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REVIEW ARTICLE

The Relationships between the Hope Dimensions of Agency Thinking and Pathways Thinking With Depression and Anxiety: a Meta-Analysis

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Abstract

Lack of hope may be important in the development and progression of depression and anxiety. Hope theory holds that hope has two cognitive components, agency thinking and pathways thinking. The aim of this meta-analytic study was to consolidate the results of studies investigating the relationships between agency thinking and pathways thinking with depression and anxiety Results showed that across studies both higher levels of agency and pathways thinking were associated with less depression and less anxiety. The weighted effect sizes for agency thinking were r=-.391 for depression and r=-.259 for anxiety. The weighted effect sizes for pathways thinking were r=-.328 for depression and r=-.206 for anxiety. The effect size for the association of agency thinking with depression was substantially larger than the effect size for the association of pathways thinking for depression. Agency thinking and pathways thinking were both more strongly associated with depression than anxiety. The agency thinking association with depression and anxiety increased in strength with age, while pathways thinking did not. The findings suggest that even though both pathways thinking and agency thinking as aspects of hope play important roles in relation to depression and anxiety, agency thinking may be especially pivotal. Future research can build on these results with experimental designs to generate causal findings and investigate ways to enhance agency thinking and pathways thinking as a means to reduce depression and anxiety.

Keywords Agency · Anxiety · Depression · Hope · Pathways · Meta-analysis

In contrast to a problem-focused model of mental health, the positive psychology approach emphasises the cultivation of positive emotions and characteristics, such as optimism, forgiveness, altruism and hope as facilitators of mental health (Park

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& Chen, 2016). In clinical practice a dual focus on positive and problematic characteristics can be beneficial (Wood & Tarrier, 2010). Application of aspects of the construct of hope may be beneficial in understanding and treating mental health problems.

Hope is a key construct in the positive psychology approach. Interest in hope was sparked when Karl Menninger delivered "The Academic Lecture on Hope" (Snyder, 2002). Menninger described hope as integral to treatment of mental health problems because of its ability to spark a willingness to learn, improve and thereby initiate therapeutic change (Schrank et al., 2012), a proposition supported by the research literature. High hope individuals have been found to have better treatment continuance than low hope individuals (Perley et al., 1971) and hope has proven to play an important role in recovery from both physical and mental illness (Duncan et al., 2021; Park & Chen, 2016).

1 Snyder's Hope Theory: A Cognitive Model for an Emotional Concept

A large scale review of hope identified forty nine individual definitions of hope constructed over the seventy plus years of research for which hope has been a focus (Schrank et al., 2008). While there are slight differences across the many definitions, mostly related to whether to define hope in terms of cognitive or emotional processes, hope was unanimously viewed as "an essentially positive phenomenon" (Schrank et al., 2008). Out of these many definitions, it is the work of Rick Snyder and colleagues on hope theory that has emerged as an important conceptualisation of hope in the literature.

Much of the early research on hope, such as that by Erikson or Mowrer (Lopez et al., 2003), viewed hope largely in either behavioural or emotional terms. Snyder's hope theory departed from such views by defining hope as cognitions employed in the pursuit of goals. Snyder assumed that human behaviour is inherently goal directed and treated goals as the cognitive anchor to his hope theory (Snyder, 2002). In hope theory, there are two categorisations of goals: positive or approach goals and negative or avoid goals (Snyder, 2002). An approach goal refers to the achievement of a new goal with a positive outcome, sustaining a present positive goal or furthering a positive goal toward which progress has already been made (Snyder, 2002). A negative or avoidance goal is aimed at delaying a negative goal outcome, or more ideally, preventing the arrival of that negative outcome altogether (Snyder, 2002).

The pursuit of these goals is facilitated by two types of thinking aimed at cognitively appraising one's goal related capabilities: pathways thinking and agency thinking (Snyder et al., 1991). Pathways thinking refers to a person's ability to generate pathways to goal achievement, whilst maintaining a concomitant sense of confidence that the chosen pathway will lead to success (Snyder, 2002). High-hope individuals will also produce plausible alternate pathways to their goals in the event the current pathway is blocked. Agency thinking is the motivational component in hope theory. Agency thinking involves utilising self-referential thoughts to produce the confidence and mental

energy needed to begin and continue using a pathway throughout the various stages of goal achievement (Snyder, 2002). Agency thinking also helps channel the needed motivation to produce alternate pathways to goals in the event of a blockage (Snyder, 2002). Snyder considered agency and pathways thinking as both iterative and additive components, with both necessary across the full goal pursuit sequence to be successful. Supporting these ideas, it has been found, for example, that individuals higher in hope experience greater success in achieving goals in both the academic and sporting realms (Curry et al., 1997; Snyder et al., 2002).

2 Previous Systematic Reviews and Meta-Analyses Focusing on Hope

A number of previous meta-analyses, consolidating findings across studies, have examined the role of hope in various life realms and associations of hope with other characteristics. The meta-analyses demonstrate the importance of hope in different areas of life and provide some insight into the association of hope with other characteristics. Blake and Norton (2014) found that across studies, higher levels of hope were significantly associated with more secure attachment and less anxious and avoidant attachment. Studies examining agency thinking and pathways thinking as separate components of hope find similar associations between these components and types of attachment. Alarcon, et al. (2013) found that across studies, greater hope was associated with more optimism, but that the constructs were somewhat distinct as indicated by differential relationships with other characteristics, such as affect. Across studies, examining agency thinking and pathways thinking as separate components these components showed similar relationships to optimism as total hope, with agency thinking showing somewhat higher associations than pathways thinking.

Marques, et al. (2017) found that across studies, greater overall hope was related to better academic performance. Reichard, et al. (2013) reported that across studies greater total hope was associated with better self-rated employee performance as well as objective measures of employee performance; greater hope was also associated with more well-being at work. Shanahan, et al. (2021) found that across studies of individuals with pain diagnoses, those with higher levels of total hope perceived less pain. Weis and Speridakos (2011) found that across studies, hope enhancement strategies increased hope and life satisfaction. With previous-meta-analyses suggesting that hope has connections to important areas of life, a meta-analysis examining the relationship between the hope components of agency thinking and pathways thinking with the mental health indicators of depression and anxiety will add to the body of information consolidating the connections that have been found between hope and other realms of life.

3 Measuring Hope

Snyder developed several scales with which to measure hope. The first was the Hope Scale (also referred to as the Adult Hope Scale, the Adult Dispositional Hope Scale, or the Trait Hope Scale), a 12-item scale intended to measure hope at the

dispositional level in adult subjects (Snyder et al., 1991). The scale is comprised of 4 items designed to measure agency thinking, 4 items to measure pathways thinking and 4 filler/distracter items (Snyder et al., 1991). The items have shown suitable internal consistency with Cronbach's alpha ranging from 0.71 to 0.76 for the agency subscale, while the pathways subscale alphas have ranged from 0.63 to 0.80. Cronbach's alpha has ranged from 0.74 to 0.84 for the total scale (Snyder et al., 1991). The scale has demonstrated a strong two-factor loading with agency and pathways loading strongly onto separate factors (Snyder et al., 1991). The scale has demonstrated both convergent and discriminant validity from related constructs such as generalised positive outcome expectancies, control perceptions, hopelessness and optimism, among others (Snyder et al., 1991).

The Hope Scale was later adapted to measure hope at the dispositional level in children. Validated for use with children between the ages of 8–16, the Children's Hope Scale is a 6-item self-report scale comprised of 3 items to measure agency thinking and 3 items to measure pathways thinking (Snyder et al., 1997). Much like the Hope Scale, the Children's Hope Scale demonstrated a strong two-factor structure along with sufficient test–retest reliability and internal reliability (Snyder et al., 1997). Convergent validity was demonstrated with constructs such as a perceived helplessness attributional style and self-perception assessments of competencies while discriminant validity was demonstrated for hopelessness and measures of intelligence (Snyder et al., 1997).

The State Hope Scale was developed to measure hope as a temporary state as opposed to an individual's dispositional hope level, with the dispositional hope level setting the range in which state hope would operate. The State Hope Scale is a 6-item self-report scale with 3 items measuring agency thinking and 3 items measuring pathways thinking. Much like the Hope Scale, the State Hope Scale demonstrated a two-factor structure representing agency and pathways thinking, with high internal consistency and discriminant validity from constructs such as desirability, self-esteem and positive/negative academic performance (Snyder et al., 1996). The State Hope Scale also proved sufficiently more malleable and responsive to successful and unsuccessful goal pursuits than the dispositional Hope Scale with scores varying accordingly to induced recall of successful or unsuccessful goal pursuits (Snyder et al., 1996).

4 Hope Theory and Mental Health

While Snyder's hope theory conceptualises hope cognitively, emotions have their place in this theory. Snyder believed that people's perception of how successful they were in their goal pursuits would influence resulting emotions (Snyder et al., 1996). Positive emotions would flow from perceptions of success while negative emotions would flow from perceptions of unsuccessful goal pursuits (Snyder, 2002). A study of college students found that individuals who expressed a high level of commitment to goal pursuits and achieved progress in goal attainment experienced positive changes in their subjective well-being over time, while well-being was impaired in those who expressed a high commitment to goal pursuits but did not achieve

progress in their goal attainment (Brunstein, 1993). Similarly, experimental evidence has shown that experimentally manipulated goal pursuits produce an increase in both state hope levels and subjective well-being when goal pursuits are successful and decreases in state hope levels and subjective well-being when goal pursuits are unsuccessful (Snyder et al., 1996). Hope was also found to attenuate the decreases in well-being resulting from unsuccessful goal pursuits, suggesting those with high hope have a more resilient belief that goal pursuits are still attainable, even in the face of setbacks (Moss-Pech et al., 2021).

