

The relationship between emotional intelligence and optimism: A meta-analysis

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Optimism involves the general expectation good things will occur and greater optimism is associated with a number of positive life outcomes related to better mental and physical health. These outcomes include reduced likelihood of depression, more effective immune functioning and lower mortality. Emotional intelligence, which consists of adaptive emotional functioning, may be a foundation for optimism. This meta-analysis examined the relationship between emotional intelligence and optimism across 6889 participants from 25 independent samples. Across studies, a higher level of emotional intelligence was associated with greater optimism with a weighted effect size of, $r = .35$, $p < .001$. Measurement approach and country of participants moderated the effect size. These results have relevance for the design of positive psychology interventions.

Keywords: Emotional intelligence; Meta-analysis; Optimism.

The core of dispositional optimism is the general expectation good things will occur (Peterson, 2000). Optimism can also be viewed as a person's explanatory style of events as proposed by attributional theory (Abramson et al., 1978). Optimism is associated with better mental health such as less likelihood of depression, and better physical health, with indices such as more effective immune functioning and lower mortality (Malouff & Schutte, 2017). Emotional intelligence, as conceptualised by Mayer et al. (2008), is the ability to perceive, understand and manage one's own emotions and those of others. Optimism is associated with concepts related to emotional processes such as, greater self-efficacy (Usán et al., 2022), better preventative coping skills (Nes & Segerstrom, 2006) and broader social networks (Macleod & Conway, 2005).

Mayer et al. (2008) proposed that emotional intelligence is an ability that is best assessed by performance measures, similar to those assessing cognitive intelligence. If emotional intelligence abilities are consistently shown across time and context, emotional intelligence can be conceptualised as a trait or disposition (Petrides & Furnham, 2000). Trait emotional intelligence is often assessed through self-report measures based on Mayer and Salovey's conceptualisation (Petrides & Furnham, 2000). A broader conceptualisation, including

competencies such as adaptability, self-motivation and empathy, with measurement of emotional intelligence including these competencies, was proposed by Bar-On (2006).

A higher level of emotional intelligence has been associated with better cognitive processing, better relationship outcomes, higher academic performance and better job performance (Brackett et al., 2011; Siegling et al., 2015). Emotional intelligence assessed as a trait or disposition shows stronger associations with positive outcomes than emotional intelligence assessed as an ability (Martins et al., 2010; Schutte et al., 2007).

The relationship between emotional intelligence and optimism

Optimistic individuals are more attentive to positive information, including a focus on aspects of the environment that have positive emotion elements (Kelberer et al., 2018). Optimism is also associated with higher-order abilities that tap into the integration and reparation of emotions (Tejada-Gallardo et al., 2020). Thus, a higher level of optimism may facilitate emotional competencies comprising emotional intelligence.

Likewise, a higher level of emotional intelligence may prompt optimism. The emotional awareness and

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regulation aspects of emotional intelligence may link with emotion-related qualities of optimism. Adaptive appraisal processes, productive decision making, positive habitual behaviours and larger social networks are associated with emotional intelligence (Zeidner et al., 2012). These qualities, along with interrelated outcomes such as social support, can be a foundation for the development of optimism. For example, appraising events in ways that allow positive expectations for the future, making successful decisions, adaptive habits, and a large social network that provides social support may foster optimism. High emotional intelligence predicts positive mood maintenance (Ciarrochi et al., 2000); thus, individuals high in emotional intelligence may be more likely to develop the positive outlook and focus on positively valenced emotional elements of the environment inherent in optimism. The connection between emotional intelligence and optimism may be bi-directional or cyclical, with the positive expectancies integral to optimism supporting aspects of emotional intelligence and aspects of emotional intelligence fostering optimism.

Several studies have examined the association between emotional intelligence and optimism, but the strength of the association across studies is unknown. Clarifying the association between optimism and emotional intelligence will contribute to understanding connections in the nomological network of positive psychology constructs and has the potential to contribute information regarding the development of positive psychology interventions.

Potential moderators of the association between emotional intelligence and optimism

Several factors may influence the connection between emotional intelligence and optimism. The conceptualisation of emotional intelligence and optimism, reflected by different measures, may influence the association between emotional intelligence and optimism. Qualities of participants, such as their age may be linked to individual development of emotional intelligence and optimism, and may influence the extent to which emotional intelligence and optimism are associated. Additionally, contextual factors, such as the culture of participants may influence the connection between emotional intelligence and optimism.

Conceptualisation and measurement

Scheier and Carver (1985) conceptualised optimism as a general tendency to expect positive outcomes, even when faced with challenges. Widely utilised measures of dispositional optimism are the Life Orientation Test (LOT; Scheier & Carver, 1985) and a slightly revised version (LOT-R; Scheier et al., 1994), which assess an individual's overall expectation that future

events will be positive. Based on a causality attribution model of optimism (Abramson et al., 1978), the Attributional Style Questionnaire (ASQ; Peterson et al., 1982) scale measures attributional factors across stability, globality and internality to determine a person's explanatory style for events. A corresponding child measure, is the Child Attributional Style Questionnaire (CASQ). Other scales assessing optimism include the Optimism-Pessimism-2 scale (SOP2; Kemper et al., 2017) and the optimism-pessimism scale (OPS; Kemper et al., 2017). Despite some conceptual differences underlying the development of the scales, optimism measures are strongly correlated, indicating a shared latent construct (Sharpe et al., 2011).

Different measures of emotional intelligence reflect somewhat different conceptualisations. Measures of emotional abilities focus on demonstrated performance of underlying abilities and use test type items that are typically evaluated against a set of predetermined criteria. The most widely used performance measure of emotional intelligence is the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT; Mayer et al., 2008) that tests emotional abilities across four factors; emotional perception, use of emotions to facilitate thought, understanding emotional information and managing emotions. Conceptually aligned to Mayer and Salovey's (Mayer et al., 2008) theoretical model are self-report measures that assess stable trait type qualities of emotional intelligence. They include the following: the Assessing Emotions Scale (AES; Schutte et al., 1998), Trait Meta-Mood Scale (TMMS; Salovey et al., 1995) and Wong and Law Emotional Intelligence Scale (WLEIS; Wong & Law, 2002).

Conceptually divergent from Mayer et al.'s (2008) model is the Emotional Quotient Inventory trait measure (EQi; Bar-On, 1997), which is based on an emotional intelligence model that includes competencies related to social stress management, adaptability, and general mood. Also, somewhat conceptually divergent from Mayer et al. (2008) model is the Trait Emotional Intelligence Questionnaire (TEIQue; Petrides, 2009), which includes factors such as self-control, emotionality and sociability. Weak correlations between the MSCEIT and trait emotional intelligence measures, alongside moderate associations within trait measures ($r = .43-.73$) support relatively distinct latent constructs are assessed by the measures (Siegling et al., 2015). Trait or dispositional measures of emotional intelligence have been found to have stronger associations with beneficial characteristics than ability measures (Martins et al., 2010).

