Depression	7	0.77	(0.23 – 1.30)	2.82***	38.55**	84.43	-

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; ns: non-significant

3.4.2 Effects on psychological wellbeing

For psychological wellbeing (eight comparisons), a significant moderate effect was observed ($g = 0.40$, 95% CI: -0.05 to 0.83, $p = 0.070$) at post-treatment. Effect sizes ranged from -0.42 to 1.50. Heterogeneity was significant and high ($I^2 = 80.15$, $Q = 35.26$, $p < 0.001$). After excluding one outlier, significant effects were no longer found. Figure 3 (below) displays the post-treatment effects in a forest plot.

3.4.3 Effects on depression

A significant large effect for depression (13 comparisons) was observed ($g = 0.62$, 95% CI: 0.19 to 1.05, $p < 0.001$) at post-treatment. Effect sizes of studies ranged from -0.89 to 2.45. Heterogeneity was significant and high ($I^2 = 87.35$, $Q = 94.87$, $p = 0.000$). Removing three outliers increased the effect size ($g = 0.68$, 95% CI: 0.38 to 0.99, $p < 0.001$) and heterogeneity was significant and high ($I^2 = 66.11$, $Q = 26.55$, $p < 0.01$). The forest plot in Figure 4 (below) displays the post-treatment effects.

Figure 2. Effects of PPIs on subjective wellbeing, including outliers

Study name	Hedges's g	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
Al-Saheel, 2016	0.19	0.31	0.10	-0.42	0.81	0.61	0.54
Arimitsu, 2016	0.08	0.33	0.11	-0.57	0.73	0.24	0.81
Asgharipoor, 2012	1.77	0.54	0.29	0.72	2.83	3.30	0.00
Asl, 2014	0.89	0.34	0.12	0.22	1.56	2.60	0.01
Chan, 2013	0.38	0.23	0.05	-0.06	0.83	1.69	0.09
Chiang, 2008	0.81	0.24	0.06	0.34	1.27	3.38	0.00
Choy, 2015	0.15	0.22	0.05	-0.28	0.59	0.70	0.48
Deng, 2016	0.79	0.26	0.07	0.29	1.29	3.08	0.00
Dowlatabadi, 2016	1.80	0.41	0.16	1.01	2.60	4.44	0.00
Hendriks, 2017	0.37	0.16	0.03	0.06	0.69	2.35	0.02
Ho, 2016	-0.08	0.06	0.00	-0.19	0.04	-1.30	0.19
Hwang, 2016	-0.44	0.48	0.23	-1.38	0.50	-0.92	0.36
Ji, 2016	0.95	0.39	0.15	0.18	1.72	2.43	0.02
Koydemir, 2015	0.75	0.23	0.05	0.30	1.20	3.25	0.00
Lü, 2013	2.22	0.43	0.18	1.37	3.06	5.16	0.00
Nikrahan, 2013	0.31	0.31	0.09	-0.29	0.91	1.01	0.31
Otsuka, 2012	0.00	0.28	0.08	-0.56	0.56	0.01	1.00
Wong, 2016	-0.22	0.25	0.06	-0.71	0.26	-0.91	0.36
Wu, 2016	0.43	0.20	0.04	0.04	0.81	2.16	0.03
Yousefi, 2015	0.36	0.36	0.13	-0.36	1.07	0.98	0.33
Zhang, 2014	-0.37	0.43	0.19	-1.22	0.48	-0.86	0.39
	0.48	0.12	0.01	0.24	0.72	3.97	0.00