5 Hope, Depression and Anxiety

The basis of hope theory in goal pursuits has theoretical links to the underpinnings of two prominent forms of distress, depression and anxiety. Arnau (2017) suggested that.lack of hope may be especially related to depression. Many sufferers of depression can point to a triggering event preceding the onset of their depression, this triggering event can often be conceptualised as a goal blockage (Ritschel & Sheppard, 2017). An example of such a blockage may be the loss of an important romantic relationship blocking the life goal to have a stable, happy marriage (Ritschel & Sheppard, 2017). This goal blockage can cause the ensuing emotional distress symptoms commonly exhibited by sufferers of major depression: loss of interest (anhedonia), energy and motivation. Theoretically, all three of these symptoms can be construed as reductions or absence of sufficient agency thinking to continue towards goal attainment (Ritschel & Sheppard, 2017). Similarly, depression sufferers also typically exhibit reductions in executive functioning skills such as shifting (moving back and forth between tasks), inhibition (overriding an immediate response to allow thinking before acting), updating and planning (Ritschel & Sheppard, 2017). Theoretically, these skill domains would be key facets related to blockages in goal pursuits.

In regard to anxiety, hope theory relates most strongly to the concept of anxious apprehension. Anxious apprehension is triggered by the anticipation or occurrence of a negative event and individuals perceiving themselves as unable to predict, control or alter this event to obtain the desired outcome (Arnau, 2017). As a physiological response is triggered to deal with the event, these self-evaluative cognitions become more prominent. This causes a feedback loop in which this focus on inadequacy increases arousal, induces hypervigilance, and activates cognitive biases causing a state of felt helplessness in relation to the oncoming negative event (Arnau, 2017). As the affected individual enters this state of helplessness, efforts to cope will typically shift from active problem solving behaviours to avoidance or rumination and eventual psychological distress (Arnau, 2017). This characterisation of anxiety as a state of helplessness because of a perceived inability to obtain desired results can easily be conceptualised as a loss of agency and pathways thinking while the ensuing distress supports Snyder's assertion that negative emotion is directly tied to an individuals' perceptions of their lack of success in goal pursuits (Arnau, 2017).

Much research over the years has supported these theoretical assertions. For example, a study of Hungarian college students found that hope levels significantly

predicted both depressive and anxious symptoms, with higher hope associated with lesser depression and anxiety (Chang et al., 2018). A study investigating hope's role in the links between loneliness and depressive and anxious symptoms found that hope predicted additional variance in depression beyond that accounted for by loneliness and moderated the relationship between loneliness and anxiety (Muyan et al., 2016). Similar results were found in populations experiencing trauma. High hope both lower levels of depression and anxiety in a childhood cancer survivors (Yuen et al., 2014) and in patients suffering from end stage renal failure (Billington et al., 2008). A longitudinal study of college students found that hope played a buffering role against depressive symptoms in the wake of a collective tragedy and trauma, with greater hope predicting lesser depression and post-traumatic stress symptoms (Liu et al., 2013).

A caveat to these results is suggested by Arnau (2017) in relation to anxiety. The majority of results when measuring hope and its relationship to anxiety do so at a very generalised level of anxiety and often do not account for differing forms of anxiety (Arnau, 2017). While hope maps well theoretically onto future-focused forms of anxiety, such as anxious apprehension, it does not map as well onto present-oriented anxiety such as panic related anxiety (Arnau, 2017). Present oriented anxiety deals with immediate threats (Arnau, 2017), while even the most present focused form of hope, state hope, is still future focused. Additionally, vulnerability to excessive maladaptive fear or panic related anxiety typically runs in families and exerts classical conditioning effects on those affected, leaving them less uninfluenced by high-trait or state hope (Arnau, 2017).

6 Agency and Pathways Thinking: Reciprocal or Unique Processes?

While Snyder theorised that agency thinking and pathways thinking were reciprocal, additive components (Curry et al., 1997; Snyder et al., 1991), more recent evidence suggests that agency and pathways can operate independently of one another. The initial questioning of agency and pathways being reciprocal came when Tong et al., (2010) suggested that while Snyder's hope theory proposes that hopeful people believe they are able to generate pathways and then follow those pathways to their goals, it does not explain how or why some people remain hopeful when there is nothing they can do to get what they want. Similarly, Snyder's hope theory cannot fully explain why people feel altruistic hope for others who may be suffering and whom they cannot help (Tong et al., 2010).

A possible explanation may be that agency and pathways thinking do not comprise hope but are instead appraisals related to hope or are antecedents of hope (Tong et al., 2010). Across four studies, Tong et al., (2010) asked participants to complete a measure based on Snyder's hope theory along with a measure of an unrelated conceptualisation of hope. In study one, participants' hope for their personal growth (Hope: Growth) was measured. In study two, participants' more generalised hope for the future (Hope: Future) was measured. In study three, participants were asked to provide retrospective accounts of how often they had felt hope over the past month (Hope: Past). In each of the three studies, these measures of hope were

compared with trait measures of agency and pathways. In study four, state measures of Snyder's conceptualisation of hope were compared with an unrelated measure of hope regarding a specific goal. Across these four studies it was found that trait agency positively predicted Hope: Growth and was positively associated with Hope: Growth, Hope: Future and Hope: Past, while pathways was not. Similarly, state agency predicted and was positively associated with Hope: Goal while state pathways was not. The researchers proposed the reason for these findings is that the agency items from Snyder's measures of hope do not measure one's perceived capacity for achieving goals but instead reflect that hopeful people tend to think goals are attainable even when personal resources are exhausted (Tong et al., 2010).

These results have been echoed in findings regarding agency thinking and pathways thinking relationships to both depression and anxiety. A study using latent variable analysis found that greater agency at one time point was significantly related to decreased depression and anxiety at the subsequent timepoint, while greater pathways was not (Arnau et al., 2007). A study of parents of children with intellectual disabilities found that greater agency significantly predicted lower maternal depression, paternal depression and paternal anxiety while pathways did not (Lloyd & Hastings, 2009). A study of African-American adults found that agency predicted both positive and negative psychological adjustment while pathways did not (Chang et al., 2019). Individuals who reported greater agency reported lower anxious and depressive symptoms along with higher vitality and life satisfaction (Chang et al., 2019). Another study found that agency thinking significantly mediated the negative relationships of both ritualistic spirituality and existential spirituality with depressive symptoms (Chang et al., 2016). Additionally, a study of female college students found that agency thinking significantly mediated the relationships between sexual assault and both depressive symptoms and anxious symptoms while pathways thinking did not, such that sexual assault was negatively related to agency which in turn was negatively related to both depressive and anxious symptoms (Chang et al., 2017).

A study of paediatric cancer patients found that agency significantly predicted state anxiety following a cancer diagnosis while pathways did not (Germann et al., 2018). In another study, greater total hope was associated with less depression in older adult stroke survivors; when the agency and pathways subscales were examined separately only greater agency significantly predicted lower depression (Gum et al., 2006).

These results suggest that agency thinking may play a more significant role in the development of depression and anxiety than pathways thinking. This is in opposition to Snyder's assertion that both components are necessary and neither alone is sufficient to define hope (Snyder et al., 1991). The aim of the present meta-analysis was to consolidate the results of studies investigating the relationships between agency thinking and pathways thinking with depression and anxiety. Such a meta-analysis expands understanding of hope in that it makes use of available information regarding the agency thinking and pathways thinking associations with depression and anxiety across studies, increasing power and thus increasing the accuracy of the association estimates. Further, a meta-analysis of the association of the respective hope components of agency thinking and pathways thinking with depression and

anxiety can provide information regarding the possibly different functions of agency thinking and pathways thinking. The meta-analysis can also provide more insights regarding the possible development of symptoms of depression and anxiety, and especially the theoretically grounded supposition that agency thinking may be associated with depressive symptoms (Arnau, 2017).

7 Current Study

The meta-analysis tested the following hypotheses:

(1) Higher levels of agency thinking will be associated with lower levels of depression.
(2) Higher levels of pathways thinking will be associated with lower levels of depression.
(3) As some previous research suggests that agency thinking may be more relevant to depression, across studies, agency thinking will be more strongly related to depression than pathways thinking.
(4) Higher levels of agency thinking will be associated with lower levels of anxiety.
(5) Higher levels of pathways thinking will be associated with lower levels of anxiety.
(6) As some previous research suggests that agency thinking may be more relevant to anxiety, across studies, agency thinking will be more strongly related to anxiety than pathways thinking.
(7) The theoretical conceptualisation of hope that focuses on agency and pathways thinking maps more closely onto aspects of depression than aspects of anxiety; thus, the associations of agency and pathways thinking respectively with depression will be stronger than the associations of agency and pathways thinking with anxiety.

Exploratory analyses also investigated the possible moderating effects of sex and age on the relationships between agency thinking and pathways thinking with depression and anxiety. These moderators were selected because information regarding these study variables was provided in the majority of studies, with other possible common study variables, such as level of education of participants, reported in only a few studies.

8 Method

8.1 Registration and Protocol

This meta-analysis was registered with Prospero before commencing. The protocol is available via https://www.crd.york.ac.uk/prospero; the registration number is CRD42022346932.

8.2 Literature Search

A systematic literature search was conducted across the PSYCinfo (via Ovid), Proquest Psychology and EBSCO databases for full-text, peer-reviewed, English language only studies completed at any time. Both published and unpublished studies were included.

Search terms included "hope*", "depression", "depress*", "anxiety", "anxi*", "agency" and "pathways". As the search terms were quite broad, the search was limited to the title, abstract and keywords of articles. Terms were combined in various formations using Boolean logic and the search strategy was adapted to each database' keyword and search functionality.

Scopus was used to find citations of landmark theoretical articles in related follow up research. Reference lists were hand searched for further relevant studies which were then retrieved via Google Scholar. Figure 1 displays a PRISMA flow diagram of the search process and the final number of included studies. Thirty-five of the included studies were published and the other five were dissertation studies.

8.3 Inclusion and Exclusion Criteria

For inclusion, studies were required to report an *r* effect size for the correlation between both agency and pathways and at least one measure of either depression or anxiety. To ensure conceptual equivalence in assessment of hope, only measures based on Snyder's conceptualisation of hope were included. Any tools to measure other definitions or conceptualisations of hope were not included. Further, studies using qualitative designs were excluded.

8.4 Coding

Data extracted from the studies was coded on the following variables: author name and publication year, sample size, effect size and direction of association, hope component (agency or pathways), percentage of female participants, mean age of participants, hope measure used, assessment of state or trait hope, depression/anxiety measure used and description of population.