Age

Research suggests that in general emotional intelligence (Sharma, 2017) and optimism (Furnham & Robinson, 2023) increase with age. However, the

relationship between emotional intelligence and age is equivocal and can be represented by a non-linear relationship peaking in middle adulthood (Cabello et al., 2016). Optimism and age also seem to have a somewhat non-linear relationship (Infeld, 2002) with optimism found to peak in middle adulthood. Optimism involves the perceived probability of achieving goals (Carver et al., 2010) and thus the relationship between optimism and age may be explained by shifts in goal orientations. Goal orientations change throughout the lifespan with young people setting growth goals compared to adults who are more likely to set maintenance goals, followed by loss-orientated goals (Infeld, 2002). As both emotional intelligence and optimism are connected to age, it is reasonable to hypothesise the relationship between emotional intelligence and optimism may be moderated by age. If emotional intelligence increases with age, then this higher level of emotional intelligence may encourage the development of optimism across the lifespan. It may be that life experiences accrued with age assist individuals learning to draw on emotional abilities to facilitate optimism with cyclical effects.

Culture

Cultural context may influence both optimism and emotional intelligence. Optimism has been found to fluctuate in response to stress and significant life events (Carver et al., 2010), with stress and life events potentially influenced by national context. A meta-analysis of 89,138 participants across 22 nations found that individualism and egalitarianism, which vary across nations, were significant predictors of optimism (Fischer & Chalmers, 2008). Cultural variances may also explain attributional differences found between Eastern and Western cultures (Yap et al., 2021). For example, Chinese participants from both mainland China and America were found to attribute good and bad events to global and external factors more consistently than other Americans, who in comparison demonstrated a self-serving bias (Lee & Seligman, 1997). Cultural norms and expectations may also influence the expression, understanding and regulation of emotions (LaPalme et al., 2016). Differing worldviews, resource variability and culturally distinct processes suggest the association between emotional intelligence and optimism may be moderated by culture as reflected by the nationality of participants.

Current study

To date, no meta-analysis has examined the overall association between emotional intelligence and optimism. A rationale for the present study was that a meta-analysis can provide information regarding the strength of the relationship between emotional intelligence and optimism

across studies, which by pooling data from studies can provide a truer estimate of the strength of the relationship than any one study can provide. A meta-analysis can also clarify what conditions may influence, or moderate, the strength of the association. Given the variability in conceptualisation, measurement and reported magnitude of association between optimism and EI, a meta-analytic investigation can identify potential moderators that may account for differences in effect sizes between studies. Potentially this can lead to identification of important conditions that foster the connection between emotional intelligence and optimism. The current investigation used meta-analytic techniques to synthesise and examine the magnitude of the association between optimism and emotional intelligence by calculating mean weighted correlation coefficients. Conceptualisation of constructs, as operationalised through measures, age, and country of study were examined as potential moderators.

The following hypothesis was tested: greater emotional intelligence is associated with more optimism. Exploratory analyses investigated whether type of emotional intelligence measure, type of optimism measure, mean age of sample, and country of sample moderate the relationship between emotional intelligence and optimism.

METHOD

Registration and protocol

This meta-analysis was registered with PROSPERO before commencement. The meta-analysis protocol is available at <https://www.crd.york.ac.uk/prospere> and the registration number is CRD42022333638.

Literature search

A systematic literature search was conducted using PsycInfo, ProQuest, Google Scholar, Scopus, and EBSCO databases for relevant published and unpublished studies, including dissertations. The combined search terms were “emotional intelligence” OR (EI) OR “emotional quotient” OR (EQ) AND “optimis*,” limited to title or abstract. Reference lists for these studies were also searched to identify other relevant studies but no additional studies were found. To reduce possible publication bias, authors of eligible studies were contacted via email to request relevant unpublished findings and missing sample information, however no further data or findings were obtained through this approach. Figure 1 shows a PRISMA flow diagram of the search process and final number of studies included in the meta-analysis as completed in June 2022.