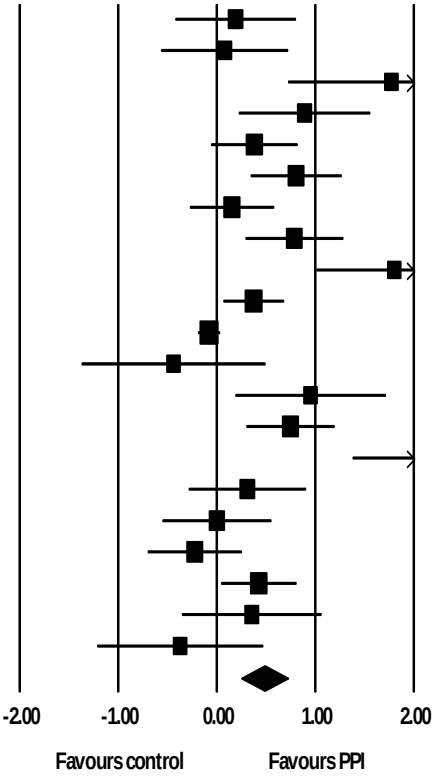


Figure 3. Effects of PPIs on psychological wellbeing, including outliers

Study name	Hedges's g	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
Arimitsu, 2016	0.99	0.35	0.12	0.30	1.68	2.80	0.01
Asgharipoor, 2012	0.11	0.45	0.20	-0.78	0.99	0.23	0.81
Chiang, 2009	1.50	0.23	0.05	1.04	1.96	6.39	0.00
Hendriks, 2017	0.20	0.16	0.03	-0.11	0.51	1.27	0.21
Hwang, 2016	-0.42	0.48	0.23	-1.36	0.52	-0.88	0.38
Im, 2016	0.57	0.29	0.08	0.01	1.13	1.99	0.05
Lai, 2003	-0.04	0.25	0.06	-0.54	0.46	-0.15	0.88
Wong, 2016	0.03	0.25	0.06	-0.45	0.51	0.12	0.91
	0.40	0.22	0.05	-0.03	0.83	1.81	0.07

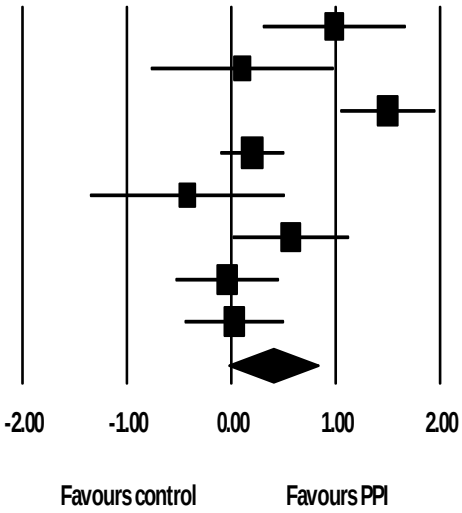
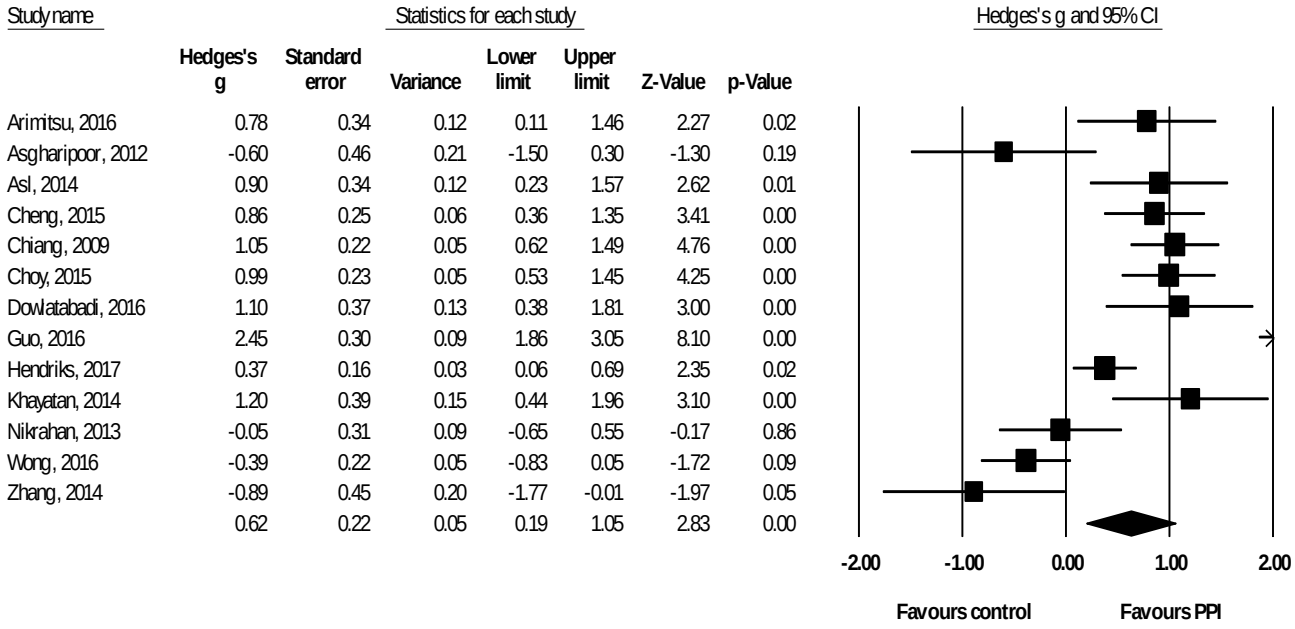


