



# The dynamics of Appraisal II: a meta-analysis of the relationship between fortitude and the indices of psychological well-being

Tyrone Brian Pretorius ,  
Anita Padmanabhanunni   
and Serena Ann Isaacs

## Abstract

Identifying the factors that contribute to differential vulnerability in the face of adversity is key to psychology fulfilling its mandate as a helping profession. One such factor, fortitude, which is described as the psychological strength to manage adversity and to stay well, has consistently been linked to psychological well-being. The objective of the research was to statistically integrate studies examining the relationship between fortitude and the indices of psychological well-being by using a meta-analysis. We used a random-effects model for the meta-analysis. In addition to the overall effect size, we examined publication bias and the moderating role of age and methodological quality. We also performed a subgroup analysis to compare between studies with positive and negative indicators of psychological well-being. In addition, we used robust variance estimation to account for effect-size dependencies, as some studies have reported more than one correlation coefficient. A total of 13 studies reporting 35 correlation coefficients pertaining to the relationship between fortitude and the indices of psychological well-being were extracted. The meta-analysis revealed a significant overall effect ( $r = .44, p < .001$ ). The results also indicated that age and methodological quality did not influence the effect size. Subgroup analysis indicated that the overall effect size for studies that used positive indicators ( $r = .49, p < .001$ ) was higher than that for studies that used negative indicators ( $r = .36, p < .001$ ). In addition, no visual or statistical evidence of publication bias was observed. The robust variance estimation results also confirmed that the effect-size dependencies did not influence the overall effect size. The study results provide strong evidence regarding the association between fortitude and psychological well-being. This finding has several implications for promoting mental health and suggests that interventions aimed at building fortitude can be leveraged to mitigate psychological distress.

---

Department of Psychology, University of the Western Cape, South Africa

## Corresponding author:

Tyrone Brian Pretorius, Department of Psychology, University of the Western Cape, Robert Sobukwe Road, Bellville, Cape Town 7535, South Africa.

Email: [tpretorius@uwc.ac.za](mailto:tpretorius@uwc.ac.za)

## Keywords

Fortitude, meta-analysis, overall effect size, psychological well-being

Experiencing hardships and distress is an intrinsic part of life (Lahti, 2019). Therefore, focusing on the factors and processes that help overcome these hardships is imperative (Adler et al., 2017; Hamid & Singaram, 2016). Although eradicating stressors and challenges from an individual's environment is considered an unrealistic goal (He et al., 2018), studies have often focused on identifying and understanding the factors that enhance psychological well-being (PWB). In doing so, individuals can effectively navigate challenges while maintaining their sense of PWB. Generally, PWB describes not only the absence of mental ill-health but also the presence of positive factors, such as positive emotions and self-concept, self-actualisation, and supportive relationships (Adler et al., 2017), in other words, an individual who manages to flourish in several areas of their life (He et al., 2018). Research has also identified various factors that contribute to PWB, such as autonomy, self-acceptance (Ryff, 2014), familial and social support, mindfulness (He et al., 2018), resilience (De Kock et al., 2021), and fortitude (Lahti, 2019; Roothman et al., 2003). High levels of well-being enhance both psychological and physical health and, through various pathways, are even associated with longer life expectancy (Diener et al., 2010; He et al., 2018; Vázquez et al., 2009). However, some adversities often surpass an individual's ability to overcome their challenges.

Recently, COVID-19 precipitated a global public health crisis. The measures implemented to curb the spread of infection (e.g., national lockdowns, closure of educational institutions and non-essential services, social-distancing policies, and work-from-home mandates) led to unprecedented disruptions in daily routines, schooling, employment, mobility, and social connectedness.

Since the onset of the pandemic, several nationwide studies on the mental health status of the general population have consistently reported decreased levels of PWB and increased negative mental health outcomes (Chen et al., 2021; Fond et al., 2021). For example, a nationally representative survey conducted in the United States (Ettman et al., 2020) reported a threefold increase in depression early on during the pandemic. Similarly, in the United Kingdom, a nationally representative survey (Fujiwara et al., 2020) indicated substantially elevated levels of anxiety during the initial stages of the pandemic compared with previous years. Other representative population-based studies from China (Wang et al., 2020) have also reported moderate-to-severe symptoms of anxiety and depression in the months following the outbreak.

Similar studies in low-to-middle-income countries, such as in South Africa (Pretorius & Padmanabhanunni, 2021a), Brazil (Goularte et al., 2021), Bangladesh (Banna et al., 2022), and India (Venugopal et al., 2022), have reported elevated levels of depression, anxiety, loneliness, and posttraumatic stress disorder among the general population. Although the levels of psychological distress clearly increased at the beginning of the pandemic, the mean levels of distress declined or returned to the pre-pandemic levels over time. This notion was observed in various longitudinal studies (Bendau et al., 2021; O'Connor et al., 2021). Furthermore, the current data suggest that certain groups of people were at a greater risk of adverse mental health outcomes, whereas others were largely unaffected. These heterogeneous trajectories and mental health outcomes associated with the same stressor highlight the influence of risk factors and protective mechanisms. Among the factors that are typically associated with greater vulnerability to negative mental health outcomes are younger age, living alone, financial insecurity, unemployment, limited access to social support resources, and preexisting physical or psychiatric illness (Ahrens et al., 2021). Several studies (Agha, 2021; Zhou et al., 2020) have also investigated the relationship between stressors and protective factors (e.g., social support, active problem-solving, and positive cognitive reappraisal) and their effect on mental health. In stress research, these protective factors are said to

operate through certain pathways, namely a health-sustaining, stress-reducing, or mediating pathway (Pretorius, 2020). For example, the health-sustaining pathway suggests that the effect of a protective factor (e.g., social support or problem-solving ability) on mental health is independent of the level of the stressor. By contrast, the stress-reducing pathway suggests that protective resources reduce or buffer the impact of stressors on PWB. Finally, the mediating pathway suggests that protective factors are a mechanism through which the stressor influences the mental or physical health outcome (Pretorius, 2020).

In this study, we focused on the construct of fortitude, which is defined as the psychological strength required to manage adversity and to stay well and is derived from positive or fortigenic appraisals of self, family, and supportive others (Pretorius & Heyns, 1998). To assess the levels of fortitude, a questionnaire called the Fortitude Questionnaire (FORQ; Pretorius & Heyns, 1998) was developed. Since its development, mounting evidence has been reported regarding the role of fortitude as a protective resource among diverse population groups facing a range of stressors, including adolescents living in contexts of adversity (Pretorius et al., 2016), young college students exposed to traumatic events (Padmanabhanunni & Wiid, 2022), and health care workers caring for patients with Alzheimer's disease (Heyns et al., 2003). In a recent systematic review (Pretorius & Padmanabhanunni, 2021b) assessing 20 years of empirical research on the FORQ, a consistent relationship was identified between fortitude and the indices of PWB. In the present study, our goal was to extend this effort by using a meta-analytic approach to statistically integrate existing studies assessing the relationship between fortitude and PWB.

## Method

We conducted our meta-analysis in terms of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher et al., 2009). However, no protocol was registered because a systematic review has already been published (Pretorius & Padmanabhanunni, 2021b).

## Search strategy

We focused on a quantitative synthesis of the results of published studies regarding the relationship between fortitude and PWB. To identify suitable studies for the period between January 1999 and May 2022, we used Google Scholar, PubMed, Academic Search Premier, Sabinet African Journals, EBSCO Open Access Medical and Health Collection, Academic Search Complete, and UKWAZI (the local library search engine). The review period was selected due to the FORQ having been developed in 1998 and the first published use of the instrument was reported in 1999. Given our previous experience, we limited the search terms to 'fortitude questionnaire', 'fortitude scale', and 'FORQ', because using the term 'fortitude' resulted in studies from a wide variety of disciplines.