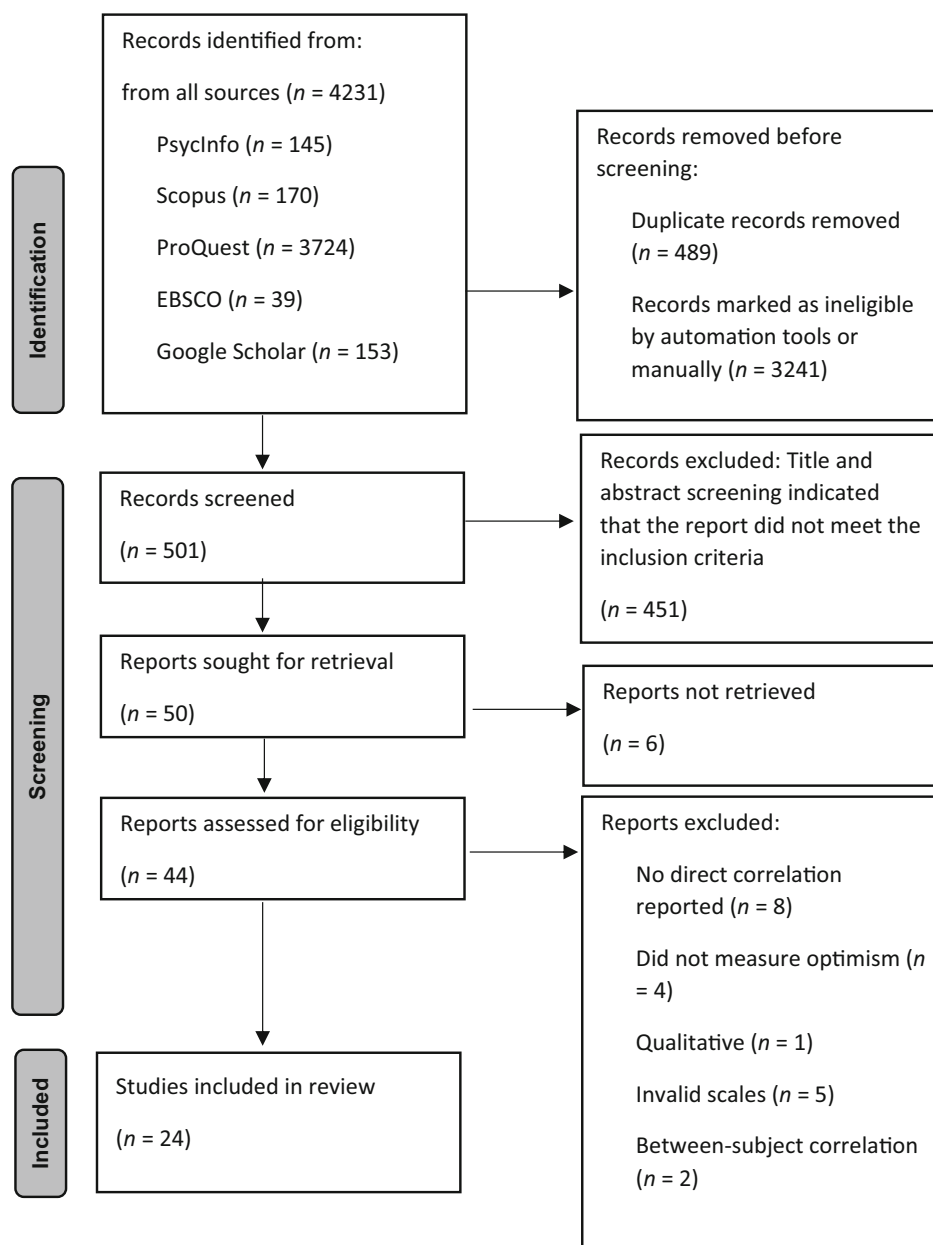


Figure 1. PRISMA flow diagram showing search process.

Inclusion and exclusion criteria

For studies to be included in this meta-analysis they had to measure an association between emotional intelligence and optimism and provide an r effect size or an effect size that could be converted to r . There was no restriction on time of publication, the country of studies, type of sample, measures of optimism or emotional intelligence used, or the language of publication. All studies published in a language other than English were translated using Microsoft Word translation, which has an accuracy similar to a human translator Synced Review (2018).

Coding process

Each study was coded for (a) author(s) and year of publication; (b) country of publication; (c) mean age of participants; (d) sample size; (e) sample context; (f) emotional intelligence measure (e.g., AES, TMMS, WLEIS, EQi, TEI, WLEIS, MSCEIT); (g) conceptualisation of emotional intelligence (e.g., ability, trait, mixed); (h) optimism measure (e.g., LOT-R, CASQ, OPS, The Optimism Scale, POSO-E); (i) conceptualisation of optimism (e.g., state or trait); and (j) effect size. Direction of effect size was entered as reported in the article and specified in the cell for effect size. Cells with missing data for non-critical

TABLE 1

Key characteristics of included studies (effect size, number of participants, context, mean age, emotional intelligence measure, conceptualisation of emotional intelligence, optimism measure, conceptualisation of optimism, country of sample)

Author	Date	Pearson <i>r</i> effect size	<i>N</i>	Sample context	Mean age	EI measure	EI conceptu- alisation	Optimism measure	Optimism conceptu- alisation	Country
Adekunle	2017	0.041	276	Adults	34.5	AES	Trait	LOT-R	Trait	Nigeria
Augusto-Landa et al.	2008	0.147	122	University students	20.71	TMMS-24	Trait	LOT-R	Trait	Spain
Augusto-Landa et al.	2011	0.450	217	University students	20.58	TMMS-24	Trait	LOT-R	Trait	Spain
Barroso et al.	2020	0.239	161	Children and Adolescents	14.51	TMMS-24	Trait	EQi Subscale	Trait	Spain
Bertges	2001	0.350	60	Children and Adolescents		AES	Trait	CASQ	State	USA
Cazalla-Luna & Molero	2018	0.332	324	University students	25.5	TMMS-24	Trait	LOT-R	Trait	Spain
Chico-Librán et al.	2011	0.344	518	University students	21	TMMS-24	Trait	LOT-R	Trait	Spain
Chocano	2018	0.210	59	Adults	38.59	EQi-C	Mixed	LOT-R	Trait	Spain
Chocano & Molero a	2019	0.150	15	Clinical sample	34.93	TMMS-24	Trait	LOT-R	Trait	Spain
Chocano & Molero b	2019	0.240	15	Clinical sample	34.93	EQi-C	Mixed	LOT-R	Trait	Spain
Di Fabio et al.	2018	0.620	201	Adults	45.5	TEIQue-SF	Mixed	LOT-R	Trait	Italy
Extremiera et al.	2007	0.217	498	Children and Adolescents	15.76	TMMS-24	Trait	LOT-R	Trait	Spain
Extremiera et al.	2010	0.157	245	Adults	41.4	TMMS-24	Trait	LOT-R	Trait	Spain
Jonker et al.	2015	0.425	285	University students		AES	Trait	LOT-R	Trait	South Africa
Khodarahimi	2015	-0.016	500	Adults	41.3	TMMS-24	Trait	OPS	Trait	Iran
Kumcagiz et al.	2011	0.330	300	University students		EI (PcSc)	Trait	The Optimism Scale	Trait	Turkey
Kwok & Gu	2017	0.400	513	Children and Adolescents	13.8	AES	Trait	LOT-R	Trait	Hong Kong
Lei & Pellitteri	2017	0.570	160	University students	23.23	AES	Trait	LOT-R	Trait	USA
Lindley	2001	0.450	316	University students		AES	Trait	LOT-R	Trait	USA
Madar et al.	2019	0.353	244	University students	30.9	WLEIS	Trait	LOT-R	Trait	Israel
Mikolajczak et al.	2006	0.680	100	University students	18.36	TEIQue-SF	Mixed	LOT-R	Trait	Spain
Olasupo et al.	2021	0.720	1053	Adults	71.34	WLEIS	Trait	LOT-R	Trait	Nigeria
Rey & Extremiera	2014	0.207	535	University students	21.97	MSCEIT	Ability	LOT-R	Trait	Spain
Schutte et al.	1998	0.520	27	Adults		AES	Trait	LOT-R	Trait	USA
Ugwu et al.	2017	0.410	175	Adults	39.65	AES	Trait	POSO-E	Trait	Nigeria

Note: AES = Assessing Emotions Scale; CASQ = Child Attributional Questionnaire; EI(PcSc) = Mehta Emotional intelligence Scale; EQi-C = Emotional Quotient Inventory; EQi Subscale = Optimism subscale of the Emotion Quotient Inventory; LOT-R = Life Orientation Test; MSCEIT = Mayer Salovey-Caruso Emotional Intelligence Test; OPS = Kemper optimism-pessimism scale; POSO-E = Ugwu optimism scale; TEIQue-SF = Trait Emotional Intelligence Questionnaire; The Optimism Scale Kumcagiz = Kumcagiz Optimism Scale; TMMS-24 = Trait Meta-Mood Scale; WLEIS = Wong and Law Emotional Intelligence Scale.

information were left blank (e.g., mean age). Full coded details for studies are presented in Table 1.