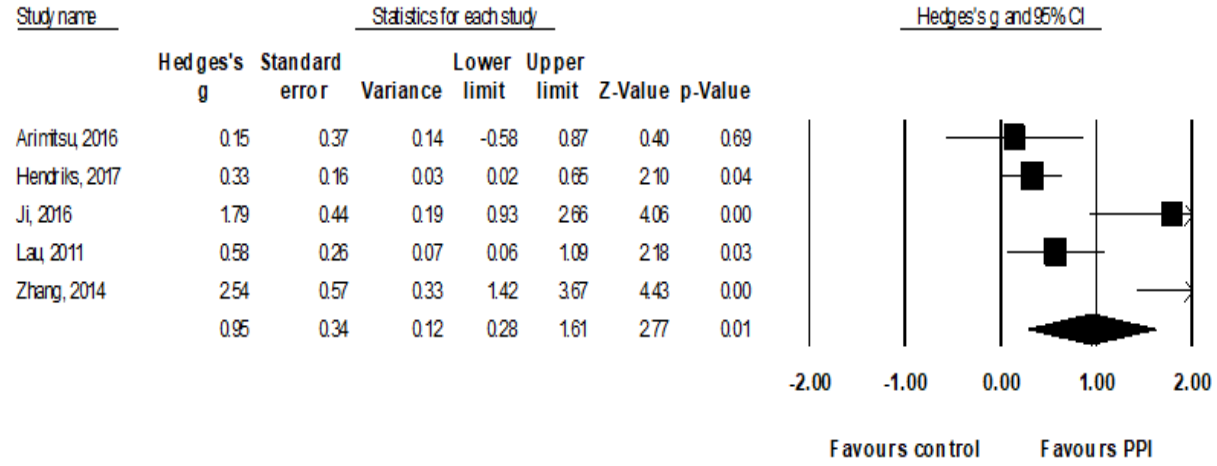
Figure 4. Effects of PPIs on depression, including outliers



3.4.4 Effects on anxiety

Effects on anxiety were reported in five studies. A significant large effect was observed (g = 0.93, 95% CI: 0.28 to 1.59, p = 0.006) at post-treatment. Effect sizes of studies ranged from 0.15 to 2.54. Heterogeneity was significant and moderate (I^2 = 44.22, Q = 22.95, p < 0.001). There were no outliers. The forest plot in Figure 5 displays the post-treatment effects.

Figure 5. Effects of PPIs on anxiety, including outliers



3.5 Subgroup analyses

A moderator analysis was conducted for subjective wellbeing and depression, but not for psychological wellbeing, due to a limited amount of studies for this outcome. Also, due to a limited amount of studies from moderate (n = 3) and high quality (n = 2), the moderating effects of study quality were not reported. Our analysis showed that none of the variables had a moderating effect. All outcomes of the subgroup analyses are shown in Table 4 (below).