## Eligibility criteria and screening process

The abstracts of the articles were independently examined by all three authors to identify the articles eligible for inclusion. An article was deemed eligible for inclusion if it was published in either English or Afrikaans, involved the FORQ as a total scale and not as a selected subscale, and reported on the relationship between fortitude and the indices of PWB. Full-text articles were obtained if the abstract indicated that the article in question met the inclusion criteria. If any doubts were raised, the full-text article was also obtained to verify whether the article met the eligibility criteria. Snowballing (i.e., searching the reference lists of the selected articles) was also used.

## Assessment of methodological quality

All of the extracted studies were independently assessed for methodological quality by the three authors. The following criteria, obtained from the Observational Study Quality Evaluation (Drukker et al., 2021) tool, were used: random sampling, a sample size greater than 85, assessment of the independent variable, assessment of the dependent variable, an explicit statement regarding the treatment of missing data, and a description of the statistical analysis. Generally, a sample size greater than 85 ensures 80% power for detecting a medium effect size at an alpha level of .05 (Cohen, 1992). Here, a study was allocated a score of 1 if random sampling was used, if the sample size was greater than 85, if the study reported on the treatment of missing data, and if the statistical analysis was fully described. Regarding the assessment of the dependent and independent variables, a study was allocated a score between 1 and 3 if standardised instruments were used, if the reliability of the instrument was reported, and if the reliability was at a satisfactory level ( $\alpha > .70$ ). Thus, the ratings ranged between 0 and 10. After we provided the independent ratings, we discussed and resolved the rating differences between us.

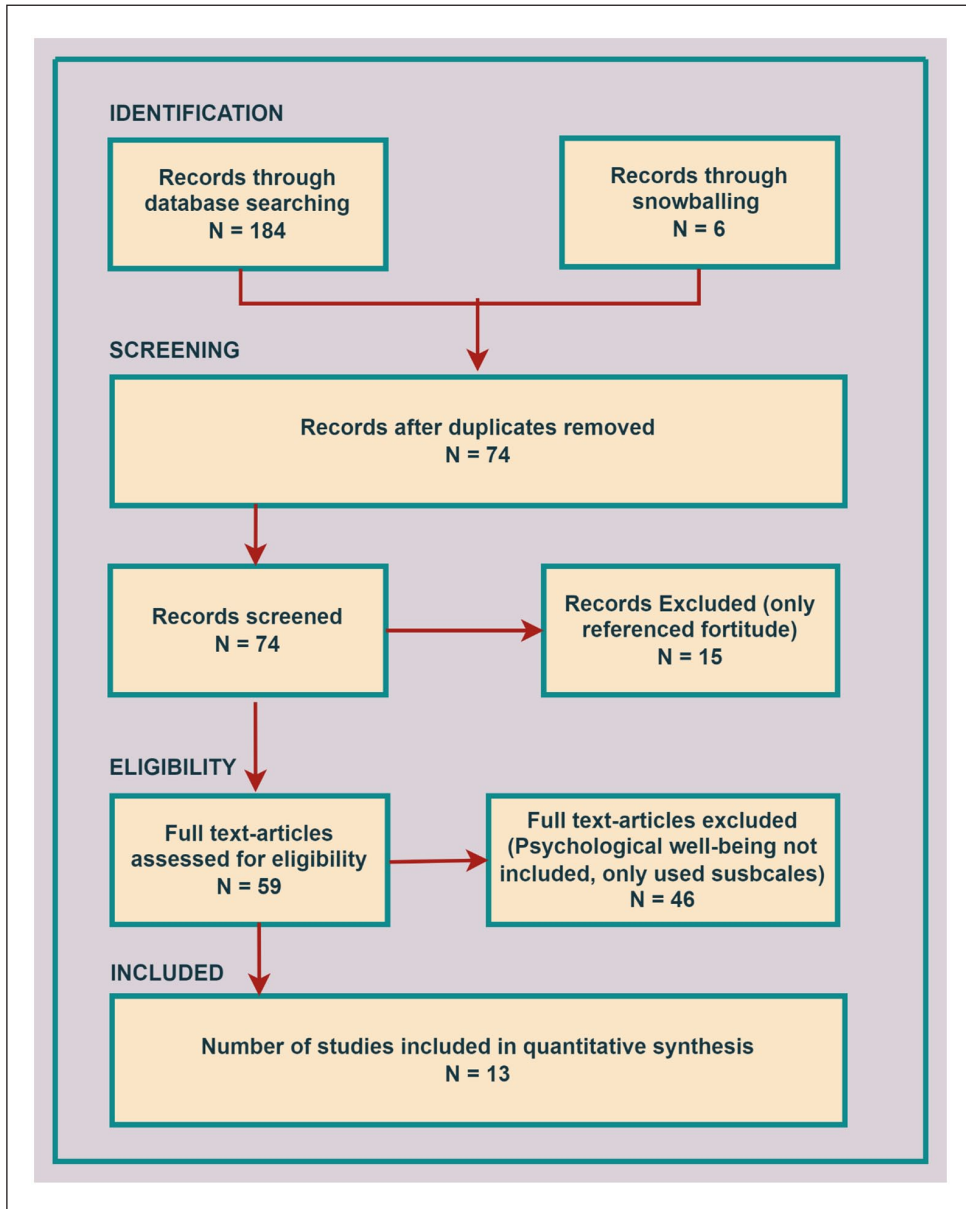
## Statistical analysis

The meta-analysis was conducted using the packages ‘metafor’ (Viechtbauer, 2010) and ‘robmeta’ (Fisher & Tipton, 2015) in R software (R Development Core Team, 2015). A random-effects model was used for the analysis. The heterogeneity of the effect sizes was examined using the  $Q$ -statistic,  $I^2$  statistic, and  $\tau^2$  (tau squared). The correlation coefficients reported in the studies were converted into Fisher’s  $Z$ , and a forest plot was used to visually present the effect sizes. Publication bias was visually examined using a funnel plot and Egger’s regression test (Egger et al., 1997). However, Quintana (2015) suggested that the funnel plot and Egger’s regression test are tests of small study bias, which may include publication bias. He instead suggested that weighting studies in terms of their likelihood of being published is an alternative way of testing for publication bias. This was therefore performed using the weight function in R software. The potential moderating role of age and methodological quality was also examined through the use of regression plots of the relationship between the moderators and the correlation coefficients. In addition, the statistical test, model sum of squares ( $Q_M$ ), was used to evaluate if the regression coefficient was statistically significant. Several studies have reported more than one correlation coefficient. Hence, robust variance estimation (RVE) was used to account for effect-size dependencies (Hedges et al., 2010). Because both positive and negative indicators of PWB have been reported, a subgroup analysis was performed to examine whether a difference existed in the effect between studies using positive and negative indicators. This subgroup analysis was performed using Meta-Essentials version 1.3 (Suurmond et al., 2017). Moderator plots (Figure 4) were also generated using Meta-Essentials.

## Results

### Studies extracted

Our search yielded an initial pool of 190 articles. In total, 104 articles were found to be duplicated across the databases, 12 articles were dissertations published in journals (i.e., also duplicates), 15 articles referenced the FORQ only, 37 articles did not focus on PWB, and 9 articles used only the subscales of the FORQ. The PRISMA flow diagram detailing the search process is presented in Figure 1.