8.5 Inter-Rater Reliability

All variables were coded for all samples by one person and then all samples were independently coded for sample size, effect size, direction of the association, hope component, percent of female participants, mean age of participants, hope measure used, trait or state hope depression or anxiety measure used, and description of the population by another researcher. This resulted in a total of 592 extractions for continuous variables and 296 extractions of categorical variables by both raters. Inter-rater reliability was 95% for overall coding. An inter-rater

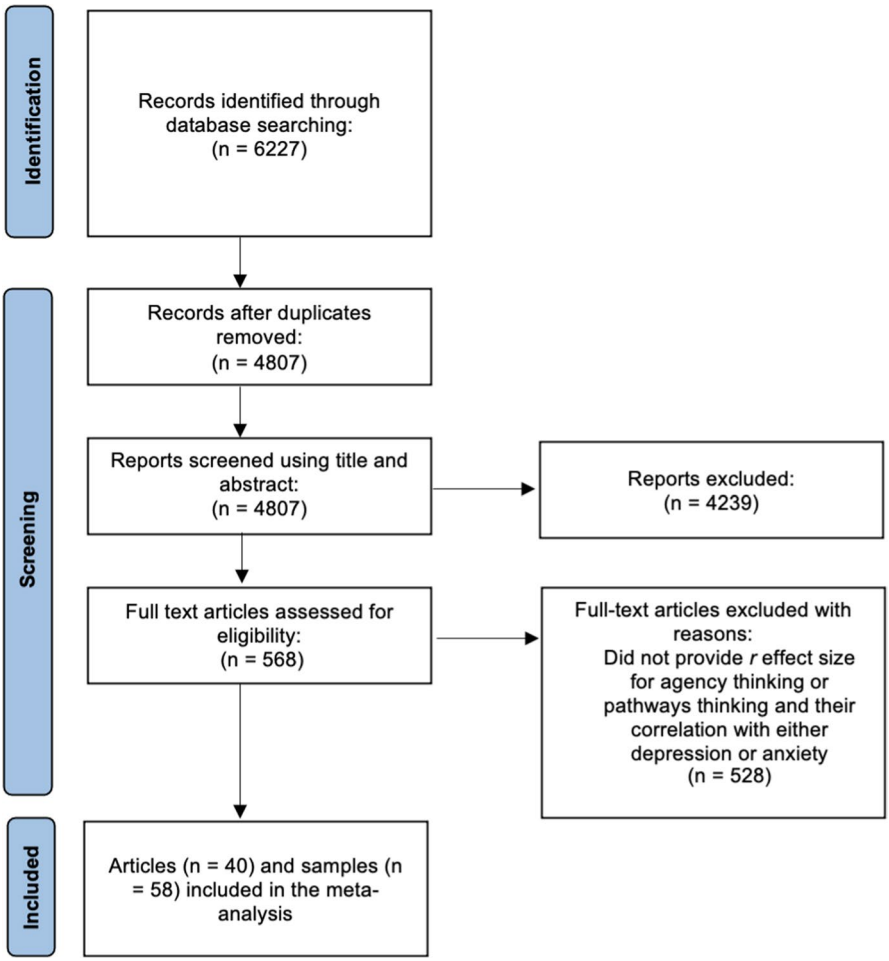

Fig. 1 PRISMA flow diagram showing search process

intra-class correlation analysis for continuous data coding and a Kappa analysis for categorical data codings would likely show similar results to the inter-rater reliability percent agreement as indicated by previous simulation studies (Bryer, 2019). Disagreements in coding were resolved through double checking the information provided in the relevant article.

8.6 Data Analyses

Data analyses were performed using Comprehensive Meta-Analysis version 3 (Borenstein et al., 2014). The meta-analysis used Pearson's *r* as the effect size and calculated a weighted mean effect size/summary effect for the following associations: agency thinking and depression, agency thinking and anxiety, pathways

thinking and depression, pathways thinking and anxiety. For studies that provided multiple effect sizes for one of the relationships, these effect sizes were averaged. Some studies provided effect sizes for different groups of participants separately (e.g. separating participants via attachment styles, males and females separately) or same groups at different time points, these effect sizes were coded individually as separate samples for the analysis. A full list of studies and effect sizes included in the analysis can be found in Appendix 1. For this meta-analysis, effect sizes will be interpreted based on suggestion for interpretation of associations between individual differences proposed by Gignac, G. E., & Szodorai, E. T. (2016). They proposed that associations of 0.10, 0.20, and 0.30 and above respectively can be considered relatively small, typical, and relatively large.

According to Borenstein et al. (2010), if the true effect size is expected to differ between studies, a random-effects model should be used for the meta-analysis. As the studies included in this meta-analysis differed in populations sampled, measure of hope used, and measure of depression or anxiety used, the true effect size was expected to vary. Therefore, a random-effects model was used for this meta-analysis. Testing for heterogeneity in effect sizes was conducted using the Q and I^2 statistics. The Q statistic measures variation across effect sizes while the I^2 gives the percentage of real variation across sample sizes as opposed to variation caused by sampling error.

Publication bias was assessed by visual inspection of funnel plots for each relationship as well as conducting Orwin's fail-safe N test (Orwin, 2022) and Duval and Tweedie's trim and fill test (Duval & Tweedie, 2000). Orwin's fail-safe N test provides a number of hypothetical studies that, if added to the meta-analysis, would produce a non-significant and trivial overall effect size (Orwin, 2022). Funnel plots were generated for each analysis with each included study's standard error measured on the y-axis and their effect size (converted to Fisher's *z)* on the x-axis. An asymmetrical distribution of studies around the mean effect size can be taken as an indicator of potential publication bias (Borenstein et al., 2020). Duval and Tweedie's trim and fill test used a funnel plot to estimate possible missing studies and what impact they would have on the mean effect size when added to the observed studies (Duval & Tweedie, 2000).

8.7 Moderator Analysis

Meta-regressions analysed the effects of the two continuous moderator variables, percentage of female participants and mean age of participants. Meta-regression is essentially the same approach to data analysis as a traditional multiple regression with two main points of difference. The first being that any moderators entered into the analysis are measured at the study level rather than the subject level (Borenstein, et al., 2010). The second being that the dependant variable is the effect size for the studies included in the meta-analysis, as opposed to subject scores (Borenstein, et al., 2010). A meta-regressions examined the moderator effects of percent of female participants and mean age was run for each of the associations between

agency and anxiety, agency and depression, pathways and anxiety, pathways and depression.

9 Results

9.1 Heterogeneity Analyses

All analyses indicated significant heterogeneity. The association of the relationship between agency thinking and depression showed a significant Q statistic, Q (49) = 298.543, p = 0.001 and a high I^2 index of 83.587. The association of the relationship between pathways thinking and depression showed a significant Q statistic, Q (49) = 336.99, p = 0.001 and a high I^2 index of 85.460. The association of the relationship between agency thinking and anxiety showed a significant Q statistic, Q (25) = 203.794, p = 0.001 and a high I^2 index of 87.733 The association of the relationship between pathways thinking and anxiety showed a significant Q statistic, Q (25) = 148.439, p = 0.001 and a high I^2 index of 83.158. These results provided justification for moderator analyses investigating possible study characteristics that may be associated with the heterogeneity between studies.

9.2 Weighted Mean Effect Size for the Association of Agency Thinking and Pathways Thinking with Depression

Table 1 shows the weighted meta-analytic effect sizes of the association of the hope components of agency thinking and pathways thinking with depression. A total of 50 samples with a total of 11,081 participants provided information regarding the association of agency and pathways with depression. The weighted mean effect size for the association between agency and depression was large and significant, r = -0.391, 95% CI [-0.429, -0.351], SE = 0.008 p = 0.001, indicating that the higher the level of agency, the lower the level of depression. The weighted mean effect size for the association between pathways and depression was large and significant r = -0.328, 95% CI [-0.371, -0.285], SE = 0.009 p = 0.001, indicating that the higher the level of pathways, the lower the level of depression.

The confidence interval for the effect size for the association between agency and depression did not overlap with the confidence interval for the association between

Table 1 Effect Sizes for the weighted meta-analytic associations of the hope components of agency thinking and pathways thinking with depression and anxiety across studies

	Outcome	
	Depression	Anxiety
Hope Component		
Agency	r = -.391	r = -.259
Pathways	r = -.328	r = -.206

All effect sizes are significant at p = .001

pathways and depression. This pattern of results indicates a substantially stronger association of agency with depression than pathways with depression.

Figures 2 and 3 show the statistics for each association between agency and pathways respectively with depression through a forest plot of effect sizes and confidence intervals.

9.3 Weighted Mean Effect Size for the Association of Agency and Pathways with Anxiety

Table 1 shows the weighted meta-analytic effect sizes of the association of the hope components of agency thinking and pathways thinking with anxiety. A total of 26 samples with a total of 7912 participants provided information regarding the association of agency and pathways with anxiety. The weighted mean effect size for the association between agency and anxiety was typical and significant, $r = -0.259$, 95% CI [-0.321, -0.196], $SE = 0.013$, $p = 0.001$, indicating that the higher the level of agency, the lower the level of anxiety. The weighted mean effect size for the association between pathways and anxiety was typical and significant $r = -0.206$, 95% CI [-0.260, -0.150], $SE = 0.009$ $p = 0.001$, indicating that the higher the level of pathways, the lower the level of anxiety.