3.6 Publication bias

For subjective wellbeing, the funnel plot was asymmetrically distributed in such a way that it was skewed in favor of studies with moderate to large effect sizes. This indicates the presence of publication bias. Egger's regression intercept also suggests that publication bias existed (intercept = 2.40, t = 3.72, df = 19, p = .0001). The mean effect sizes were calculated by imputing missing studies using the Trim and Fill method. One study was imputed and the effect size was adjusted to g = 0.52 (95% CI: 0.28 - 0.75), meaning the effect size actually increased. Our findings are in line with other meta-analyses on the efficacy of wellbeing interventions (Bolier et al., 2013; Chakhssi et al., 2018; Weiss, Westerhof, & Bohlmeijer, 2016), which consistently report more bias towards the publication of positive outcomes. Publication bias findings were not reported for psychological wellbeing, depression, and anxiety, due to the low numbers of studies (eight, 13, and five respectively). Such low numbers could lead to an unreliable publication bias analysis (Cuijpers, 2016; Lau, Ioannidis, Terrin, Schmid, & Olkin, 2006).

Table 4. Results of moderator analysis

Outcome	Criteria	Value	# studies	Hedges' G (95% CI)	Z-Value (p-Value)
Subjective wellbeing	Population	*Clinical*	6	0.88 (0.45 – 1.31)	3.99 (0.00) ***
		Non-clinical	15	0.32 (0.07– 0.58)	2.50 (0.01) *
	Delivery	*Group*	16	0.64 (0.37 – 0.92)	4.65 (0.00) ***
		Self-help	5	-0.01 (-0.18 – 0.16)	-0.10 (0.92) ns
	Intervention	*Single component*	11	0.33 (0.10 – 0.56)	2.84 (0.00) ***
		Multi-component	10	0.70 (0.26 – 1.14)	3.13 (0.00) ***
	Control	*Active*	8	0.16 (-0.20 – 0.51)	0.87 (0.38) ns
		Non-active	13	0.66 (0.34 – 0.97)	4.06 (0.00) ***
	Duration	*≤ 8 weeks*	16	0.32 (0.12 – 0.52)	3.08 (0.00) **
		> 8 weeks	5	1.27 (0.24 – 2.30)	2.41 (0.02) **
	Adaptation	*Adapted*	10	0.30 (-0.01 – 0.60)	1.92 (0.06) **
		Not adapted	11	0.64 (0.35 – 0.94)	4.25 (0.00) ***
Depression	Population	*Clinical*	6	0.63 (0.10 – 1.16)	2.34 (0.02) *
		Non-clinical	7	0.62 (-0.05 – 1.28)	1.82 (0.07) **
	Delivery	*Group*	11	0.70 (0.23 – 1.16)	2.93 (0.00) ***
		Self-help	2	0.23 (-0.99 – 1.45)	0.37 (0.71) ns
	Intervention	*Single component*	5	0.37 (-0.32 – 1.07)	1.06 (0.29) ns
		Multi-component	8	0.78 (0.18 – 1.38)	2.52 (0.01) *
	Control	*Active*	4	-0.21 (-1.02 – 0.61)	-0.49 (0.62) ns
		Non-active	9	0.96 (0.52 – 1.41)	4.23 (0.00) ***
	Duration	*≤ 8 weeks*	10	0.79 (0.34 – 1.24)	3.43 (0.00) ***
		> 8 weeks	3	0.04 (-0.97 – 1.05)	0.08 (0.94) ns
	Adaptation	*Adapted*	3	0.15 (-0.59 – 0.89)	0.41 (0.67) ns
		Not adapted	10	0.76 (0.23 – 1.29)	2.81 (0.00) **

* p<0.05; ** p<0.01; *** p<0.001; ns: non-significant.

3.7 Follow-up effects

The follow-up effects of the PPIs were examined from four weeks after baseline/post-test up to three months after baseline/post-test (see Table 3). Follow-up effects for psychological wellbeing and anxiety could not be calculated due to the limited amount of studies, namely four and two respectively. For subjective wellbeing (eight comparisons) the effect size slightly decreased (g = 0.43, 95% CI: 0.08 - 0.77, p = 0.01). For depression (seven comparisons, after removal of one outlier), an increased effect size (g = 0.77, 95% CI: 0.23– 1.30, p = 0.005) was found. These findings suggest that PPI's in non-Western countries are also effective up to three months follow-up.