**Figure 1.** PRISMA flow diagram of the extracted studies.

The characteristics of the studies extracted and used in the meta-analysis are reported in Table 1. As shown in the table, 13 studies reporting 35 correlation coefficients between fortitude and the indices of psychological distress were included in the meta-analysis. The mean age across the 13 studies was 26.56 ( $SD=8.89$ , range: 15.10–44). The median sample size was 263 (range: 26–1480). In total, 15 effect sizes (42.9%) were related to negative indicators of PWB, whereas 20 effect sizes (57.9%) were related to positive indicators.

**Table 1.** Studies extracted for the meta-analysis.

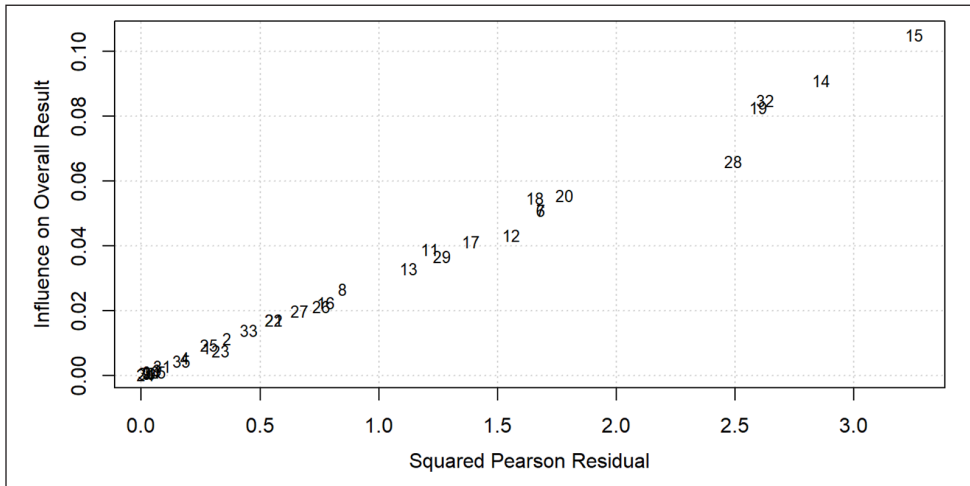
ID	Study	Year	N	r	Age	Population	Indicator of well-being	Quality
1	Beattie et al. (1)	2016	486	0.51	19	University students	Psychological distress	9
2	Beattie et al. (2)	2016	486	0.51	19	University students	Mental health symptoms	9
3	Edwards (1)	2003	216	0.4	30	Health club members	Life satisfaction	4
4	Edwards (2)	2003	216	0.5	30	Health club members	Psychological well-being	4
5	Edwards	2006	26	0.5	31.7	Health club members	Psychological well-being	3
6	Heyns et al. (1)	2003	226	0.23	38	Nurses	Burnout: personal accomplishment	8
7	Heyns et al. (2)	2003	226	0.23	38	Nurses	Burnout: emotional exhaustion	8
8	Khumalo et al. (1)	2011	459	0.56	40.79	Setswana speaking adults	Psychological well-being	7
9	Khumalo et al. (2)	2011	459	0.46	40.79	Setswana speaking adults	Emotional well-being	7
10	Khumalo et al. (3)	2011	459	0.41	40.79	Setswana speaking adults	Psychological well-being	7
11	Khumalo et al. (4)	2011	459	0.27	40.79	Setswana speaking adults	Social well-being	7
12	Padmanabhanunni	2020	143	0.23	44	Lay counsellors	Burnout	8
13	Padmanabhanunni & Wiid (1)	2022	218	0.27	21	University students	PTSD symptoms	8
14	Padmanabhanunni & Wiid (2)	2022	218	0.16	21	University students	PTSD: intrusion symptoms	8
15	Padmanabhanunni & Wiid (3)	2022	218	0.14	21	University students	PTSD: avoidance symptoms	8
16	Padmanabhanunni & Wiid (4)	2022	218	0.3	21	University students	PTSD: negative mood alterations	8
17	Padmanabhanunni & Wiid (5)	2022	218	0.25	21	University students	PTSD: negative mood alterations	8
18	Pretorius et al.	2016	498	0.24	15.1	Adolescents	Trauma symptoms	8
19	Pretorius & Padmanabhanunni (1)	2021	337	0.64	21.95	University students	Loneliness	9
20	Pretorius & Padmanabhanunni (2)	2021	337	0.61	21.95	University students	Anxiety	9

(Continued)

Table 1. (Continued)

ID	Study	Year	N	r	Age	Population	Indicator of well-being	Quality
21	Pretorius & Padmanabhanunni (3)	2021	337	0.54	21.95	University students	Life satisfaction	9
22	Padmanabhanunni & Pretorius	2020	337	0.54	21.95	University students	Depression	9
23	Saban	2021	86	0.34	22.5	Students with disabilities	PTSD	8
24	M. P. Wissing & Temane (1)	2013	568	0.42	21	College students	Mental health continuum	6
25	M. P. Wissing & Temane (2)	2013	1480	0.51	20	College students	Mental health continuum	6
26	M. P. Wissing & Temane (3)	2013	185	0.3	22	Rural college students	Mental health continuum	6
27	M. P. Wissing & Temane (4)	2013	263	0.55	20	Urban college students	Mental health continuum	6
28	M. P. Wissing & Temane (5)	2013	122	0.65	NR	Adults speaking Afrikaans	Mental health continuum	6
29	M. P. Wissing & Temane (6)	2013	204	0.59	35.9	Adults	Mental health continuum	6
30	M. P. Wissing & Temane (7)	2013	409	0.46	NR	Teachers	Mental health continuum	6
31	M. P. Wissing & Temane (8)	2013	459	0.48	NR	Adults speaking Setswana	Mental health continuum	6
32	J. A. P. Wissing et al. (1)	2008	384	0.64	NR	White adults and students	Affective well-being	8
33	J. A. P. Wissing et al. (2)	2008	384	0.53	NR	White adults and students	Life satisfaction	8
34	J. A. P. Wissing et al. (3)	2008	130	0.47	NR	Black adults and students	Affective well-being	8
35	J. A. P. Wissing et al. (4)	2008	130	0.50	NR	Black adults and students	Life satisfaction	8

PTSD: posttraumatic stress disorder; NR: not reported.



**Figure 2.** Baujat plot indicating studies that contributed to heterogeneity.

### Heterogeneity of effect sizes

The heterogeneity indices indicated a large heterogeneity in the effect sizes (Cochrane’s  $Q=303.71$ ,  $p < .001$ ). Because the  $Q$ -statistic is sensitive to the sample size (Higgins et al., 2003), the  $I^2$  statistic and  $\tau^2$  were also considered. Hence, both  $I^2=90.31\%$ , 95% confidence interval (CI) [84.81, 94.40] and  $\tau^2=.029$ , 95% CI = [.017, .052] provided evidence of heterogeneity. Regarding  $I^2$ , the literature suggests that an  $I^2$  value greater than 75% is an indicator of high variance (Higgins et al., 2003). To determine which studies contributed most to heterogeneity, the Baujat plot (Baujat et al., 2002) shown in Figure 2 was used.