Even though the effect size for agency was larger than the effect size for pathways, the effect size of the association of pathways with anxiety overlapped with the confidence intervals for the effect size of the association of agency with anxiety,

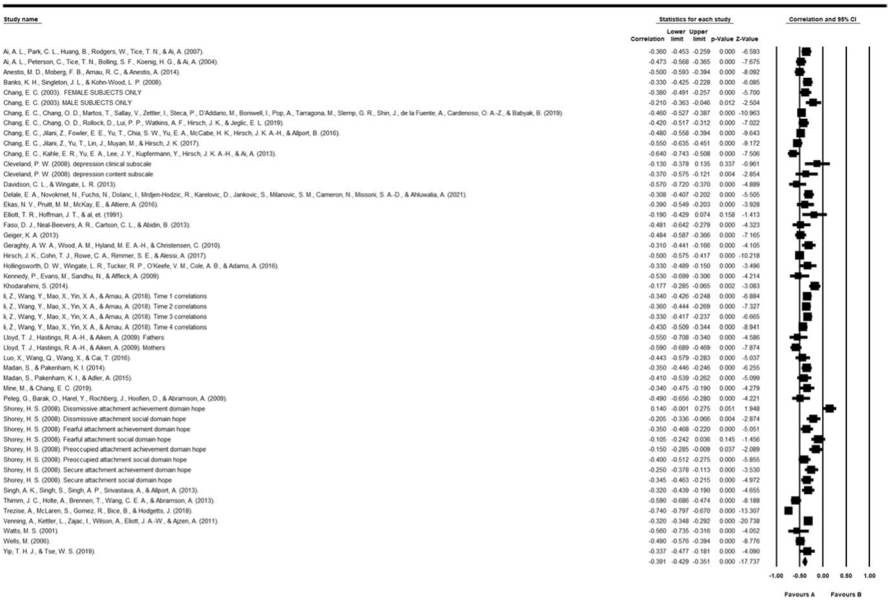

Fig. 2 Forest plot for associations between agency and depression

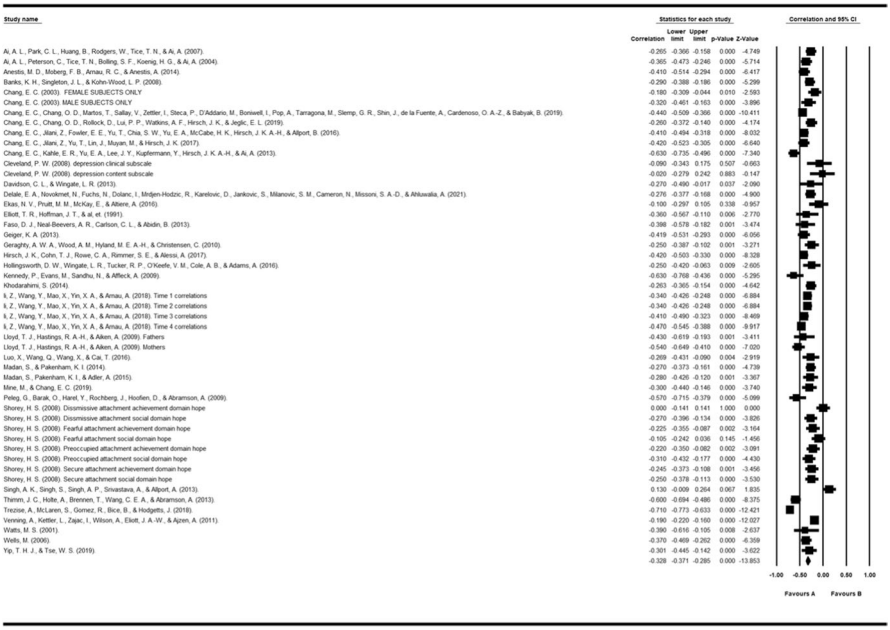

Fig. 3 Forest plot for associations between pathways and depression

suggesting that the effect sizes for pathways and agency with anxiety were not significantly different from each other. However, the effect sizes for the associations between both agency and pathways with anxiety were weaker than agency and pathways associations with depression as indicated by confidence intervals for the effect sizes for the association between agency and pathways respectively with anxiety not overlapping with the effect sizes for these hope components effect size confidence intervals in their association with depression. This pattern of results suggests a stronger association of agency thinking and pathways thinking with depression than with anxiety.

Figure 4 and Fig. 5 show the statistics for each association between agency and pathways respectively with anxiety through a forest plot of effect sizes and confidence intervals.

9.4 Publication Bias

According to Siegel et al. (2022) it is best to use multiple approaches to investigate possible publication bias. Among the most valuable modern methods are examination of asymmetry of funnel plots and the trim and fill method (Siegel et al., 2022). Funnel plots were inspected visually for signs of asymmetry. Duval and Tweedie's trim and fill test (Duval & Tweedie, 2000). Additionally, adding another publication bias method to triangulate bias estimates, Orwin's fail-safe N (Orwin, 2022) further examined possible publication biases.

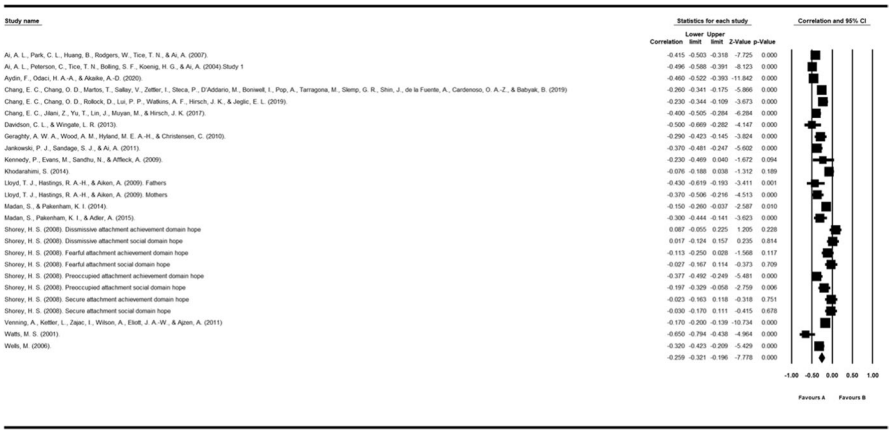

Fig. 4 Forest plot for correlations between agency and anxiety

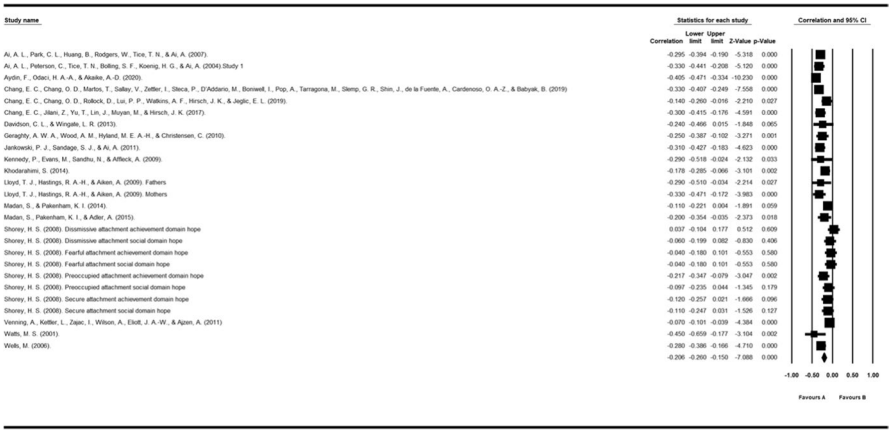

Fig. 5 Forest plot for correlations between pathways and anxiety

The funnel plot for associations between agency and depression showed a largely symmetrical distribution with slightly more studies to the left of the mean towards the base of the plot. Duval and Tweedie's trim and fill found a total of 6 missing studies to the right of the mean. Adding these hypothetical studies into the analysis would result in a new summary weighted effect estimate of $r = -0.358$, CI [-0.400, -0.315]. Orwin's fail-safe N estimated that 917 additional studies with a correlation of 0.000 would be needed to reduce the effect below a trivial correlation of -0.02. Figure 6 provides the funnel plot for all included associations between agency and depression and the generated point estimate (represented by the centre line).

The funnel plot for associations between pathways and depression showed an asymmetrical distribution, with most studies landing on the right side of the mean. Duval and Tweedie's trim and fill found a total of 11 missing studies to the

left of the mean. Adding these hypothetical studies into the analysis would produce a new summary effect estimate of $r = -0.383$, CI [-0.429, -0.334]. Orwin's fail-safe N estimated that 709 additional studies with a correlation of 0.000 would be needed to reduce the summary effect below a trivial correlation of -0.02. Figure 7 provides the funnel plot for all included associations between pathways and depression and the generated point estimate (represented by the centre line.

The funnel plot for associations between agency and anxiety showed a largely symmetrical distribution around the mean with a slight increase in studies to the left of the mean at the base of the plot. Duval and Tweedie's trim and fill found 1 missing study to the right of the mean. Adding this hypothetical study into the analysis would produce a new effect estimate of $r = -0.248$, CI [-0.310, -0.184]. Orwin's fail-safe N estimated that 272 additional studies with a correlation of 0.000 would be needed to reduce the summary effect below a trivial correlation of -0.02. Figure 8 provides the funnel plot for all included associations between agency and anxiety and the generated point estimate (represented by the centre line).

The funnel plot for associations between pathways and anxiety showed a largely symmetrical distribution around the mean with a slight increase in studies to the left of the mean at the base of the plot. Duval and Tweedie's trim and fill found 1 missing study to the right of the mean. Adding this hypothetical study into the analysis would produce a new summary effect estimate of $r = -0.200$, CI [-0.254, -0.145]. Orwin's fail-safe N estimated that 185 additional studies with a correlation of 0.000 would be needed to reduce the summary effect below a trivial correlation of -0.02. Figure 9 provides the funnel plot for all included associations between agency and anxiety and the generated point estimate (represented by the centre line).