Inter-rater reliability

Two people independently coded variables from a total of 25 samples, reporting a 92% inter-rater reliability for overall coding. Inter-rater reliability for effect size coding was 100%. These results suggest good reliability of data extraction and coding. Disagreements were resolved through further discussion before reaching a final consensus.

Data analyses

Comprehensive Meta-Analysis Version 3.3 software (Borenstein et al., 2014) calculated a weighted Pearson's *r* correlation coefficient for effect size and illustrated using forest plots. If information provided included

the effect sizes for subscales of emotional intelligence but not for the composite score, the effect sizes were averaged. One study provided effect sizes for two emotional intelligence measures; these were averaged for the main effect and all moderator analyses, except the emotional intelligence measurement analyses; satisfying the assumption of independence. Moderator analyses were conducted on the type of emotional intelligence and optimism measures, the mean age of participants, country of sample and sample context. Because effect sizes were expected to vary across studies, a random effects model was used for this meta-analysis.

Publication bias was assessed using funnel plots and Duval and Tweedie's trim and fill test. Funnel plots were visually inspected; with studies distributed asymmetrically about the mean effect size indicating a possible publication bias. Using a funnel plot, the trim and fill test estimated the number of possible missing studies and their impact on mean effect size when included with observed

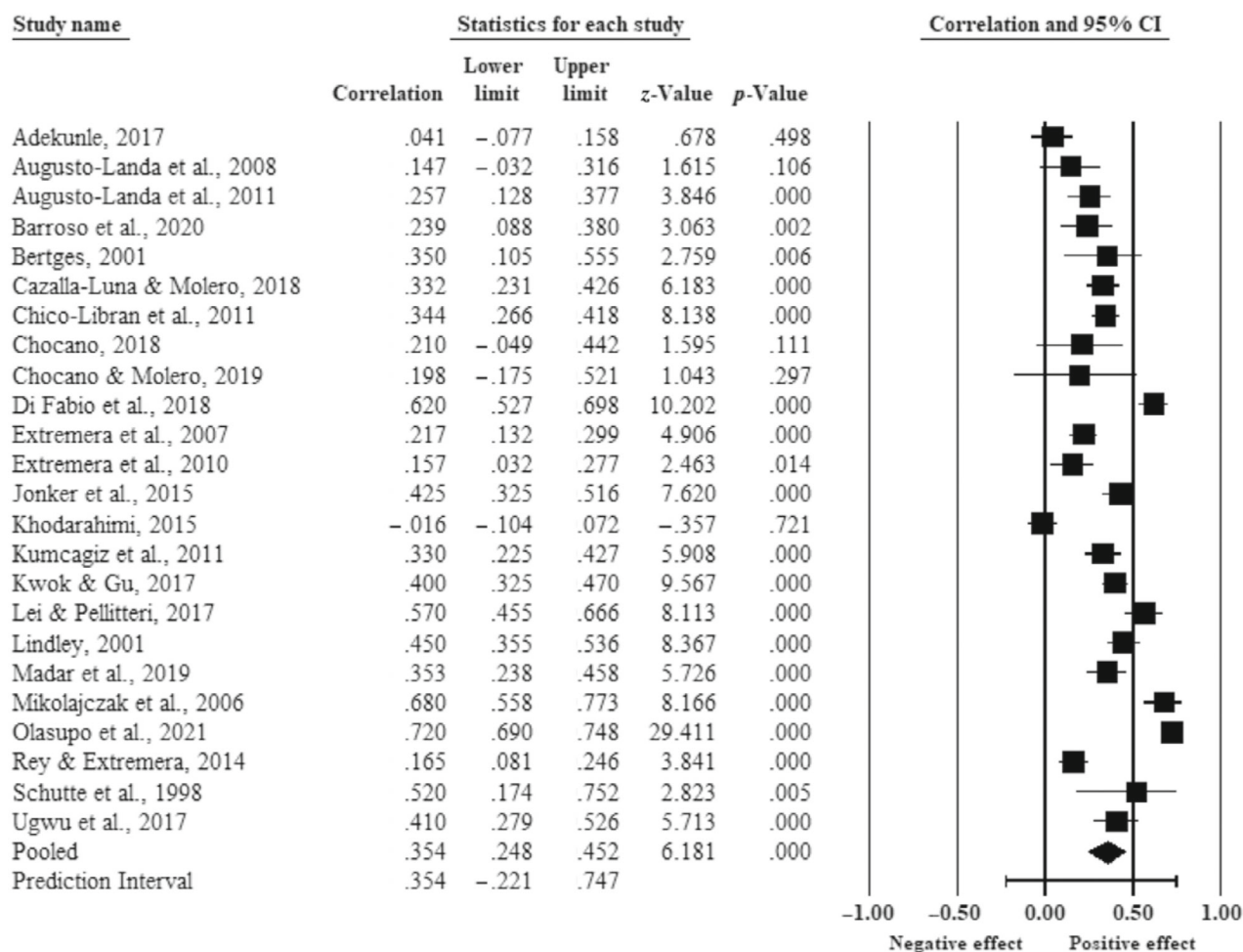


Figure 2. Forest plot for all studies (including effect sizes, expressed as correlations, p -values, and z -values, and confidence intervals).

studies. Egger's test and Orwin's fail-safe N were also calculated.

RESULTS

Table 1 shows the characteristics of the included studies. The references for the included studies are provided in Appendix A. The total number of participants was 6889, obtained from 24 studies with 25 independent samples.

Heterogeneity analyses

Significant heterogeneity was found for the overall weighted effect size $Q(23) = 524.45$, $p < .001$, $\tau^2 = .079$ with a high I^2 index of 96.61, indicating potential moderators of effect size.

Weighted mean effect size

The overall effect size for the positive association between emotional intelligence and optimism was significant,

$r = .35$, 95% CI [.25, .45], $p < .001$, indicating that across studies higher emotional intelligence was associated with greater optimism. Figure 2 shows the forest plot of effect sizes, expressed as correlations, p -values, and z -values, as well as confidence intervals. Weighted distributions showed all studies contributed at least 4% and no more than 5% of the overall effect size, indicating no one study dominated the analysis. A sensitivity analysis provided adjusted estimates for each study removed. No study was found to significantly change the effect size, indicating the results were robust.

Publication bias

Visual inspection of the funnel plot for the meta-analysis of optimism and emotional intelligence showed symmetrically distributed studies (see Figure 3). Further, results of Duval and Tweedie's trim and fill tests found no missing studies. Orwin's fail-safe N also indicated that publication bias did not influence meta-analytic associations.