Each study was identified by its identification number in the Baujat plot, and the effect sizes that contributed most to heterogeneity were located in the upper-right corner of the plot. Here, effect sizes 14 and 15 (Padmanabhanunni & Wiid, 2022), effect size 32 (J. A. P. Wissing et al., 2008), effect size 19 (Pretorius & Padmanabhanunni, 2021a), and effect size 28 (M. P. Wissing & Temane, 2013) contributed most to the heterogeneity of the effect sizes. The package ‘metafor’ also provided an indication of whether any study disproportionately influenced the overall effect size. None of the studies was identified as a significant influencer, and the study weights ranged between 1.21% and 3.28%.

### Combined effect size

A forest plot of the various effect sizes is presented in Figure 3. This plot visually confirms the study heterogeneity, as indicated by the heterogeneity statistics. The overall effect size resulting from the random effects is also represented by a polygon at the bottom of the forest plot ( $r=.44$ , 95% CI = [.39, .4],  $p < .001$ ). The sizes of the squares of the various effect sizes indicate the contribution of each effect size to the combined effect size.

### The role of potential moderator variables

To examine the potential effect of age and methodological quality on the dataset, a moderator analysis was performed. The regression plots of age and methodological quality as moderators are presented in Figure 4(a) and (b), respectively.



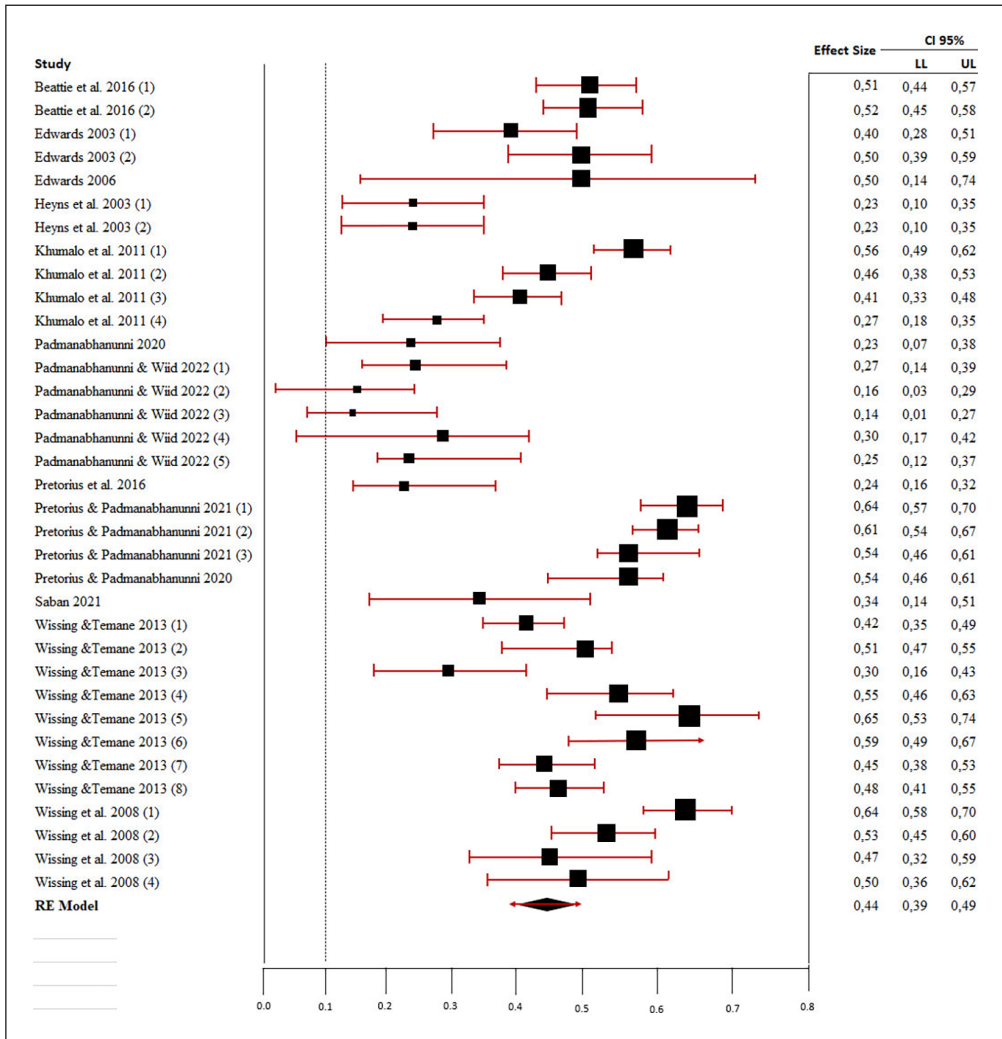


Figure 3. Forest plot of the relationship between fortitude and the indices of psychological well-being.

Visual inspection of the regression plots suggested that neither age nor methodological quality had an effect on the effect sizes. This was confirmed by statistical tests of significance: age,  $Q_M = .163, p = .69$ ; methodological quality,  $Q_M = .101, p = .75$ .

### Subgroup analysis

We hypothesised that two distinct subgroups existed in the 35 effect sizes, namely those reported in relation to positive and negative indicators of well-being. A forest plot of the two subgroups is presented in Figure 5.

As shown in Figure 4, the combined effect size for positive indicators ( $r = .49, 95\% \text{ CI} = [.44, .53]$ ) was higher than that for negative indicators ( $r = .36, 95\% \text{ CI} = [.26, .46]$ ). In addition, the heterogeneity statistics indicated heterogeneity in both subgroups: positive indicators,  $Q = 92.49, p < .001, I^2 = 79.46\%, \tau^2 = .01$ ; negative indicators,  $Q = 176.85, p < .001, I^2 = 92.08\%, \tau^2 = .04$ .