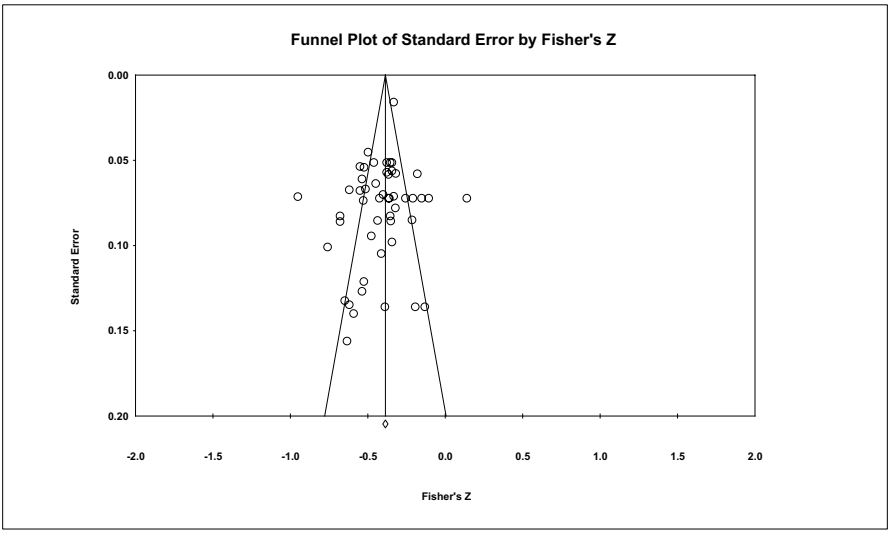

Fig. 6 Funnel plot of standard error by fisher's Z for included associations between agency and depression

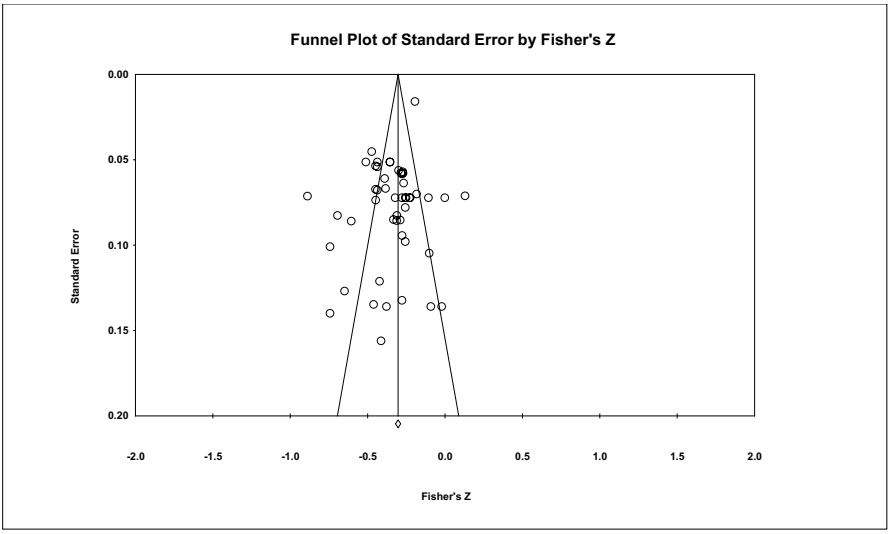

Fig. 7 Funnel plot of standard error by fisher's Z for included study associations between pathways and depression

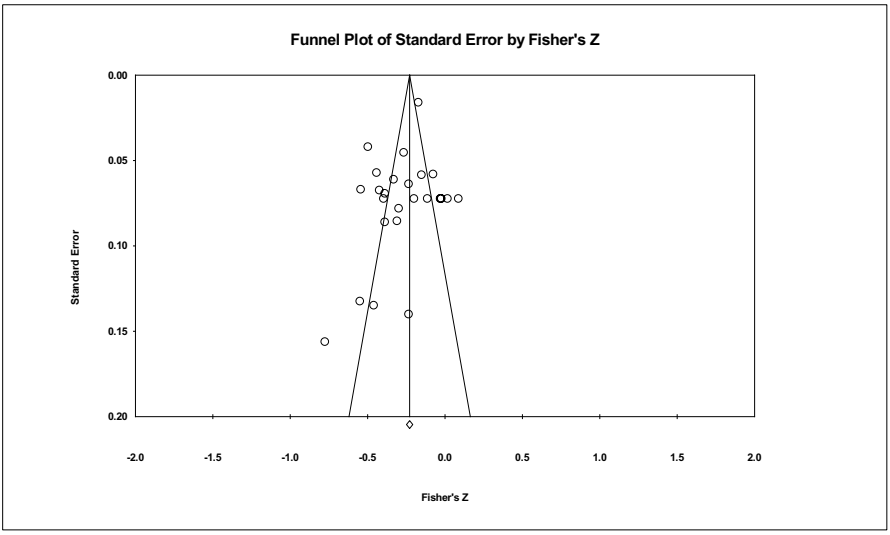

Fig. 8 Funnel plot of standard error by fisher's Z for included study associations between agency thinking and anxiety

9.5 Moderator Analyses

9.5.1 Mean Age and Percent of Female Participants

A series of meta-regression analyses were conducted to assess whether mean age and percent of female participants in samples were significant moderators of each of

the associations included in the meta-analysis. For the association between agency and anxiety, mean age (b = -0.0064, $p < 0.05$) was a significant moderator, while percent female (b = 0.0015, p = 0.3771) was not. For the association between agency and depression, mean age (b = -0.0053, $p < 0.05$) was a significant moderator while percent female (b = -0.0015, p = 0.1851) was not. For the association between pathways and anxiety, neither mean age (b = -0.0030, p = 0.1322) nor percent female (b = 0.0011, p = 0.4251) were significant moderators. For the association between pathways and depression, neither mean age (b = -0.0028, p = 0.1342) nor percent female (b = 0.0002, p = 0.8831) were significant moderators. Tables with the full results for each moderator analysis can be found in Appendix 2.

10 Discussion

According to hope theory (Snyder, 2002), hope consists of cognitions related to the pursuit of goals. These cognitions involve agency-related thinking, entailing appraising one's ability to successfully pursue and reach goals, and pathways-related thinking, entailing thoughts regarding strategies in reaching goals. The present meta-analytic study investigated relationships between the hope components of agency thinking and pathways thinking with depression and anxiety. The study results warrant adding lower levels of depression and anxiety alongside other beneficial characteristics, such as less distress (Weis & Speridakos, 2011), better academic performance (Marques et al., 2017), better work performance (Reichard, et al. (2013), more secure attachment (Blake & Norton, 2014), greater life satisfaction (Weis & Speridakos, 2011), and more optimism (Alarcon, et al. (2013), identified in previous meta-analyses and reviews of hope.

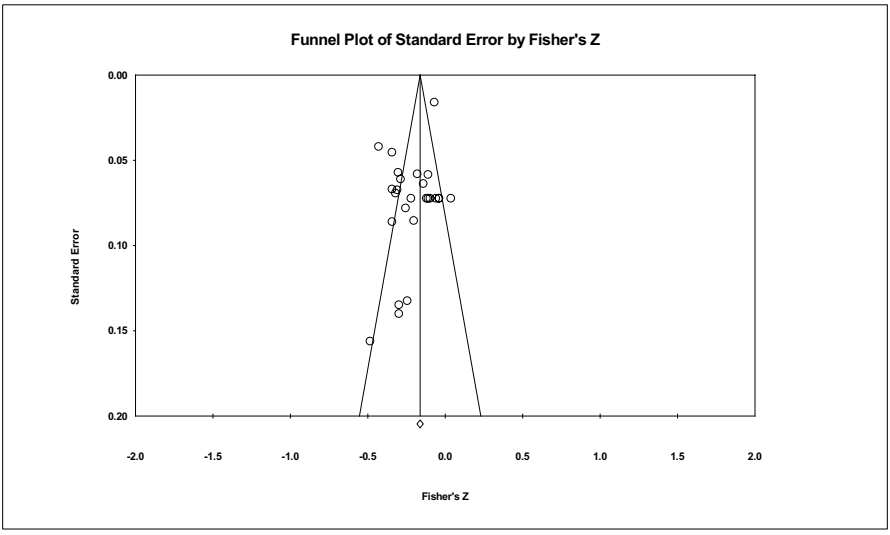

Fig. 9 Funnel plot of standard error by fisher's Z for included study associations between pathways and anxiety

The results provided support for the hypotheses that across studies greater agency-related related thinking and greater pathways-related thinking would be associated with less depression and less anxiety. In the context of high intercorrelations between agency thinking, pathways thinking and total hope found in previous research (Snyder et al., 1991) and previous single study research results indicating higher total hope is associated with lower depression and lower anxiety (Billington et al., 2008; Chang et al., 2018; Muyan et al., 2016; Yuen et al., 2014), the present meta-analytic results support previous findings and expand understanding regarding cognitive components of hope in relation to depression and anxiety. The meta-analytic findings highlight the relevance of hope theory as proposed by Snyder (2002) to depression and anxiety.

As hypothesised, across studies, agency thinking was more strongly related to depression than pathways thinking. This finding confirms results of previous studies regarding the importance of agency thinking in relation to depression. A theoretical explanation for these results may be that high-hope individuals think goals are attainable even when personal resources are exhausted (Tong et al., 2010). Agency thinking may also continue despite the inability to generate pathways toward goals (Tong et al., 2010).

The association between agency thinking and anxiety was somewhat stronger than the link between pathways thinking and anxiety, but not significantly so as indicated by overlaps between the effect size for pathways thinking with the confidence intervals for agency thinking, thus the hypothesis regarding the relative importance of agency versus pathways thinking in relation to anxiety was not supported.

As hypothesised, across studies effects for the association between agency and pathways thinking with depression were stronger than the associations between agency and pathways with anxiety. Hope theory (Snyder, 2002), with its focus on attaining goals, may be especially relevant to depression. Goal blockage and associated emotions may be a key factors underlying depression (Ritschel & Sheppard, 2017). Hope theory also is theoretically relevant to understanding anxiety, but as pointed by Arnau (2017), hope theory is future.focused, while anxiety can be future or present oriented.

Percent of female participants in samples did not moderate effect sizes. This suggests that there may be no substantial differences between women and men in linkages between agency and pathways thinking with depression and anxiety.

Age was only a significant moderator for associations featuring agency. The results indicated that the association of greater agency thinking with less depression and less anxiety becomes stronger with age. The moderator effects of age were stronger for depression than for anxiety. This finding may relate to the proposition that results add further evidence that hope theory maps more readily onto depression theoretically than onto anxiety as suggested by Arnau (2017).

11 Strengths and Limitations

A strength of the meta-analysis is that it focused on the individual components of Snyder's hope theory, presenting a more fine-grained insight into the links between greater hope and less depression and anxiety than a focus on total hope. The analysis of the components of agency thinking and pathways thinking complements the

information presented in other meta-analyses and review articles focused on hope theory (e.g., Duncan et al., 2021; Schrank et al., 2008; Weis & Speridakos, 2011). Another strength is the diversity of populations sampled and the large number of participants included for analysis.