4. Discussion

This study aimed to examine the efficacy of PPIs from non-Western countries across randomized controlled trials. Following a systematic literature search, 28 RCTs were included in the meta-analysis. A moderate effect size was found for subjective wellbeing (g = 0.48) and psychological wellbeing (g = 0.40), and large effect sizes for depression (g = 0.62) and anxiety (g = 0.95). After removing outliers, the effect sizes decreased for subjective wellbeing (g = 0.36) and for psychological wellbeing (g = 0.22), but slightly increased for depression (g = 0.69). Follow-up results showed slightly decreased effect sizes for subjective wellbeing (g = 0.43) and an increased effect size for depression (g = 0.77). The overall study quality was low. Three studies were rated with a high quality, two with a moderate quality, and 23 with a low quality. There were also indications of publication bias, with a bias towards the publication of studies with positive results and with large effect sizes. Our findings on the larger effect sizes of studies from non-Western countries are in line with a previous meta-analysis on MPPIs (Hendriks et al., 2018b), that reported substantially larger effect sizes of PPIs from non-Western countries on subjective wellbeing, psychological wellbeing, and depression. The effects of PPIs on anxiety have not been reported in previous meta-analyses, most likely because of the low number of studies reporting this outcome. Since our meta-analysis was based on only five studies reporting on anxiety, caution is warranted when interpreting findings on anxiety in this study. The moderate to large effect sizes found in the current meta-analysis are also larger than those reported in a meta-analysis on PPIs by Bolier et al. (2013), which did not include non-Western studies. Hence, our findings indicate that the effect size of PPIs that are conducted in non-Western countries have larger effects than PPIs that are conducted in Western countries.

A possible explanation for the larger differences in effect sizes is the low quality of the studies from non-Western countries. The mean score of the study quality in this analysis was 1.79, indicating that there is a high risk of bias in the studies and the overall study quality is rated as low. In comparison, a previous meta-analysis of MPPIs where study quality was determined using the same criteria revealed a mean score of 3.43 for quality of studies from Western countries (Hendriks et al, 2018b). A high risk of bias, or low study quality, is often associated with larger effect sizes, or vice versa. For example, a meta-analysis on the efficacy of psychotherapy (Cuijpers, van Straten, Bohlmeijer, Hollon, & Andersson, 2010) reported relatively smaller effect sizes in studies of higher quality, compared with low-quality studies. A meta-analysis on the efficacy of PPIs (Bolier et al., 2013) suggested that the association between high effect sizes and lower study quality might also be applicable to PPIs. Our quality analysis showed that RCTs of PPIs from non-Western countries often do not adequately describe the sequence generation of randomization, or how allocation to the intervention was concealed. Inadequate random

sequence and allocation concealment can overestimate treatment effects significantly (Armijo-Olivo et al., 2015; Dettori, 2010). Blinding of assessors was also not described in the large majority of the studies, which can lead to overestimation of treatment effects (Schulz & Grimes, 2002). The found sample sizes were also small: 14 studies (50%) had fewer than 20 participants in the intervention group, and 10 studies (36%) had between 20 and 40 participants in the intervention group. The large majority of the studies in this meta-analysis was underpowered, which can lead to inflated estimates of the effect sizes (La Caze & Duffull, 2011). Only five studies used intention-to-treat analysis (ITT), which is a statistical method where data from all randomized participants is analyzed, regardless of their adherence. Intention-to-treat analysis avoids an overestimation of the effects of an intervention (Gupta, 2011; Hollis & Campbell, 1999).

In addition to the methodological biases, other biases may contribute to higher effect sizes in non-Western countries. A well-known phenomenon in psychology is the Hawthorne effect. The awareness of being observed leads to conformity and social desirability, which in turn leads to positive behavior outcomes (McCambridge, Witton, & Elbourne, 2014). Research suggests that in collectivistic societies people tend to respond in more socially desirable ways, to maintain good relationships with others (Johnson & Van de Vijver, 2003; Lalwani, Shavitt, & Johnson, 2006). Another aspect of the Hawthorne effect is the novelty effect of an intervention. In studies on the effects of mobile health interventions in Western countries, it is noted that new technologies are perceived as more novel and having more value than traditional interventions. This novelty effect may lead to greater enthusiasm among participants and a greater attention to a particular intervention (Ammenwerth & Rigby, 2016; Turner-McGrievy, Kalyanaraman, & Campbell, 2013). In non-Western countries, this effect could also be applicable to regular psychological interventions, since access to mental health interventions is limited (de Jong et al., 2015; Rathod et al., 2017).