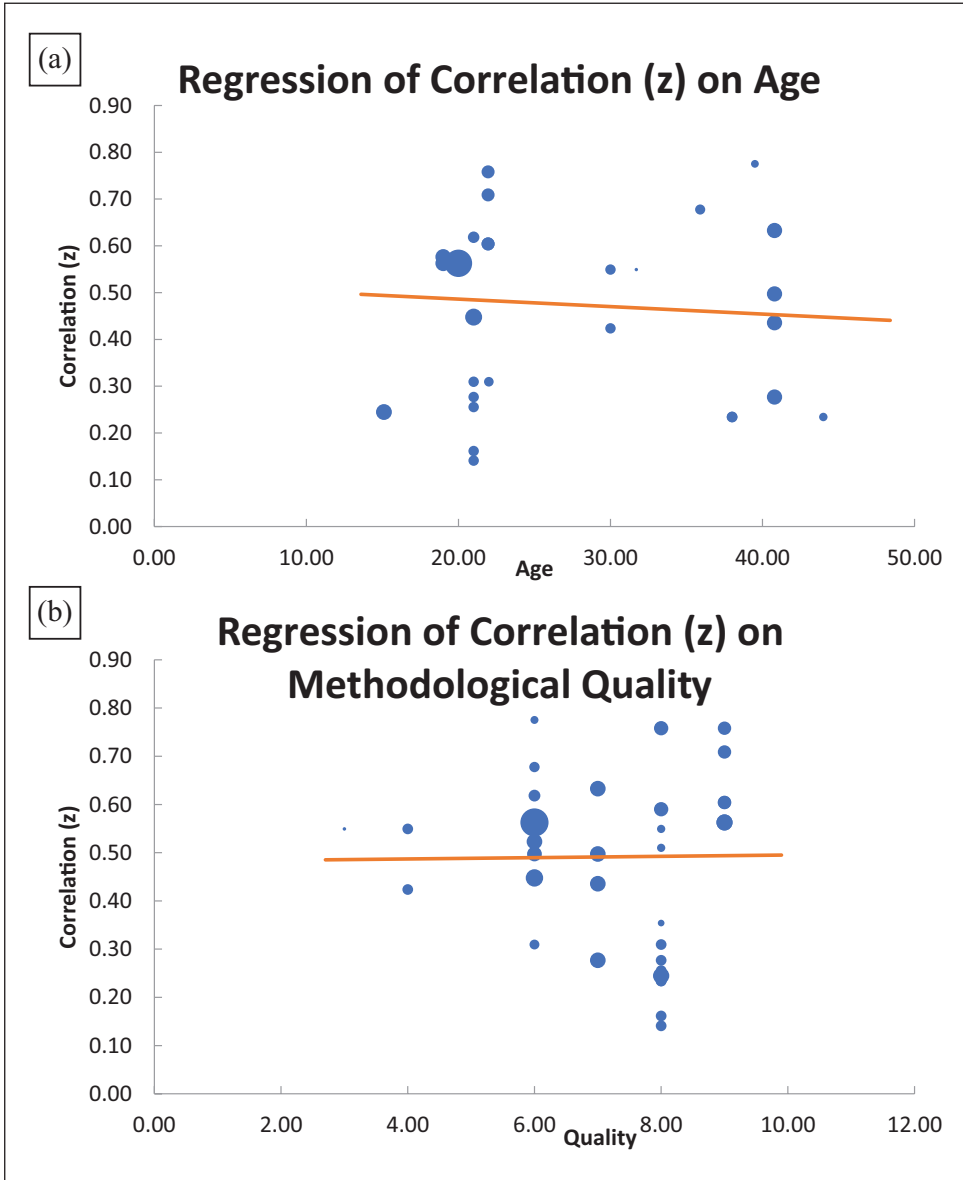


Figure 4. Plot of age and methodological quality as moderator variables.

### Assessing publication bias

We examined publication bias visually with a funnel plot and statistically with Egger’s regression test and weighting studies. The funnel plot is presented in Figure 6.

Visual inspection of the funnel plot provided evidence of symmetry, because the 35 effect sizes were almost equally spread around the combined effect size, denoted by the vertical line. The evidence of symmetry was confirmed by Egger’s regression test, which was not significant ( $z = -.660$ ,  $p = .51$ ). The weighting of the studies also did not significantly affect the point estimate. The

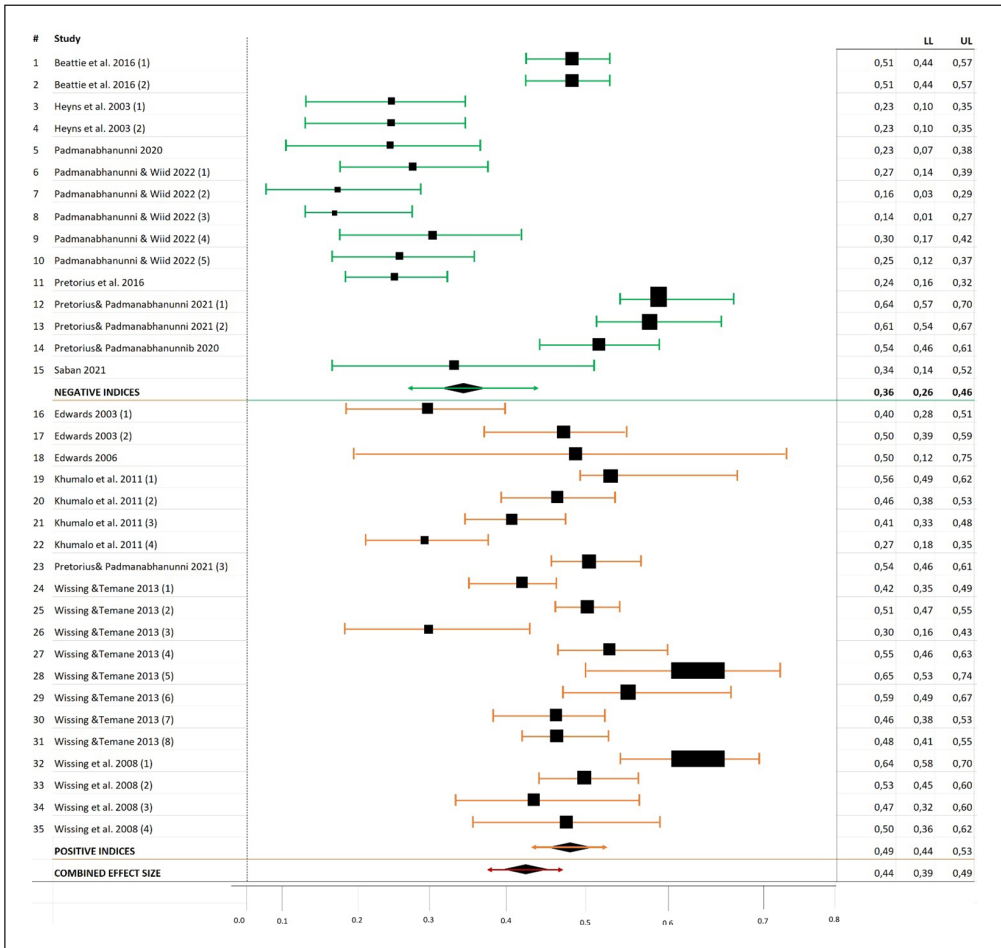


Figure 5. Forest plot of subgroups: positive and negative indicators of well-being.

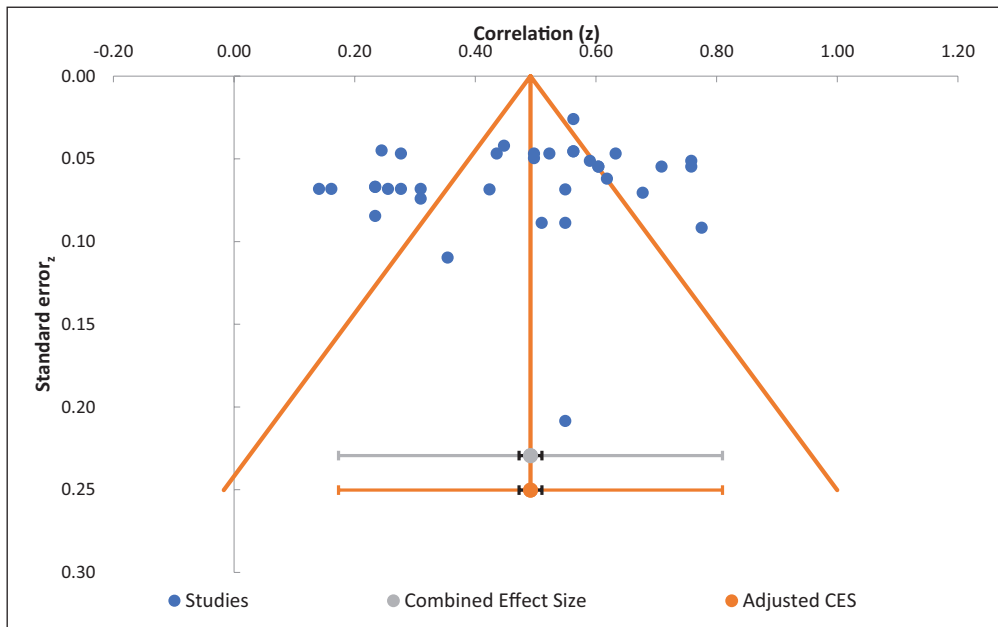
estimates were .471 (95% CI = [.410, .531]) in the unadjusted model (in which the studies were not weighted) and .446 (95% CI = [.392, .499]) in the weighted model.