A limitation of this study is the correlational nature of the studies included in the meta-analysis. While the weighted effect sizes show the strength and direction of the relationships between each hope component with depression and anxiety, they do not allow causal inferences to be made about the nature of these relationships. It may be that there are bi-directional or cyclical relationships between components of hope with anxiety and depression as well as interactions between the components of hope as proposed by Snyder (2002) that influence depression and anxiety.

The meta-analysis used a conservative approach in that results were based on reported associations rather than adjusted associations that correct for measurement error. These associations may be biased downward by measurement error in the scales used. The use of CMA program in the present study relates to this limitation and future meta-analyses might provide effect size information using a program that adjusts for measurement error, such as psychmeta (Dahlke et al., 2019). In light of this measurement error limitation, it may be that the true associations between the hope dimensions of agency and pathways with depression and anxiety are higher than the reported effect sizes.

12 Conclusion and Future Directions

The results of this meta-analysis supported the utility of hope theory (Snyder, 2002) applied to understanding aspects of depression and anxiety. Across studies, higher levels of the hope components of agency thinking and pathways thinking were associated with less depression and less anxiety. Agency thinking may be especially relevant in relation to depression.

As this study is purely correlational, future directions might aim for experimental results that could provide more information regarding causality. A 2011 meta-analysis on hope-enhancement strategies presented some evidence that these strategies ability to increased hope and life satisfaction and lowered psychological distress (Weis & Speridakos, 2011). Further experimental studies investigating the impact on depression and anxiety of strategies designed to increase agency thinking and pathways thinking separately and together would be useful. Such studies would allow causal inferences to be made about the impact of components of on depression and anxiety. Longitudinal studies might further research the interactions between agency thinking, pathways thinking and depression and anxiety as they change over time.

The strong connections between higher levels of agency thinking and pathways thinking with less depression and less anxiety found in the present meta-analysis suggest their relevance to clinical practice focused on depression and anxiety. Building on the positive psychology approach and Snyder's (2002) hope theory, strategies to strengthen beneficial appraisals related to agency thinking and pathways thinking have promise.

Appendix 1

Key Characteristics of Studies Included in the Meta-Analysis.
Tables 2 and 3

Table 2 Agency and Pathways Correlated With Anxiety

Study Name	*N*	Mean age	% Female	Hope Measure	State or Trait Hope	Anxiety Measure	State or Trait anxiety	Population	Hope Component	*r*
Ai et al. (2004)	226	62.3	43	The Hope Scale (1991)	Trait Hope	Trait Anxiety Inventory (from State Trait Anxiety Inventory STAI-2)	Trait Anxiety	Patients admitted for cardiac surgery in US	Agency Pathways	-0.496 -0.33
Ai et al. (2007)	309	62.4	42	The Hope Scale (1991)	Trait Hope	Trait Anxiety Inventory (from State Trait Anxiety Inventory STAI-2)	Trait Anxiety	Patients admitted for cardiac surgery in US	Agency Pathways	-0.415 -0.295
Aydin and Odaci (2021)	570	21.51	63.5	The Hope Scale (1991)	Trait Hope	Trait Anxiety Inventory (from State Trait Anxiety Inventory STAI-2)	Trait Anxiety	Final year undergraduates in Turkish universities studying psychological counselling and guidance	Agency Pathways	-0.46 -0.405
Chang et al. (2018)	489	21.67	51	The Hope Scale (1991)	Trait Hope	BAI (Beck Anxiety Inventory)	State Anxiety	Hungarian college students	Agency Pathways	-0.26 -0.33
Chang et al. (2017)	223	21.32	100	The Hope Scale (1991)	Trait Hope	BAI (Beck Anxiety Inventory)	State Anxiety	US college students from southeast university	Agency Pathways	-0.4 -0.3
Chang et al. (2019)	249	21.58	80	The Hope Scale (1991)	Trait Hope	BAI (Beck Anxiety Inventory)	State Anxiety	African American college students	Agency Pathways	-0.23 -0.14

Table 2 (continued)

Study Name	*N*	Mean age	% Female	Hope Measure	State or Trait Hope	Anxiety Measure	State or Trait anxiety	Population	Hope Component	*r*
Davidson and Wingate (2013)	60	26.15	62	Revised Trait Hope Scale	Trait Hope	SAS (Zung Self Rating Anxiety Scale)	State Anxiety	Adult outpatients at midwestern US mental health clinic	Agency Pathways	-0.5 -0.24
Geraghty et al. (2010)	167	37	86	The Hope Scale (1991)	Trait Hope	GAD-7 (The Brief Generalized Anxiety Disorder Scale)	State Anxiety	Respondents to newspaper and radio adverts in southwest England for an internet administered self-help study to reduce worry	Agency Pathways	-0.29 -0.25
Jankowski and Sandage (2011)	211	34.58	52	The Hope Scale (1991)	Trait Hope	ECR (The Experiences in Close Relationships Scale, Anxiety Subscale)	Trait Anxiety	Masters students from a protestant affiliated university in the US Midwest	Agency Pathways	-0.37 -0.31

Table 2 (continued)

Study Name	*N*	Mean age	% Female	Hope Measure	State or Trait Hope	Anxiety Measure	State or Trait anxiety	Population	Hope Component	*r*
Kennedy et al. (2009)	54	31	20	The State Hope Scale	State Hope	HADS (Hospital Anxiety and Depression Scale)	State Anxiety	Patients receiving rehabilitation for a spinal cord injury received within the past 12 months at the National Spinal Injuries Centre Buckingham-shire, UK	Agency Pathways	-0.23 -0.29
Khodarahimi (2014)	300	14.69	50	Children's Hope Scale	Trait Hope	GHQ-28 (General Health Question-naire) 7 items on anxiety/insomnia	State Anxiety	Adolescents from Eghlid City, Fars Province, Iran	Agency Pathways	-0.076 -0.178
Lloyd and Hastings (2009) Fathers[a]	58	41.78	0	The Adult Dispo-sitional Hope Scale /Trait Hope Scale	Trait Hope	HADS (Hospital Anxiety and Depression Scale)	State Anxiety	Parents of children with intellectual disabilities in North Wales or the Northwest of England	Agency Pathways	-0.43 -0.29

Table 2 (continued)

Study Name	*N*	Mean age	% Female	Hope Measure	State or Trait Hope	Anxiety Measure	State or Trait anxiety	Population	Hope Component	*r*
Lloyd and Hastings (2009) Mothers	138	39.56	100	The Adult Dispositional Hope Scale /Trait Hope Scale	Trait Hope	HADS (Hospital Anxiety and Depression Scale)	State Anxiety	Parents of children with intellectual disabilities in North Wales or the Northwest of England	Agency Pathways	-0.37 -0.33
Madan and Pakenham (2014)	296	49.15	81	The Adult Dispositional Hope Scale /Trait Hope Scale	Trait Hope	BSI (Brief Symptom Inventory—Anxiety Subscale)	State Anxiety	Members of the MS society of Queensland Australia	Agency Pathways	-0.15 -0.11
Madan and Pakenham (2015)	140	52.08	40	The Adult Dispositional Hope Scale /Trait Hope Scale	Trait Hope	BSI (Brief Symptom Inventory—Anxiety Subscale)	State Anxiety	Carers of Members of the MS society of Queensland Australia	Agency Pathways	-0.3 -0.2
Shorey (2006) Fearful attachment social domain hope[b]	194	19.14	66.5	Domain Specific Hope Scale-Revised (DSHS-R; Shorey & Snyder, 2004)	Trait Hope	ECR (The Experiences in Close Relationships Scale, Anxiety Subscale)	Trait Anxiety	Introductory psychology students in US	Agency Pathways	-0.027 -0.04
Shorey (2006) Preoccupied attachment achievement domain hope	194	19.14	66.5	Domain Specific Hope Scale-Revised (DSHS-R; Shorey & Snyder, 2004)	Trait Hope	ECR (The Experiences in Close Relationships Scale, Anxiety Subscale)	Trait Anxiety	Introductory psychology students in US	Agency Pathways	-0.377 -0.217

Table 2 (continued)

Study Name	*N*	Mean age	% Female	Hope Measure	State or Trait Hope	Anxiety Measure	State or Trait anxiety	Population	Hope Component	*r*
Shorey (2006) Preoccupied attachment social domain hope	194	19.14	66.5	Domain Specific Hope Scale-Revised (DSHS-R; Shorey & Snyder, 2004)	Trait Hope	ECR (The Experiences in Close Relationships Scale, Anxiety Subscale)	Trait Anxiety	Introductory psychology students in US	Agency Pathways	-0.197 -0.097
Shorey (2006) Secure attachment achievement domain hope	194	19.14	66.5	Domain Specific Hope Scale-Revised (DSHS-R; Shorey & Snyder, 2004)	Trait Hope	ECR (The Experiences in Close Relationships Scale, Anxiety Subscale)	Trait Anxiety	Introductory psychology students in US	Agency Pathways	-0.023 -0.12
Shorey (2006) Secure attachment social domain hope	194	19.14	66.5	Domain Specific Hope Scale-Revised (DSHS-R; Shorey & Snyder, 2004)	Trait Hope	ECR (The Experiences in Close Relationships Scale, Anxiety Subscale)	Trait Anxiety	Introductory psychology students in US	Agency Pathways	-0.03 -0.11
Shorey (2006) Dismissive attachment achievement domain hope	194	19.14	66.5	Domain Specific Hope Scale-Revised (DSHS-R; Shorey & Snyder, 2004)	Trait Hope	ECR (The Experiences in Close Relationships Scale, Anxiety Subscale)	Trait Anxiety	Introductory psychology students in US	Agency Pathways	0.087 0.037

Table 2 (continued)