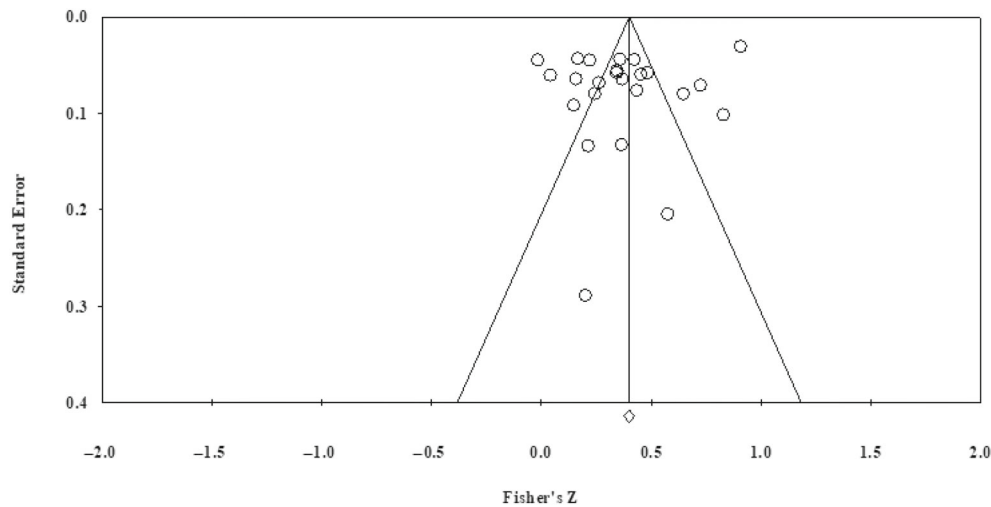


Figure 3. Funnel plot of standard error by Fisher's Z.

Note: AES = Assessing Emotions Scale; TEIQue = Trait Emotional Intelligence Questionnaire; EQi-C = Emotional Quotient Inventory; TMMS-24 = Trait Meta-Mood Scale; WLEIS = Wong and Law Emotional Intelligence Scale.

TABLE 2
Moderator results

Moderator	<i>k</i>	<i>R</i>	Lower	Upper	<i>p</i>	<i>Q</i>	<i>p</i>	<i>I</i> ²	<i>Tau</i> ²
Emotional intelligence measure, $Q(4) = 54.283, p < .001$									
AES	7	.40	.25	.53	<.001	48.70	<.001	88	.042
TMMS-24	9	.21	.12	.30	<.001	44.56	<.001	82	.017
WLEIS	2	.57	.11	.82	.017	56.90	<.001	98	.143
EQi-C	2	.22	-.02	.43	.070	0.013	.908	0	0
TEIQue	2	.64	.57	.70	<.001	0.706	.401	0	0
Optimism measure, $Q(1) = 1.206, p = .272$									
LOT-R	19	.38	.26	.49	<.001	422.57	<.001	96	.08
Other optimism measure	5	.26	.07	.43	.007	40.60	<.001	90	.04
Age, $Q(3) = 0.961, p = .811$									
8–21	8	.34	.23	.43	<.001	41.05	<.001	83	.019
22–30	3	.36	.13	.56	.003	29.09	<.001	93	.045
31–40	5	.26	.07	.42	.006	21.36	<.001	81	.032
41+	4	.42	-.06	.74	.086	336.13	<.001	99	.265
Sample type, $Q(2) = 1.079, p = .583$									
University students	11	.37	.29	.45	<.001	68.89	<.001	85	.022
Children and adolescents	4	.30	.18	.41	<.001	11.39	.010	74	.011
Adults	8	.36	.05	.61	.023	407.94	<.001	98	.212
Country of sample, $Q(2) = 10.59, p = .005$									
Spain	11	.28	.19	.36	<.001	4.35	<.001	79	.016
USA	4	.48	.39	.57	<.001	4.34	.226	31	.004
Nigeria	3	.43	-.109	.78	.113	175.81	<.001	99	.253

Note: AES = Assessing Emotions Scale; EQi-C = Emotional Quotient Inventory; LOT-R = Life Orientation Test; TEIQue = Trait Emotional Intelligence Questionnaire; TMMS-24 = Trait Meta-Mood Scale; WLEIS = Wong and Law Emotional Intelligence Scale.

Moderator analyses

Results of moderator analyses are shown in Table 2.

Measurement

Only one study that used a performance measure (the MSCEIT) to assess emotional intelligence was found. The effect size found in this study was $r = .21$. Because

categorical moderator analyses must have at least two effect sizes in each category, the MSCEIT performance measure could not be included in the moderator analysis that focused on the type of emotional intelligence measure. For the other measures, measure was a significant moderator. The TEIQue demonstrated the strongest effect ($r = .64$). The WLEIS and AES had strong to moderate effect size, while the TMMS-24 had a weaker effect size and the EQi-C was not significantly associated with