### Effect size dependencies

As indicated in Table 1, the 35 effect sizes were reported in 13 different studies. To account for the dependencies of effect sizes, RVE was used with a correction for small sample sizes, which resulted in a slight increase in the overall effect size (.508, 95% CI = [.425, .592]).

### Discussion

In a scoping review of 20 years of empirical research on the FORQ, Pretorius and Padmanabhanunni (2021b) concluded that the FORQ is a versatile measure that has been applied in different cultural contexts and among a wide range of population groups and has demonstrated sound reliability. In



**Figure 6.** Funnel plot of the assessment of symmetry and publication bias.

the present study, our goal was to extend this work by using a meta-analytic approach to statistically integrate existing studies assessing the relationship between fortitude and PWB.

Fortitude has been identified as a salient aspect of mental health and well-being, and a large number of studies have confirmed that the presence of fortitude is associated with positive mental and physical health outcomes (for an overview, please refer to Pretorius & Padmanabhanunni, 2021b). Despite the growing body of research investigating fortitude and various indices of PWB, to the best of our knowledge, no meta-analytical studies have yet provided an overall mean estimate of the relationship or quantified effect size variance to explain differences in effects across studies. This type of research is considered critical in gaining broader insights into the strength of the relationship between fortitude and PWB and understanding the factors that underlie the differences in the direction and magnitude of effects within and across studies of these variables (Noble et al., 2022).

The current meta-analysis yielded a medium effect size, and the effect sizes were larger for positive than for negative indicators of well-being. This agrees with the conceptualisation of fortitude as a fortigenic construct (Pretorius & Heyns, 1998). The medium effect size observed may be due to the methodological differences in studies including small sample sizes, which may have contributed to some bias in the interpretation of the findings. Our results indicated a large heterogeneity in the reported effect sizes. In addition, neither age nor methodological quality affected the observed effect size, and no evidence of publication bias was observed.

Overall, the results of the meta-analysis regarding fortitude and PWB can be considered in relation to its current implications for intervention. Globally, people continue to grapple with the impact of COVID-19 (Şimşir et al., 2022). Although successive waves of the pandemic have been associated with increased access to vaccination and personal protective equipment and a greater knowledge of how to treat this disease, a large percentage of people continue to experience adverse mental health outcomes because of the prolonged social isolation, economic restrictions, continued fear of COVID-19, unresolved grief, and difficulties in accessing mental health care

(Padmanabhanunni et al., 2022; Pretorius & Padmanabhanunni, 2021a; Veer et al., 2020). Numerous empirical studies (e.g., Aknin et al., 2022) have documented heightened levels of anxiety, depression, loneliness, and posttraumatic stress reactions among the general population. Other studies have also documented increases in psychosocial challenges, such as gender-based violence and substance abuse (Usher et al., 2021). Therefore, identifying the factors that can protect people against adverse mental health outcomes is urgently required.

Fortitude represents a salient protective factor in mitigating psychological distress. The construct of fortitude is grounded in the theory of cognitive appraisal, and several studies conducted during the pandemic have underscored the salience of cognitive factors in promoting adaptation. For example, Veer et al. (2020) indicated that a positive appraisal style is a strong predictor of coping and resilience. Hence, a potentially effective approach for promoting adaptation is to alter potentially unhelpful patterns of appraisal, which represents a central component of evidence-based mental health interventions, such as cognitive behavioural therapy. Growing evidence has been reported regarding the accessibility and usability of digital cognitive behavioural mental health interventions, particularly those delivered via mobile phone applications (Jarvis et al., 2019). These interventions can be adapted to focus on amplifying fortigenic appraisals and thereby promote adaptation and coping. Brief digital cognitive behavioural therapy interventions have been found to be effective in improving coping and resilience in highly stressful situations (Ang et al., 2022; Weiner et al., 2020). These interventions have also been found to inhibit the emergence of psychological disorders, including depression and anxiety (Weiner et al., 2020). Within the context of the pandemic, digitally delivered interventions have the advantage of circumventing challenges in access to mental health care, which arise because of the social-distancing mandates, quarantine requirements, and stay-at-home orders.

Although the present study provided strong evidence regarding the association between fortitude and PWB, some limitation should be noted. Although no signs of publication bias were observed in the studies included in the analysis, some studies may have not been included because they were not listed in the databases selected. These incomplete data may have led to an overestimation of the effect size.

## Conclusion

The current meta-analysis provides robust evidence regarding the association between fortitude and PWB. This has implications for promoting mental health in light of COVID-19 and suggests that interventions aimed at building fortitude can be leveraged to mitigate psychological distress.

## Acknowledgements

The authors thank John Thwaites, a graphic designer, for helping with the graphs.