Study Name	*N*	Mean age	% Female	Hope Measure	State or Trait Hope	Anxiety Measure	State or Trait anxiety	Population	Hope Component	*r*
Shorey (2006) Dismissive attachment social domain hope	194	19.14	66.5	Domain Specific Hope Scale-Revised (DSHS-R; Shorey & Snyder, 2004)	Trait Hope	ECR (The Experiences in Close Relationships Scale, Anxiety Subscale)	Trait Anxiety	Introductory psychology students in US	Agency Pathways	0.017 -0.06
Shorey (2006) Fearful attachment achievement domain hope	194	19.14	66.5	Domain Specific Hope Scale-Revised (DSHS-R; Shorey & Snyder, 2004)	Trait Hope	ECR (The Experiences in Close Relationships Scale, Anxiety Subscale)	Trait Anxiety	Introductory psychology students in US	Agency Pathways	-0.113 -0.04
Venning et al. (2011)	3913	N/A	52	The Hope Scale (1991)	Trait Hope	DASS-21 (DEPRESSION ANXIETY AND STRESS SCALE)	State Anxiety	Data drawn from South Australian Youth Mental Health Survey for adolescents 13–17 years	Agency Pathways	-0.17 -0.07
Watts (2001)	44	38.5	0	The Adult Dispositional Hope Scale /Trait Hope Scale	Trait Hope	Trait Anxiety Inventory (from State Trait Anxiety Inventory STAI-2)	Trait Anxiety	HIV-seropositive men	Agency Pathways	-0.65 -0.45

Table 2 (continued)

Study Name	*N*	Mean age	% Female	Hope Measure	State or Trait Hope	Anxiety Measure	State or Trait anxiety	Population	Hope Component	*r*
Wells (2006)	271	35.39	62	The Hope Scale (1991)	Trait Hope	State anxiety inventory (from State Trait Anxiety Inventory STAI-2)	State Anxiety	Graduate level students or parents of students at a k-12 school and teachers or administrators at a public high school in US	Agency	-0.32
									Pathways	-0.28

N/A = not reported; [a] Correlations provided for mothers and fathers as separate, each was entered as a separate sample [b] Hope was measured in two different life domains with groups divided by attachment style, groups recorded correlations between each life domain hope and depression with each correlation entered as a separate sample

Table 3 Agency and Pathways Correlated With Depression

Study Name	*N*	Mean age	% Female	Hope Measure	State or Trait Hope	Anxiety Measure	State or Trait anxiety	Population	Hope Component	*r*
Ai et al. (2007)	309	62.4	42	The Hope Scale (1991)	Trait Hope	CES-D (Centre for Epidemiologic Studies Depression Scale)	State Depression	Patients admitted for cardiac surgery in US	Agency Pathways	-0.36 -0.265
Ai et al. (2004)	226	62.3	43	The Hope Scale (1991)	Trait Hope	CES-D (Centre for Epidemiologic Studies Depression Scale)	State Depression	Patients admitted for cardiac surgery in US	Agency Pathways	-0.473 -0.365
Anestis et al. (2014)	220	20.83	77.27	The Hope Scale (1991)	Trait Hope	DASS-21 (Depression anxiety and stress scale)	State Depression	Undergrads at mid-sized US southern university	Agency Pathways	-0.5 -0.41
Banks (2008)	318	20	65	The Hope Scale (1991)	Trait Hope	CES-D (Centre for Epidemiologic Studies Depression Scale)	State Depression	African American US university students	Agency Pathways	-0.33 -0.29
Chang (2003) Female[a]	206	47.9	100	The Hope Scale (1991)	Trait Hope	BDI (Beck Depression Inventory)	State Depression	Parents of US midwestern university students	Agency Pathways	-0.38 -0.18
Chang (2003) Male	141	50.7	0	The Hope Scale (1991)	Trait Hope	BDI (Beck Depression Inventory)	State Depression	Parents of US midwestern university students	Agency Pathways	-0.21 -0.32
Chang et al. (2019)	489	21.67	51	The Hope Scale (1991)	Trait Hope	BDI (Beck Depression Inventory)	State Depression	Hungarian college students	Agency Pathways	-0.46 -0.44

Table 3 (continued)

Study Name	*N*	Mean age	% Female	Hope Measure	State or Trait Hope	Anxiety Measure	State or Trait anxiety	Population	Hope Component	*r*
Chang et al. (2019)	249	21.58	80	The Hope Scale (1991)	Trait Hope	BDI (Beck Depression Inventory)	State Depression	African American college students	Agency	-0.42
									Pathways	-0.26
Chang et al. (2016)	343	21.75	67	The Hope Scale (1991)	Trait Hope	BDI (Beck Depression Inventory)	State Depression	US college students from southeast university	Agency	-0.48
									Pathways	-0.41
Chang et al. (2017)	223	21.32	100	The Hope Scale (1991)	Trait Hope	BDI (Beck Depression Inventory)	State Depression	US college students from southeast university	Agency	-0.55
									Pathways	-0.42
Chang et al. (2013)	101	42.18	71	The Hope Scale (1991)	Trait Hope	CES-D (Centre for Epidemiologic Studies Depression Scale)	State Depression	Patients from community based primary care clinic in south-eastern US	Agency	-0.64
									Pathways	-0.63
Cleveland (2008) Depression Clinical Subscale[b]	57	43.3	52.6	The Hope Scale (1991)	Trait Hope	MMPI-2 (Minnesota Multiphasic Personality Inventory 2)—Depression Clinical Subscale	Trait	Cross-cultural missionaries who completed the MMPI-2	Agency	-0.13
									Pathways	-0.09

Table 3 (continued)

Study Name	*N*	Mean age	% Female	Hope Measure	State or Trait Hope	Anxiety Measure	State or Trait anxiety	Population	Hope Component	*r*
Cleveland (2008) Depression Content Subscale	57	43.3	52.6	The Hope Scale (1991)	Trait Hope	MMPI-2 (Minnesota Multiphasic Personality Inventory 2)—Depression Content Subscale	Trait	Cross-cultural missionaries who completed the MMPI-2	Agency Pathways	-0.37 -0.02
Davidson and Wingate (2013)	60	26.15	62	The Hope Scale (1991)	Trait Hope	CES-D (Centre for Epidemiologic Studies Depression Scale)	State Depression	Adult outpatients at US mid-western mental health clinic	Agency Pathways	-0.57 -0.27
Delale et al. (2021)	302		100	The Hope Scale (1991)	Trait Hope	EPDS (Edinburgh Postnatal Depression Scale)	State Depression	Healthy pregnant women from Adriatic islands of Brac and Hvar as well as mainland city of Spit and count Split Dalmatia	Agency Pathways	-0.308 -0.276
Ekas et al. (2016)	94	38.87	100	The Hope Scale (1991)	Trait Hope	CES-D (Centre for Epidemiologic Studies Depression Scale)	State Depression	Mothers of children with autism spectrum disorder in the US	Agency Pathways	-0.39 -0.1

Table 3 (continued)

Study Name	*N*	Mean age	% Female	Hope Measure	State or Trait Hope	Anxiety Measure	State or Trait anxiety	Population	Hope Component	*r*
Elliott et al. (1991)	57	36.72	21	The Hope Scale (1991)	Trait Hope	IDD (Inventory to Diagnose Depression)	Trait Depression	Men and women with traumatically acquired spinal cord injuries in the US	Agency Pathways	-0.19 -0.36
Faso et al. (2013)	71	40.39	75	The Hope Scale (1991)	Trait Hope	CES-D (Centre for Epidemiologic Studies Depression Scale)	State Depression	Parents of children with autism spectrum disorder in the US	Agency Pathways	-0.481 -0.398
Geiger (2012)	187	19.8	76	The Hope Scale (1991)	Trait Hope	BDI (Beck Depression Inventory)	State Depression	Students from a north-western American university	Agency Pathways	-0.484 -0.419
Geraghty et al. (2010)	167	37	86	The Hope Scale (1991)	Trait Hope	PHQ-9 (Patient Health Questionnaire 9)	State Depression	Respondents to newspaper and radio adverts in southwest England for an internet administered self-help study to reduce worry	Agency Pathways	-0.31 -0.25

Table 3 (continued)

Study Name	*N*	Mean age	% Female	Hope Measure	State or Trait Hope	Anxiety Measure	State or Trait anxiety	Population	Hope Component	*r*
Hirsch et al. (2017)	349	23.08	66	The Hope Scale (1991)	Trait Hope	BDI (Beck Depression Inventory)	State Depression	Students from south-eastern United States university	Agency Pathways	-0.5 -0.42
Hollingsworth et al. (2016)	107	20.41	70	The Hope Scale (1991)	Trait Hope	CES-D (Centre for Epidemiologic Studies Depression Scale)	State Depression	African American college students recruited at a leadership conference at a midwestern university	Agency Pathways	-0.33 -0.25
Kennedy et al. (2009)	54		20	The State Hope Scale	State Hope	HADS (Hospital Anxiety and Depression Scale)	State Depression	Patients receiving rehabilitation for a spinal cord injury received within the past 12 months at the national spinal injuries centre Buckingham-shire, UK	Agency Pathways	-0.53 -0.63
Khodarahimi (2014)	300	14.69	50	Children's Hope Scale	Trait Hope	GHQ-28 (General Health Question-naire) 7 items on depression	State Depression	Adolescents from Eghlid City, Fars Province, Iran	Agency Pathways	-0.177 -0.263

Table 3 (continued)

Study Name	*N*	Mean age	% Female	Hope Measure	State or Trait Hope	Anxiety Measure	State or Trait anxiety	Population	Hope Component	*r*
Liu et al. (2013) Time 1 correlations[c]	381	19.69	54	The State Hope Scale	State Hope	CES-D (Centre for Epidemiologic Studies Depression Scale)	State Depression	Students from two universities in Changsha, Hunan Province, China	Agency Pathways	-0.34 -0.34
Liu et al. (2013) Time 2 correlations	381	19.69	54	The State Hope Scale	State Hope	CES-D (Centre for Epidemiologic Studies Depression Scale)	State Depression	Students from two universities in Changsha, Hunan Province, China	Agency Pathways	-0.36 -0.34
Liu et al. (2013) Time 3 correlations	381	19.69	54	The State Hope Scale	State Hope	CES-D (Centre for Epidemiologic Studies Depression Scale)	State Depression	Students from two universities in Changsha, Hunan Province, China	Agency Pathways	-0.33 -0.41
Liu et al. (2013) Time 4 correlations	381	19.69	54	The State Hope Scale	State Hope	CES-D (Centre for Epidemiologic Studies Depression Scale)	State Depression	Students from two universities in Changsha, Hunan Province, China	Agency Pathways	-0.43 -0.47