Despite the lower study quality and the influence of possible biases that may have contributed to overestimation of the effect sizes, the possibility that PPIs in non-Western countries have larger effect sizes than PPIs from Western countries simply because they are more effective cannot be excluded. We suggest that PPIs constitute a good cultural fit with non-Western populations. Western European and North American cultures ("Western") are often described as independent, whereas Asian and South American cultures ("Eastern") are characterized as interdependent (Markus & Kitayama, 1991; Morris & Peng, 1994; Park, Uchida, & Kitayama, 2016). While the goal of positive psychology interventions is to increase the wellbeing of the individual, many positive interventions operate through collective pathways that aim to improve interdependent relationships. The self, in interdependent cultures, is often perceived as a group-self with strong connections and feelings towards family members and the close environment. In such a setting, a group intervention may elicit more social support and wellbeing than in an individualized, independent, and egocentric cultural setting. Examples are positive psychology activities such as the gratitude visit (Davis et al., 2016; Emmons & Stern, 2013), acts of kindness (Buchanan & Bardi, 2010), and forgiveness (Derakhtkar & Ahangarkani, 2016). In addition, many positive psychology activities aim to stimulate low arousal emotions such as kindness (Otake, Shimai, Tanaka-Matsumi, Otsui, & Fredrickson, 2006; O'Connell, O'Shea, & Gallagher, 2016), and compassion (Arimitsu, 2016; Yang, Liu, Shao, Ma, & Tian, 2015), and integrate prayer and other spiritual activities (Rouholamini, Kalantarkousheh, & Sharifi, 2017; Wu & Koo, 2016) into interventions. Studies show people from Eastern cultures prefer such low arousal emotions (Lim, 2016; Tugade & Fredrickson, 2004), and there is evidence suggesting cultural fit of emotions is associated with better health (Yoo & Miyamoto, 2018). PPIs often include activities that aim to increase awareness, based on Buddhist philosophy, for example,

mindfulness-based activities (Hamilton, Kitzman, & Guyotte, 2006; Ivtzan & Lomas, 2016), and loving kindness meditation (Fredrickson, Cohn, Coffey, Pek, & Finkel, 2008). In addition, several studies from Iran were recently published that examined the effects of Islamic-based PPIs (Al-Seheel & Noor, 2016; Rouholamini et al., 2017; Saeedi, Nasab, Zadeh, & Ebrahimi, 2015). Such intervention may constitute a cultural fit with the backgrounds of the participants. This, in turn, could result in greater enthusiasm, commitment, and participation among the study populations, and therefore contribute to higher effect sizes.

4.1 Study limitations

Besides the low quality of the studies, there are four additional limitations to the findings of this meta-analysis. First, our findings were based on a relatively small number of studies per outcome and subgroup. For example, psychological wellbeing was an outcome in only eight studies, depression in 11 studies, and anxiety in five studies. Sample sizes were relatively small in the exploratory subgroup analyses. This limits the interpretation of the differences between groups. Due to the small number of studies, publication bias analysis was not performed for psychological wellbeing, depression, and anxiety. Follow-up effects could only be calculated for subjective wellbeing and depression, and findings should be treated with caution in light of the limited numbers. For these reasons, definite conclusions on the effects of PPIs from non-Western countries cannot be drawn. Second, due to the high heterogeneity of the studies, it was not possible to clearly determine optimal conditions, for example, differences in efficacy between clinical or healthy populations, or differences in duration of the intervention. Third, only studies published in peer reviewed journals in the English language were included. Studies that were published in book chapters, dissertations, studies in grey literature and studies that were not in the English language (for example, two studies from Iran, which were only available in Arabic) were excluded. Fourthly, only RCTs were included in the analyses, and non-randomized controlled trials were excluded. While RCTs are considered the gold standard in clinical research (Rosen, Manor, Engelhard, & Zucker, 2006), they are often cost intensive and complex (Korn & Freidlin, 2012). Sufficiently powering an RCT with its concomitant costs may not always be feasible in low and middle income countries, due to lack of financial resources. For example, 625 articles on positive psychology in the Indian Journal of Positive Psychology were screened. These studies were conducted in India and other Asian countries. Only two of these studies were RCTs. Including quasi-experimental studies, which are perhaps more often conducted in non-Western countries than RCTs, could increase the number of studies in the subgroups and thereby provide a more complete overview of the efficacy of PPIs in non-Western countries.