## Declaration of conflicting interests


The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

## ORCID iDs

Tyrone Brian Pretorius  <https://orcid.org/0000-0002-6325-6623>

Anita Padmanabhanunni  <https://orcid.org/0000-0001-7733-7486>

## References

- Adler, A., Unanue, W., Osin, E., Ricard, M., Alkire, S., & Seligman, M. (2017). Psychological wellbeing. In *Happiness: Transforming the development landscape*. The Centre for Bhutan Studies and GNH. <https://www.bhutanstudies.org.bt/>
- Agha, S. (2021). Mental well-being and association of the four factors coping structure model: A perspective of people living in lockdown during COVID-19. *Ethics, Medicine and Public Health, 16*, Article 100605. <https://doi.org/10.1016/j.jemep.2020.100605>
- Ahrens, K., Neumann, R., Kollmann, B., Brokelmann, J., Von Werthern, N., Malyshau, A., Weichert, D., Lutz, B., Fiebach, C., & Wessa, M. (2021). Impact of COVID-19 lockdown on mental health in Germany: Longitudinal observation of different mental health trajectories and protective factors. *Translational Psychiatry, 11*(1), 1–10. <https://doi.org/10.1038/s41398-021-01508-2>
- Aknin, L. B., De Neve, J. E., Dunn, E. W., Fancourt, D. E., Goldberg, E., Helliwell, J. F., Jones, S. P., Karam, E., Layard, R., Lyubomirsky, S., Rzepa, A., Saxsena, S., Thronton, E. M., Vanderweele, T. J., Whilans, A. V., Zaki, J., Karadag, O., & Ben Amor, Y. (2022). Mental health during the first year of the COVID-19 pandemic: A review and recommendations for moving forward. *Perspectives on Psychological Science, 17*(4), 915–936. <https://doi.org/10.1177/17456916211029964>
- Ang, W. H. D., Chew, H. S. J., Dong, J., Yi, H., Mahendren, R., & Lau, Y. (2022). Digital training for building resilience: Systematic review, meta-analysis, and meta-regression. *Stress and Health, 1*–22. <https://doi.org/10.1002/smi.3154>
- Banna, M. H. A., Sayeed, A., Kundu, S., Christopher, E., Hasan, M. T., Begum, M. R., Kormoker, T., Dola, S. T. I., Hassan, M. M., & Chowdhury, S. (2022). The impact of the COVID-19 pandemic on the mental health of the adult population in Bangladesh: A nationwide cross-sectional study. *International Journal of Environmental Health Research, 32*(4), 850–861. <https://doi.org/10.1080/09603123.2020.1802409>
- Baujat, B., Mahé, C., Pignon, J. P., & Hill, C. (2002). A graphical method for exploring heterogeneity in meta-analyses: Application to a meta-analysis of 65 trials. *Statistics in Medicine, 21*(18), 2641–2652.
- Beattie, B. E., Stewart, D. W., & Walker, J. R. (2016). A moderator analysis of the relationship between mental health help-seeking attitudes and behaviours among young adults. *Canadian Journal of Counselling and Psychotherapy, 50*(3), 290–314. <https://psycnet.apa.org/record/2016-59181-006>
- Bendau, A., Plag, J., Kunas, S., Wyka, S., Ströhle, A., & Petzold, M. B. (2021). Longitudinal changes in anxiety and psychological distress, and associated risk and protective factors during the first three months of the COVID-19 pandemic in Germany. *Brain and Behavior, 11*(2), Article e01964. <https://doi.org/10.1002/brb3.1964>
- Chen, J., Farah, N., Dong, R. K., Chen, R. Z., Xu, W., Yin, J., Chen, B. Z., Delios, A. Y., Miller, S., & Wan, X. (2021). Mental health during the COVID-19 crisis in Africa: A systematic review and meta-analysis. *International Journal of Environmental Research and Public Health, 18*(20), Article 10604. <https://doi.org/10.3390/ijerph182010604>
- Cohen, J. (1992). A power primer. *Psychological Bulletin, 112*(1), 155–159. <https://psycnet.apa.org/doi/10.1037/0033-2909.112.1.155>
- De Kock, J. H., Latham, H. A., Leslie, S. J., Grindle, M., Munoz, S. A., Ellis, L., Polson, R., & O'Malley, C. M. (2021). A rapid review of the impact of COVID-19 on the mental health of healthcare workers: Implications for supporting psychological well-being. *BMC Public Health, 21*(1), Article 104. <https://doi.org/10.1186/s12889-020-10070-3>
- Diener, E., Wirtz, D., Tov, W., Prieto, C., Choi, D., Oishi, S., & Biswas-Diner, R. (2010). New well-being measures: Short scales to assess flourishing and positive and negative feelings. *Social Indicators Research, 97*, 143–156. <https://doi.org/10.1007/s11205-009-9493-y>
- Drukker, M., Weltens, I., van Hooijdonk, C., Vandenberk, E., & Bak, M. (2021). Development of a methodological quality criteria list for observational studies: The observational study quality evaluation. *Frontiers in Research Metrics and Analytics, 6*, Article 675071. <https://doi.org/10.3389/frma.2021.675071>
- Edwards, S. (2003). The structure of a psychological wellness profile. *International Journal of Mental Health Promotion, 5*(2), 6–11. <https://doi.org/10.1080/14623730.2003.9721901>
- Edwards, S. (2006). Physical exercise and psychological well-being. *South African Journal of Psychology, 36*(2), 357–373. <https://doi.org/10.1177/008124630603600209>

- Egger, M., Smith, G. D., Schneider, M., & Minder, C. (1997). Bias in meta-analysis detected by a simple, graphical test. *British Medical Journal*, *315*(7109), 629–634. <https://doi.org/10.1136/bmj.315.7109.629>
- Ettman, C. K., Abdalla, S. M., Cohen, G. H., Sampson, L., Vivier, P. M., & Galea, S. (2020). Prevalence of depression symptoms in US adults before and during the COVID-19 pandemic. *JAMA Network Open*, *3*(9), Article e2019686. <https://doi.org/10.1001/jamanetworkopen.2020.19686>
- Fisher, Z., & Tipton, E. (2015). *Robumeta: Robust variance meta-regression* (R package version 1.6), <http://CRAN.R-project.org/package=robumeta>
- Fond, G., Nemani, K., Etchecopar-Etchart, D., Loundou, A., Goff, D. C., Lee, S. W., Lancon, C., Auquier, P., Baumstarck, K., & Llorca, P.-M. (2021). Association between mental health disorders and mortality among patients with COVID-19 in 7 countries: A systematic review and meta-analysis. *JAMA Psychiatry*, *78*(11), 1208–1217. <https://doi.org/10.1001/jamapsychiatry.2021.2274>
- Fujiwara, D., Dolan, P., Lawton, R., Behzadnejad, F., Lagarde, A., Maxwell, C., & Peytrignet, S. (2020). *Wellbeing costs of COVID-19 in the UK*. <https://pesquisa.bvsalud.org/global-literature-on-novel-coronavirus-2019-ncov/resource/pt/grc-740235>
- Goularte, J. F., Serafim, S. D., Colombo, R., Hogg, B., Caldieraro, M. A., & Rosa, A. R. (2021). COVID-19 and mental health in Brazil: Psychiatric symptoms in the general population. *Journal of Psychiatric Research*, *132*, 32–37. <https://doi.org/10.1016/j.jpsychires.2020.09.021>
- Hamid, S., & Singaram, V. S. (2016). Exploring the relationship between demographic factors, performance and fortitude in a group of diverse 1st-year medical students. *African Journal of Health Professions Education*, *8*(1), 99–103. <https://doi.org/10.7196/AJHPE.2016.v8i1.748>
- He, F. X., Turnbull, B., Kirshbaum, M. N., Phillips, B., & Klainin-Yobas, P. (2018). Assessing stress, protective factors and psychological well-being among undergraduate nursing students. *Nurse Education Today*, *68*, 4–12. <https://doi.org/10.1016/j.nedt.2018.05.013>
- Hedges, L. V., Tipton, E., & Johnson, M. C. (2010). Robust variance estimation in meta-regression with dependent effect size estimates. *Research Synthesis Methods*, *1*(1), 39–65. <https://doi.org/10.1002/jrsm.5>
- Heyns, P. M., Venter, J. H., Esterhuysen, K. G., Bam, R. H., & Odendaal, D. C. (2003). Nurses caring for patients with Alzheimer's disease: Their strengths and risk of burnout. *South African Journal of Psychology*, *33*(2), 80–85. <https://doi.org/10.1177/008124630303300202>
- Higgins, J. P. T., Thompson, S. G., Deeks, J. J., & Altman, D. G. (2003). Measuring inconsistency in meta-analyses. *British Medical Journal*, *327*, 557–560. <https://doi.org/10.1136/bmj.327.7414.557>
- Jarvis, M. A., Padmanabhanunni, A., & Chipps, J. (2019). An evaluation of a low-intensity cognitive behavioral therapy mHealth-supported intervention to reduce loneliness in older people. *International Journal of Environmental Research and Public Health*, *16*(7), Article 1305. <https://doi.org/10.3390/ijerph16071305>
- Khumalo, I. P., Temane, Q. M., & Wissing, M. P. (2011). Well-being in the Batswana cultural context: Constructs and measures. *Journal of Psychology in Africa*, *21*(2), 277–285. <https://doi.org/10.1080/14330237.2011.10820456>
- Lahti, E. (2019). Embodied fortitude: An introduction to the Finnish construct of *sisu*. *International Journal of Wellbeing*, *9*(1), 61–82. <https://doi.org/10.5502/ijw.v9i1.672>
- Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & PRISMA Group. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *Annals of Internal Medicine*, *151*(4), 264–269. <https://doi.org/10.1136/bmj.b2535>
- Noble, D. W., Pottier, P., Lagisz, M., Burke, S., Drobnia, S. M., O'Dea, R. E., & Nakagawa, S. (2022). Meta-analytic approaches and effect sizes to account for 'nuisance heterogeneity' in comparative physiology. *Journal of Experimental Biology*, *225*(Suppl\_1), Article jeb243225.
- O'Connor, R. C., Wetherall, K., Cleare, S., McClelland, H., Melson, A. J., Niedzwiedz, C. L., O'Carroll, R. E., O'Connor, D. B., Platt, S., & Scowcroft, E. (2021). Mental health and well-being during the COVID-19 pandemic: Longitudinal analyses of adults in the UK COVID-19 Mental Health & Wellbeing study. *The British Journal of Psychiatry*, *218*(6), 326–333. <https://doi.org/10.1192/bjp.2020.212>
- Padmanabhanunni, A. (2020). Caring does not always cost: The role of fortitude in the association between personal trauma exposure and professional quality of life among lay trauma counselors. *Traumatology*, *26*(4), 420. <https://psycnet.apa.org/doi/10.1037/trm0000262>