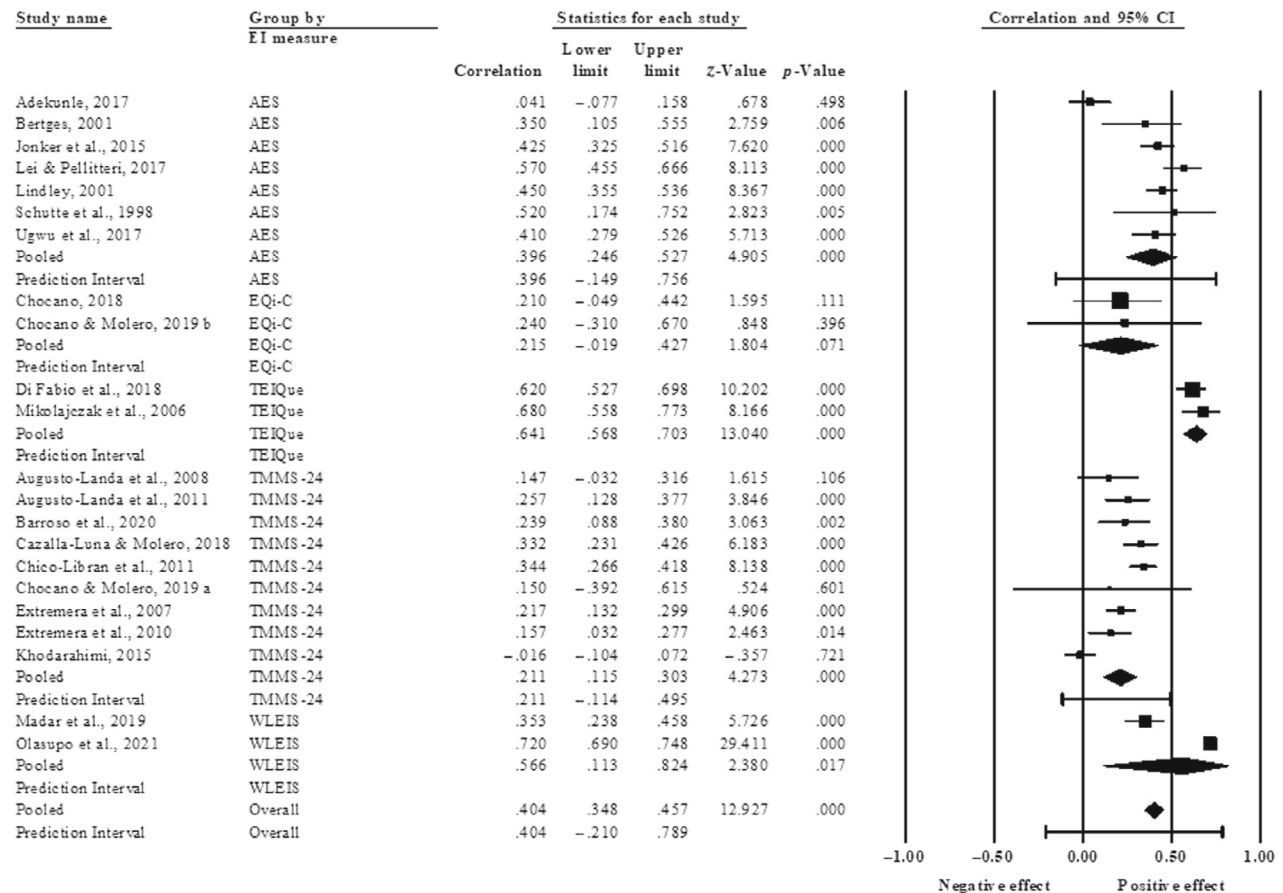


Figure 4. Forest Plot for emotional intelligence measures (including effect sizes, expressed as correlations, p-values, and z-values, and confidence intervals).

Note: LOT = Life Orientation Test.

optimism. Figure 4 shows the forest plot of effect sizes, expressed as correlations, p -values, and z -values, as well as confidence intervals.

Nineteen studies used the LOT-R scale to assess optimism and five used alternative measures. A comparison of the LOT-R with other measures showed a not significant moderation effect for type of optimism measure. See Figure 5.

Age

To test if mean age moderates the relationship between emotional intelligence, a quadratic meta-regression was calculated following a procedure recommended by M. Borenstein (personal communication, August 2022). For each study, mean age was centred (Mage-C) representing the linear component and subsequently squared (Mage-C^2) representing the curvilinear component. The curvilinear component indicated a better fit than the linear component ($p = .0085$). Using the formula: predicted value = ($\text{Mage-C} * \text{Mage-C}$ coefficient) + ($\text{Mage-C}^2 * \text{Mage-C}^2$ coefficient) + intercept coefficient,

predicted values were calculated and plotted as displayed in Figure 6. The model predicted some of the variance, $Q(2) = 9.30$, $p = .0096$, and although goodness of fit indicated significant unexplained variance, $Q(17) = 171.61$, $p < .0001$, $\tau^2 = 0.0373$, $I^2 = 90.09$, 60% of total variance was explained. These results indicated that the association between emotional intelligence and optimism was strongest for younger and older people in contrast to middle aged people.

Country

To test if country of samples moderated the relationship between emotional intelligence and optimism, three countries, each of which was represented by two or more samples, namely Nigeria, Spain and USA, were included for moderation analyses. Country of sample was found to be a significant moderator of the meta-analytic effect size, $Q(2) = 11.71$, $p = .003$ with studies conducted in the USA reporting the strongest association between emotional intelligence and optimism, $r = .48$, $p < .001$. Effect sizes, expressed as correlations, p -values, and z -values, as well as confidence intervals are shown in Figure 7.

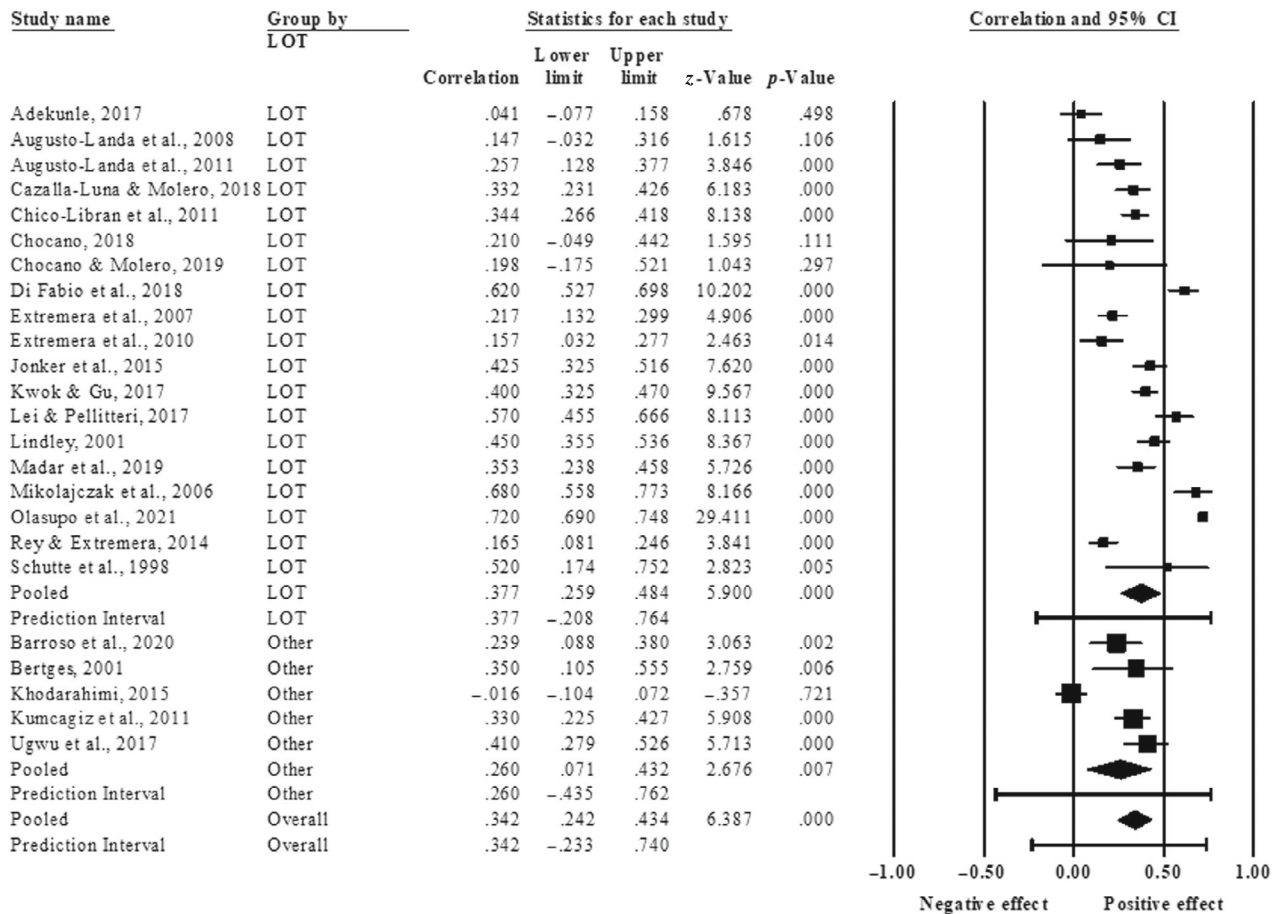


Figure 5. Forest plot for optimism measure (including effect sizes, expressed as correlations, p-values, and z-values, and confidence intervals).