4.2 Recommendations

The limited number of studies included contributed to the finding of no significant moderators and unreliable results for the publication bias analyses. Research in the field of positive psychology in non-Western countries is still in its infancy. A bibliometric analysis revealed that in the time period 1998 - 2013, only nine RCTs from non-Western countries were published, and that number has now (2018) almost quadrupled (Hendriks et al., 2018a). With this strong trend towards globalization of positive psychology, the study quality of non-Western country RCTs could benefit from protocol guidelines such as the Consolidated Standards of Reporting Trials (CONSORT) (Schulz, Altman, & Moher, 2010) or the Standard Protocol Items: Recommendations for Interventional Trials (SPIRIT) guidelines (Chan et al., 2013). Further, we urge researchers from non-Western countries to publish in peer-reviewed journals, even when there is a null finding of no effect, as this is likely to reduce the publication bias in positive psychology research.

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Appendix A

Search strategy

Pubmed	*((well-being[Title/Abstract] OR happiness[Title/Abstract] OR happy[Title/Abstract] OR flourishing[Title/Abstract] OR "life satisfaction"[Title/Abstract] OR "satisfaction with life"[Title/Abstract] OR optimism[Title/Abstract] OR gratitude[Title/Abstract] OR strengths[Title/Abstract] OR forgiveness[Title/Abstract] OR compassion[Title/Abstract] OR "positive psych*"[Title/Abstract])) AND "random"*[Title/Abstract]*
PsycINFO	*well-being or happiness or happy or flourishing or "life satisfaction" or "satisfaction with life" or optimism or gratitude or strengths or forgiveness or compassion or "positive psych*").ti. and ("well-being" or happiness or happy or flourishing or "life satisfaction" or "satisfaction with life" or optimism or gratitude or strengths or forgiveness or compassion or "positive psych*").ab. and random*.af*
Scopus	*#1 well-being or happiness or happy or flourishing or "life satisfaction" or "satisfaction with life" or optimism or gratitude or strengths or forgiveness or compassion or "positive psych*"* *#2 AND ABS(well-being or happiness or happy or flourishing or "life satisfaction" or "satisfaction with life" or optimism or gratitude or strengths or forgiveness or compassion or "positive psych*")AND TITLE-ABS-KEY(random*)) AND DOCTYPE(ar) AND PUBYEAR > 1997 AND (LIMIT-TO (SUBJAREA,"MEDI") OR LIMIT-TO (SUBJAREA,"HEAL") OR LIMIT-TO (SUBJAREA,"PSYC") OR LIMIT-TO (SUBJAREA,"SOCI") OR LIMIT-TO (SUBJAREA,"NURS") OR LIMIT-TO (SUBJAREA,"BUSI") OR LIMIT-TO (SUBJAREA,"MULT")) AND (LIMIT-TO (LANGUAGE,"English")) AND (LIMIT-TO (AFFILCOUNTRY,"United