- Padmanabhanunni, A., & Pretorius, T. B. (2020). When coping resources fail: The health-sustaining and moderating role of fortitude in the relationship between COVID-19-related worries and psychological distress. *African Safety Promotion: A Journal of Injury and Violence Prevention*, 18(2), 28–47.
- Padmanabhanunni, A., Pretorius, T. B., & Kagee, A. (2022). The health-sustaining, moderating, and mediating roles of sense of coherence in the relationship between fear of COVID-19 and burnout among South African teachers. *International Journal of Environmental Research and Public Health*, 19(9), Article 5160. <https://doi.org/10.3390/ijerph19095160>
- Padmanabhanunni, A., & Wiid, C. (2022). From fear to fortitude: Differential vulnerability to PTSD among South African university students. *Traumatology*, 28(1), 167–174. <https://doi.org/10.1037/trm0000312>
- Pretorius, T., & Heyns, P. (1998). *Fortitude as stress-resistance: Development and validation of the Fortitude Questionnaire (FORQ)*. <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.464.1299&rep=rep1&type=pdf>
- Pretorius, T., & Padmanabhanunni, A. (2021a). A looming mental health pandemic in the time of COVID-19? Role of fortitude in the interrelationship between loneliness, anxiety, and life satisfaction among young adults. *South African Journal of Psychology*, 51(2), 256–268. <https://journals.co.za/doi/abs/10.1177/0081246321991030>
- Pretorius, T. B. (2020). Pathways to health: Conceptual clarification and appropriate statistical treatment of mediator, moderator, and indirect effects using examples from burnout research. *South African Journal of Psychology*, 50(3), 320–335. <https://doi.org/10.1177/0081246320943498>
- Pretorius, T. B., & Padmanabhanunni, A. (2021b). The dynamics of appraisal: A review of 20 years of research using the Fortitude Questionnaire. *South African Journal of Psychology*, 51(1), 158–174. <https://doi.org/10.1177/0081246320957489>
- Pretorius, T. B., Padmanabhanunni, A., & Campbell, J. (2016). The role of fortitude in relation to exposure to violence among adolescents living in lower socio-economic areas in South Africa. *Journal of Child and Adolescent Mental Health*, 28, 153–162. <https://doi.org/10.2989/17280583.2016.1200587>
- Quintana, D. S. (2015). From pre-registration to publication: A non-technical primer for conducting a meta-analysis to synthesize correlational data. *Frontiers in Psychology*, 6, Article 1549. <https://doi.org/10.3389/fpsyg.2015.01549>
- R Development Core Team. (2015). *R: A language and environment for statistical computing*. The R Foundation for Statistical Computing.
- Roothman, B., Kirsten, D. K., & Wissing, M. P. (2003). Gender differences in aspects of psychological well-being. *South African Journal of Psychology*, 33(4), 212–218. <https://hdl.handle.net/10520/EJC98250>
- Ryff, C. (2014). Psychological well-being revisited: Advances in the science and practice of eudaimonia. *Psychotherapy & Psychosomatics*, 83, 10–28. <https://doi.org/10.1159/000353263>
- Saban, S. (2021). *Trauma and fortitude amongst undergraduate students with disabilities* [Masters thesis]. University of the Western Cape. <http://hdl.handle.net/11394/8620>
- Şimşir, Z., Koç, H., Seki, T., & Griffiths, M. D. (2022). The relationship between fear of COVID-19 and mental health problems: A meta-analysis. *Death Studies*, 46(3), 515–523. <https://doi.org/10.1080/07481187.2021.1889097>
- Suurmond, R., van Rhee, H., & Hak, T. (2017). Introduction, comparison and validation of meta-essentials: A free and simple tool for meta-analysis. *Research Synthesis Methods*, 8(4), 537–553. <https://doi.org/10.1002/jrsm.1260>
- Usher, K., Bradbury Jones, C., Bhullar, N., Durkin, D. J., Gyamfi, N., Fatema, S. R., & Jackson, D. (2021). COVID-19 and family violence: Is this a perfect storm? *International Journal of Mental Health Nursing*, 30(4), 1022–1032. <https://doi.org/10.1111/inm.12876>
- Vázquez, C., Hervás, G., Rahona, J. J., & Gómez, D. (2009). Psychological well-being and health. Contributions of positive psychology. *Anuario de Psicología Clínica y de la Salud/Annuary of Clinical and Health Psychology*, 5, 15–27.
- Veer, I., Riepenhausen, A., Zerban, M., Wackerhagen, C., Engen, H., Puhmann, L., Köber, G., Bögemann, S. A., Weermeijer, J., Ušcihko, A., Mor, N., Barsuola, G., Cardone, P., Deza-Araujo, Y. I., Farkas, K., Feller, C., Hujsuk, M., Ilen, L., Kasanova, Z., . . . Kalisch, R. (2020). *Mental resilience in the Corona lockdown: First empirical insights from Europe*. <https://pdfs.semanticscholar.org/cf27/9ac4b7d5d37a0fb48c232325b3cc16d116a2.pdf>



- Venugopal, V. C., Mohan, A., & Chennabasappa, L. K. (2022). Status of mental health and its associated factors among the general populace of India during COVID-19 pandemic. *Asia-Pacific Psychiatry, 14*(2), Article e12412. <https://doi.org/10.1111/appy.12412>
- Viechtbauer, W. (2010). Conducting meta-analyses in R with the metafor package. *Journal of Statistical Software, 36*, 1–43. <https://doi.org/10.18637/jss.v036.i03>
- Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., Ho, C. S., & Ho, R. C. (2020). Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. *International Journal of Environmental Research and Public Health, 17*(5), Article 1729. <https://doi.org/10.3390/ijerph17051729>
- Weiner, L., Berna, F., Nourry, N., Severac, F., Vidailhet, P., & Mengin, A. C. (2020). Efficacy of an online cognitive behavioral therapy program developed for healthcare workers during the COVID-19 pandemic: The REDuction of STress (REST) study protocol for a randomized controlled trial. *Trials, 21*(1), 1–10. <https://doi.org/10.1186/s13063-020-04772-7>
- Wissing, J. A. B., Wissing, M. P., Du Toit, M. M. Q., & Michael Temane, Q. M. (2008). Psychometric properties of various scales measuring psychological well-being in a South African context: The FORT 1 Project. *Journal of Psychology in Africa, 18*(4), 511–520. <https://doi.org/10.1080/14330237.2008.10820230>
- Wissing, M. P., & Temane, Q. M. (2013). The prevalence of levels of wellbeing revisited in an African context. In C. L. M. Keyes (Ed.), *Mental well-being: International contributions to the study of positive mental health* (pp. 71–90). Springer.
- Zhou, Y., MacGeorge, E. L., & Myrick, J. G. (2020). Mental health and its predictors during the early months of the COVID-19 pandemic experience in the United States. *International Journal of Environmental Research and Public Health, 17*(17), Article 6315. <https://doi.org/10.3390/ijerph1717631>