Table 3 (continued)

Study Name	*N*	Mean age	% Female	Hope Measure	State or Trait Hope	Anxiety Measure	State or Trait anxiety	Population	Hope Component	*r*
Lloyd and Hastings (2009) Fathers[d]	58	41.78	0	The Hope Scale (1991)	Trait Hope	HADS (Hospital Anxiety and Depression Scale)	State Depression	Parents of children with intellectual disabilities in North Wales or the Northwest of England	Agency Pathways	-0.55 -0.43
Lloyd and Hastings (2009) Mothers	138	39.56	100	The Hope Scale (1991)	Trait Hope	HADS (Hospital Anxiety and Depression Scale)	State Depression	Parents of children with intellectual disabilities in North Wales or the Northwest of England	Agency Pathways	-0.59 -0.54
Luo et al. (2016)	115	27	60	The Hope Scale (1991)	Trait Hope	BDI (Beck Depression Inventory)	State Depression	Outpatients with depression undergoing treatment at a psychological clinic in Xiangya Second Hospital at Central South University in China	Agency Pathways	-0.443 -0.269

Table 3 (continued)

Study Name	*N*	Mean age	% Female	Hope Measure	State or Trait Hope	Anxiety Measure	State or Trait anxiety	Population	Hope Component	*r*
Madan and Pakenham (2014)	296	49.15	81	The Hope Scale (1991)	Trait Hope	BSI (Brief Symptom Inventory—Depression Subscale)	State Depression	Members of the MS society of Queensland Australia	Agency Pathways	-0.35 -0.27
Madan and Pakenham (2015)	140	52.08	40	The Hope Scale (1991)	Trait Hope	BSI (Brief Symptom Inventory—Depression Subscale)	State Depression	Carers of members of the MS society of Queensland Australia	Agency Pathways	-0.41 -0.28
Muyan and Chang (2019)	149	20.96	100	The Hope Scale (1991)	Trait Hope	BDI (Beck Depression Inventory)	State Depression	Students at a Turkish public university	Agency Pathways	-0.34 -0.3
Peleg et al. (2009)	65	28.8	28	The Hope Scale (1991)	Trait Hope	BDI (Beck Depression Inventory)	State Depression	Participants from two largest brain injury rehabilitation centres in Israel	Agency Pathways	-0.49 -0.57
Shorey (2006) Dismissive attachment achievement domain hope	194	19.14	66.5	Domain Specific Hope Scale-Revised (DSHS-R; Shorey & Snyder, 2004)	Trait Hope	BDI and CES-D	State Depression	Introductory psychology students in US in US	Agency Pathways	0.14 0

Table 3 (continued)

Study Name	*N*	Mean age	% Female	Hope Measure	State or Trait Hope	Anxiety Measure	State or Trait anxiety	Population	Hope Component	*r*
Shorey (2006) Dismissive attachment social domain hope	194	19.14	66.5	Domain Specific Hope Scale-Revised (DSHS-R; Shorey & Snyder, 2004)	Trait Hope	BDI and CES-D	State Depression	Introductory psychology students in US	Agency Pathways	-0.205 -0.27
Shorey (2006) Fearful attachment achievement domain hope	194	19.14	66.5	Domain Specific Hope Scale-Revised (DSHS-R; Shorey & Snyder, 2004)	Trait Hope	BDI and CES-D	State Depression	Introductory psychology students in US	Agency Pathways	-0.35 -0.225
Shorey (2006) Fearful attachment social domain hope	194	19.14	66.5	Domain Specific Hope Scale-Revised (DSHS-R; Shorey & Snyder, 2004)	Trait Hope	BDI and CES-D	State Depression	Introductory psychology students in US	Agency Pathways	-0.105 -0.105
Shorey (2006) Preoccupied attachment achievement domain hope	194	19.14	66.5	Domain Specific Hope Scale-Revised (DSHS-R; Shorey & Snyder, 2004)	Trait Hope	BDI and CES-D	State Depression	Introductory psychology students in US	Agency Pathways	-0.15 -0.22

Table 3 (continued)

Study Name	*N*	Mean age	% Female	Hope Measure	State or Trait Hope	Anxiety Measure	State or Trait anxiety	Population	Hope Component	*r*
Shorey (2006) Preoccupied attachment social domain hope	194	19.14	66.5	Domain Specific Hope Scale-Revised (DSHS-R; Shorey & Snyder, 2004)	Trait Hope	BDI and CES-D	State Depression	Introductory psychology students in US	Agency Pathways	-0.4 -0.31
Shorey (2006) Secure attachment achievement domain hope	194	19.14	66.5	Domain Specific Hope Scale-Revised (DSHS-R; Shorey & Snyder, 2004)	Trait Hope	BDI and CES-D	State Depression	Introductory psychology students in US	Agency Pathways	-0.25 -0.245
Shorey (2006) Secure attachment social domain hope	194	19.14	66.5	Domain Specific Hope Scale-Revised (DSHS-R; Shorey & Snyder, 2004)	Trait Hope	BDI and CES-D	State Depression	Introductory psychology students in US	Agency Pathways	-0.345 -0.25
Singh et al. (2013)	200	23.83	60	The Adult Dispositional Hope Scale /Trait Hope Scale	Trait Hope	BDI (Beck Depression Inventory)	State Depression	Students of a professional course at Banaras Hindu University in India	Agency Pathways	-0.32 0.13

Table 3 (continued)

Study Name	*N*	Mean age	% Female	Hope Measure	State or Trait Hope	Anxiety Measure	State or Trait anxiety	Population	Hope Component	*r*
Thimm et al. (2013)	149	28.6	82	The Hope Scale (1991)	Trait Hope	BDI (Beck Depression Inventory)	State Depression	Undergraduate students and patients in Norway recruited from general practitioners and screened with BDI and previous depression questionnaire	Agency Pathways	-0.59 -0.6
Trezise et al. (2018)	199	70.63	55	The Adult Dispositional Hope Scale /Trait Hope Scale	Trait Hope	CES-D (Centre for Epidemiologic Studies Depression Scale)	State Depression	Community sample in Australia recruited from community events, email and social networking	Agency Pathways	-0.74 -0.71
Venning et al. (2011)	3913		52	The Hope Scale (1991)	Trait Hope	DASS-21 (DEPRESSION ANXIETY AND STRESS SCALE) (Depression anxiety and stress scale)	State Depression	Data drawn from South Australian Youth Mental Health Survey for adolescents 13–17 years	Agency Pathways	-0.32 -0.19

Table 3 (continued)

Study Name	*N*	Mean age	% Female	Hope Measure	State or Trait Hope	Anxiety Measure	State or Trait anxiety	Population	Hope Component	*r*
Watts (2001)	44	38.5	0	The Adult Dispositional Hope Scale /Trait Hope Scale	Trait Hope	CES-D (Centre for Epidemiologic Studies Depression Scale)	State Depression	HIV-seropositive men	Agency	-0.56
									Pathways	-0.39
Wells (2006)	271	35.39	62	The Hope Scale (1991)	Trait Hope	BDI (Beck Depression Inventory)	State Depression	Graduate level students or parents of students at a k-12 school and teachers or administrators at a public high school in US	Agency	-0.49
									Pathways	-0.37
Yip and Tse (2019)	139	30.13	58	The Adult Dispositional Hope Scale /Trait Hope Scale	Trait Hope	BDI (Beck Depression Inventory)	State Depression	Chinese adults living in Hong Kong	Agency	-0.337
									Pathways	-0.301

N/A = not reported; [a] Correlations provided for mothers and fathers separately, they were entered as separate samples [b] separate correlations provided for each depression subscale of the MMPI-2, they were entered as separate samples Child. [c] Only correlations provided between state hope and state depression from the same time point were included, each timepoint entered as its own sample [d] Correlations provided for mothers and fathers separately, they were entered as separate samples [e] Hope was measured in two different life domains with groups divided by attachment style, groups recorded correlations between each life domain hope and depression with each correlation entered as a separate sample

Appendix 2

Moderator Analyses for Each Correlation Included in the Meta-Analysis. Tables 4, 5, 6, and 7

Table 4 Moderator analyses for agency and anxiety correlations

Moderators	*b*	SE	95% CI	*Z*	*p*	*k*
Mean age	-.0064	.0027	[-.0117, -.0012]	-2.39	.0170	50
% Female	.0015	.0017	[-.0018, .0048]	.88	.3771	50

Table 5 Moderator analyses for agency and depression correlations

Moderators	*b*	SE	95% CI	*Z*	*p*	*k*
Mean age	-.0053	.0018	[-.0089, -.0017]	-2.89	.0039	50
% Female	-.0015	.0012	[-.0038, .0007]	-1.33	.1851	50

Table 6 Moderator analyses for pathways and anxiety correlations

Moderators	*b*	SE	95% CI	*Z*	*p*	*k*
Mean age	-.0030	.0020	[-.0070, .0009]	-1.51	.1322	26
% Female	.0011	.0014	[-.0016, .0037]	.80	.4251	26

Table 7 Moderator analyses for pathways and depression correlations

Moderators	*b*	SE	95% CI	*Z*	*p*	*k*
Mean age	-.0028	.0019	[-.0065, .0009]	-1.50	.1342	26
% Female	.0002	.0012	[-.0022, .0025]	.15	.8831	26

b = beta weight for moderator variable; SE = standard error; CI = confidence interval, the 95% lower and upper limits of *b*; *Z* = *z* test for *b*; *p* = *p* value for test of statistical significance for each *b* value; *k* = the number of effect sizes associated with the *b* value

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Declarations

Ethics Approval This meta-analysis did not require ethics approval nor participant informed consent.

Competing Interest The authors have no conflicts of interest to declare that are relevant to the content of this article.

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