States")) AND (LIMIT-TO (EXACTKEYWORD,"Human") OR LIMIT-TO (EXACTKEYWORD,"Article") OR LIMIT-TO (EXACTKEYWORD,"Humans") OR LIMIT-TO (EXACTKEYWORD,"Controlled Study") OR LIMIT-TO (EXACTKEYWORD,"Male") OR LIMIT-TO (EXACTKEYWORD,"Female") OR LIMIT-TO (EXACTKEYWORD,"Adult") OR LIMIT-TO (EXACTKEYWORD,"Randomized Controlled Trial") OR LIMIT-TO (EXACTKEYWORD,"Controlled Clinical Trial") OR LIMIT-TO (EXACTKEYWORD,"Middle Aged") OR LIMIT-TO (EXACTKEYWORD,"Aged") OR LIMIT-TO (EXACTKEYWORD,"Clinical Trial") OR LIMIT-TO (EXACTKEYWORD,"Physiology") OR LIMIT-TO (EXACTKEYWORD,"Priority Journal") OR LIMIT-TO (EXACTKEYWORD,"Major Clinical Study") OR LIMIT-TO (EXACTKEYWORD,"Young Adult") OR LIMIT-TO (EXACTKEYWORD,"Treatment Outcome") OR LIMIT-TO (EXACTKEYWORD,"Methodology") OR LIMIT-TO (EXACTKEYWORD,"Quality Of Life") OR LIMIT-TO (EXACTKEYWORD,"Clinical Article") OR LIMIT-TO (EXACTKEYWORD,"Procedures") OR LIMIT-TO (EXACTKEYWORD,"Questionnaire") OR LIMIT-TO (EXACTKEYWORD,"Human Experiment") OR LIMIT-TO (EXACTKEYWORD,"Normal Human") OR LIMIT-TO (EXACTKEYWORD,"Wellbeing") OR LIMIT-TO (EXACTKEYWORD,"Double Blind Procedure") OR LIMIT-TO (EXACTKEYWORD,"Randomization") OR LIMIT-TO (EXACTKEYWORD,"Depression") OR LIMIT-TO (EXACTKEYWORD,"Outcome Assessment") OR LIMIT-TO (EXACTKEYWORD,"Random Allocation") OR LIMIT-TO (EXACTKEYWORD,"Follow Up") OR LIMIT-TO (EXACTKEYWORD,"Questionnaires") OR LIMIT-TO (EXACTKEYWORD,"Exercise Therapy") OR LIMIT-TO (EXACTKEYWORD,"Time") OR LIMIT-TO (EXACTKEYWORD,"Animals") OR LIMIT-TO (EXACTKEYWORD,"Double-Blind Method") OR LIMIT-TO (EXACTKEYWORD,"Well-being") OR LIMIT-TO (EXACTKEYWORD,"Psychology") OR LIMIT-TO (EXACTKEYWORD,"Psychological Aspect") OR LIMIT-TO (EXACTKEYWORD,"Stress, Mechanical") OR LIMIT-TO (EXACTKEYWORD,"Training") OR LIMIT-TO (EXACTKEYWORD,"Physical Activity") OR LIMIT-TO (EXACTKEYWORD,"Strength") OR LIMIT-TO (EXACTKEYWORD,"Mental Health") OR LIMIT-TO (EXACTKEYWORD,"Placebo") OR LIMIT-TO (*

EXACTKEYWORD,"Health Status") OR LIMIT-TO (EXACTKEYWORD,"Happiness") OR LIMIT-TO (EXACTKEYWORD,"Personal Satisfaction") OR LIMIT-TO (EXACTKEYWORD,"Self Concept") OR LIMIT-TO (EXACTKEYWORD,"Life Satisfaction") OR LIMIT-TO (EXACTKEYWORD,"Follow-Up Studies") OR LIMIT-TO (EXACTKEYWORD,"Anxiety") OR LIMIT-TO (EXACTKEYWORD,"Satisfaction") OR LIMIT-TO (EXACTKEYWORD,"Psychological Well Being") OR LIMIT-TO (EXACTKEYWORD,"Self Report") OR LIMIT-TO (EXACTKEYWORD,"Instrumentation") OR LIMIT-TO (EXACTKEYWORD,"Emotion") OR LIMIT-TO (EXACTKEYWORD,"Adaptation, Psychological") OR LIMIT-TO (EXACTKEYWORD,"United States") OR LIMIT-TO (EXACTKEYWORD,"Fatigue") OR LIMIT-TO (EXACTKEYWORD,"Social Support") OR LIMIT-TO (EXACTKEYWORD,"Affect") OR LIMIT-TO (EXACTKEYWORD,"Pilot Study")