DISCUSSION

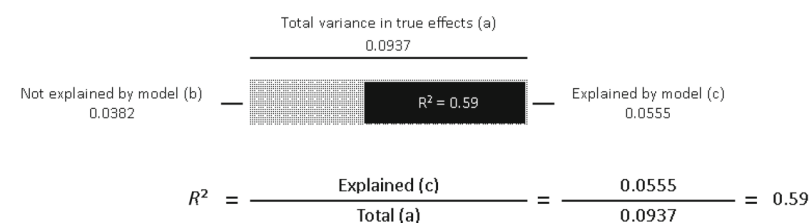
The present meta-analysis consolidated findings regarding the association between emotional intelligence and optimism. The overall weighted effect size was $r = .36$ across 25 samples, which included a total of 6889 participants. This effect size indicates that higher emotional intelligence is associated with more optimism. The finding of the interconnections between emotional intelligence and optimism across studies adds to the understanding of the nomological network of positive psychology constructs.

The association between optimism and emotional intelligence supports the theoretical assumption that individuals who perceive and respond to emotions adaptively are more likely to be optimistic. An optimistic outlook in turn may foster the development of emotional competencies. Thus, the two qualities may have bi-directional supportive functions. For example, optimists have been found to have a positive attentional bias (Madar et al., 2019), which may facilitate their recognition of positive emotions in the self and others. The regulation aspects of emotional intelligence may in turn foster

optimism through appraisals involving the expectancy that good events will occur, resulting in positive emotion and maintenance of positive mood as reported by Ciarrochi et al. (2000). These positive expectancy appraisals prompted by emotional intelligence would likely result in higher levels of optimism.

Effect size varied across measurement approach, age and country of sample. Emotional intelligence measurement significantly moderated the emotional intelligence-optimism relationship. Studies using the TEIQue (Petrides, 2009) to assess emotional intelligence showed the strongest effect size. This measure is based on a broad conceptualisation of emotional intelligence and includes factors related to self-control, emotionality and sociability. Such a broad conceptualisation may reflect multiple processes that foster optimism. The strength of the association between emotional intelligence and optimism was not significantly moderated by differences in optimism measures, possibly supporting the convergent validity of these measures.

The moderating effect of age on the association between emotional intelligence and optimism was somewhat ambiguous. A significant curvilinear relationship

R^2 for Model 1, Random effects (MM), Z-Distribution, Fisher's Z

- (a) To compute the total variance (of all studies about the grand mean) we run the regression with no covariates.
 (b) To compute the variance not explained by the model (of all studies about the regression line) we run the regression with the covariates.
 (c) The difference between these values gives us the variance explained by the model.

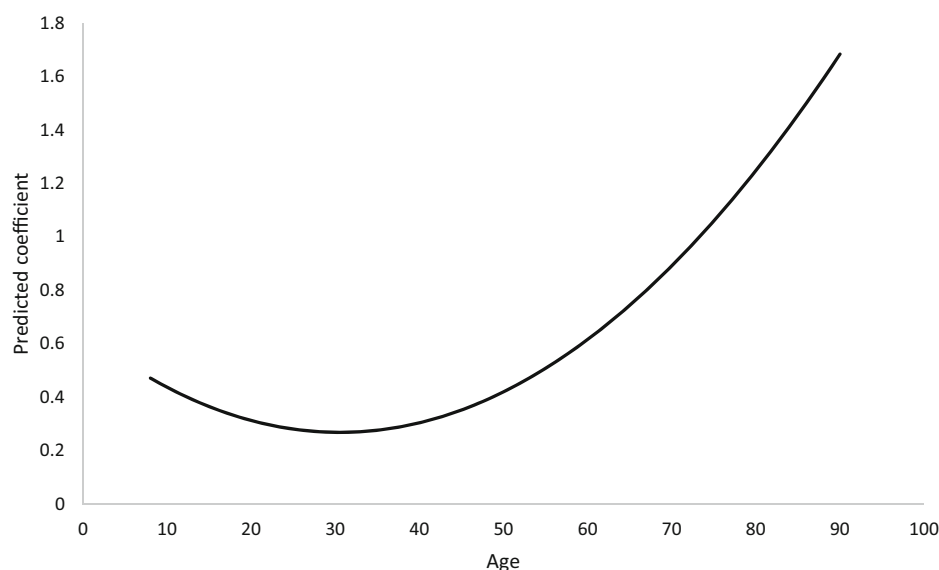


Figure 6. Predicted value as a function of Mage (C) and Mage (C)^2 .

using continuous data suggested that the connections between emotional intelligence and optimism are strongest in childhood, adolescence and after the age of 40, with especially strong effect sizes for the oldest samples. However, a categorical age comparison of ages did not show a significant effect. Thus, there is only partial support for age moderation effects. As suggested by the moderator analysis using continuous data, it may be that life experience and development of competencies allows individuals to more effectively draw on adaptive emotion functions to support positive expectancies, such as those related to optimism. To the extent that age may moderate the association between emotional intelligence and optimism, the association seems especially strong at the oldest age. This is interesting given previous findings that emotional intelligence and optimism peak in middle adulthood. Perhaps, this is indicative of underlying factors that may moderate the emotional intelligence and optimism relationship, such as adaptability that becomes more salient as people experience negative life events and cognitive decline. Additionally, at later stages of

development, there may have been more opportunities for bi-directional or cyclical effects to strengthen the ties between optimism and emotional intelligence.

The country of samples was a significant moderator of the association of emotional intelligence with optimism. Similar effect sizes were found for the Nigerian and USA samples, while Spanish samples reported smaller effect sizes. Large variability found within the Nigerian and Spanish samples suggests confounding variables such as context of sample, pathological symptoms, emotional intelligence measure and age, that may in part explain differences between countries. Given the samples were drawn from a limited number of countries, the findings regarding the moderating effect of country is at best suggestive.

Limitations

Several cautions are in order when interpreting the results of this meta-analysis. First, the effect size of the relationship between emotional intelligence and optimism is

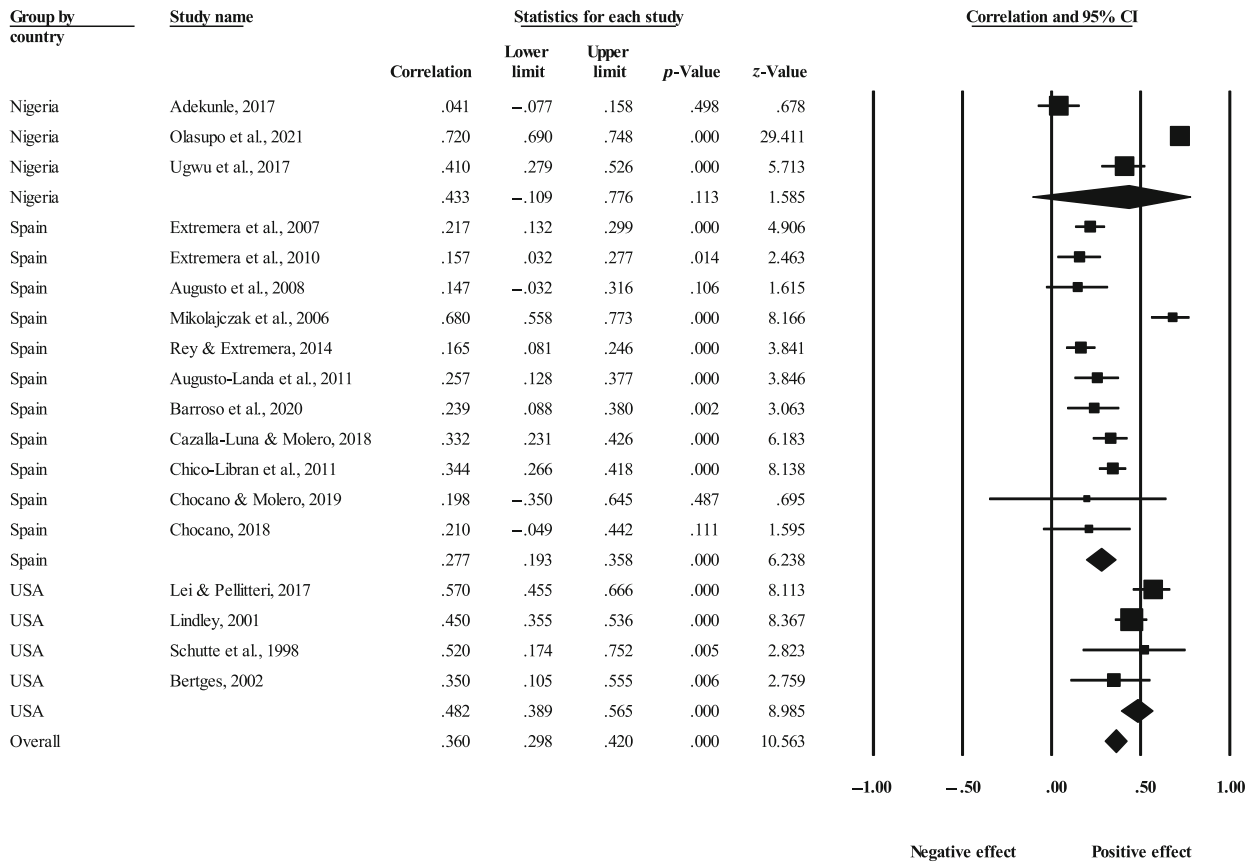


Figure 7. Forest plot for country of sample.

based on concurrent correlational connections and thus causation cannot be inferred. It may be that emotional intelligence encourages the development of optimism, or a high level of optimism may foster the development of some emotional intelligence abilities, and the ties between emotional intelligence and optimism may be bi-directional and cyclical, nurtured through an inter-connecting network of related characteristics. Characteristics that might influence both optimism and emotional intelligence include characteristic thinking styles, such as those related to appraisal and reappraisal of events (McRae et al., 2012) and individual differences in personality, such as differences in Big Five characteristics (McCrae & John, 1992).

Second, even though 6889 participants contributed to the meta-analysis and the nature of participants was somewhat diverse in regard to age, gender and nationality, future studies conducted with participants with other characteristics may find somewhat different results. In regard to the moderator analyses examining the impact of study characteristics on the association between optimism and emotional intelligence, most groups in the categorical moderator analyses consisted of fewer than 10 studies, limiting the power of these moderation analyses.

Implications and future research

Both emotional intelligence and optimism are positive psychology constructs related to a variety of beneficial outcomes (Brackett et al., 2011; Macleod & Conway, 2005; Malouff & Schutte, 2017; Nes & Segerstrom, 2006; Siegling et al., 2015; Usán et al., 2022). The positive and significant association between the two constructs found across studies, suggests the possibility of a mutual relationship between emotional intelligence and optimism that involves each strengthening the other. This finding has implications for the conceptualisation of the development and nature of both optimism and emotional intelligence. For example, an individual's typical appraisal of events (McRae et al., 2012) as positive may influence the development of optimism and be an aspect of the individual's emotion regulation competency component of emotional intelligence.

To clarify the nature of the association between optimism and emotional intelligence, future longitudinal studies might investigate further the possible bi-directional influence between emotional intelligence and optimism. Such studies could also examine the effect of increasing age on the association between the constructs. Intervention studies have shown that it is possible

to increase both emotional intelligence (Mattingly & Kraiger, 2019) and optimism (Malouff & Schutte, 2017). Future positive psychology interventions might explore to what extent increasing emotional intelligence through training increases optimism and whether programmes intended to increase optimism might also increase emotional intelligence. Future positive psychology intervention research might examine whether a dual focus on increasing both emotional intelligence and optimism might provide maximal benefits for outcomes such as psychological well-being, mental health, and relationship quality.

The result of such longitudinal and intervention studies would have implications for the design of both programmes intended to increase optimism and programmes intended to increase emotional intelligence. As both optimism (Malouff & Schutte, 2017) and emotional intelligence (Brackett et al., 2011; Siegling et al., 2015) are associated with positive outcomes, maximising the impact of programmes intended to increase these characteristics has value across areas such as clinical psychology, education, and functioning of organisations.

Conclusion

The positive constructs of emotional intelligence and optimism are linked. Emotional intelligence may facilitate optimism and optimism may facilitate emotional intelligence. Positive psychology interventions might simultaneously target increasing emotional intelligence and optimism to bring about positive outcomes in various realms.

DATA AVAILABILITY STATEMENT

The data included in the meta-analysis is presented in Table 1 of the manuscript and the data file is available from the corresponding author.

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APPENDIX A

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