A Meta Analysis on State Anxiety and Self Esteem

Sky Taylor

Methods

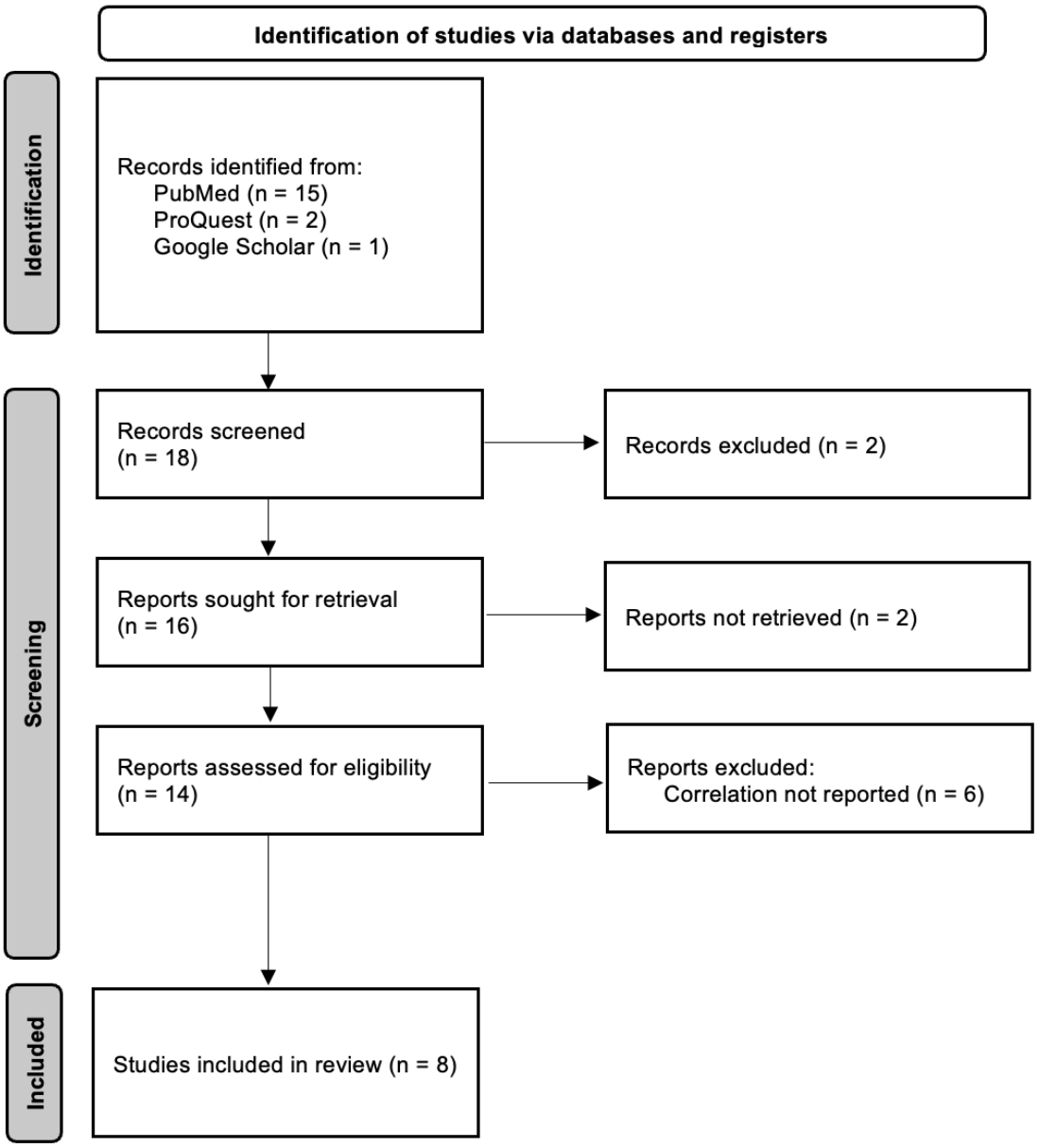
Literature search and screening

Following PRISMA guidelines (Page et al., 2021) to maintain transparency, Figure 1 shows a flow diagram of the study selection process. Database searches used the following keywords in title and abstract searches: “state anxiety” AND “self-esteem” AND “student”. The search was restricted to papers written in English that included quantitative measures of state anxiety and self-esteem which reported the Pearson’s correlation coefficient between these measures. Additionally, systematic reviews and meta-analyses were excluded from the literature search. Initial screening of abstracts and full text eligibility screening was conducted by the reviewer independently and data was extracted manually. For each study, the sample size, the Pearson’s correlation coefficient, the type of document, and the scales used to measure state anxiety and self-esteem were recorded (Table 1). Table 2 shows the remaining studies that seemed to meet the inclusion criteria but were excluded during screening and provides reasons for their exclusion.

Risk of bias was not assessed however this could have been achieved through following the guidelines from the revised Cochrane risk-of-bias tool (Sterne et al., 2019) which follows an algorithm to assess the risks of each study across 5 domains. This would enable critical evaluation of the reliability of the findings of the meta-analysis. As bias was not assessed and studies relied on surveys and hence were observational in design, the certainty in the quality of evidence was fairly low, which should be taken into consideration when interpreting the results of this analysis.

Figure 1

PRISMA Flow Diagram for the Selection and Screening of Studies.



Note. Diagram based on Page et al. (2021).

Table 1

Summary of Studies Included in the Meta-Analysis.

Authors	Year	*n*	*r*	Type	SA Measure	SE Measure
Dancot et al.	2021	464	-0.580	Journal article	STAI	SLCS
Guil et al.	2019	153	-0.360	Journal article	STAI	SES
Hovey et al.	2006	133	-0.580	Journal article	STAI	SES
Kolayis	2012	124	-0.508	Journal article	STAI	CSEI
Luo et al.	2012	2214	-0.320	Journal article	STAI	SES
Naughton et al.	2015	355	-0.610	Journal article	STAI	SES
Pauker	1976	133	-0.190	Thesis	STAI	Original scale
Suliman & Halabi	2007	165	-0.571	Journal article	STAI	SES

Note. SA = State Anxiety, SE = Self-Esteem, STAI = State-Trait Anxiety Inventory (Spielberger, 1970), SLCS = Self-Liking/Self-Competence Scale (Tafarodi & Swann, 2001), CSEI = Coopersmith Self-Esteem Inventory (Coopersmith, 2012).

Table 2

Studies Excluded During the Screening Process.

Study	Stage of Exclusion	Reason for Exclusion
Ekehammar et al. (2005)	Full text eligibility screening	Correlation not reported
Foret et al. (2012)	Full text eligibility screening	Correlation not reported
Ghanbari et al. (2021)	Abstract screening	Not selected population
Harris & Snyder (1986)	Full text eligibility screening	Correlation not reported
Huprich et al. (2016)	Full text eligibility screening	Full text not available
Li et al. (2010)	Full text eligibility screening	Correlation not reported
Pope et al. (2001)	Abstract screening	Not selected population
Russler (1991)	Full text eligibility screening	Full text not available
Vaughn (1989)	Full text eligibility screening	Correlation not reported
Wilson et al. (2015)	Full text eligibility screening	Correlation not reported

Data Analysis

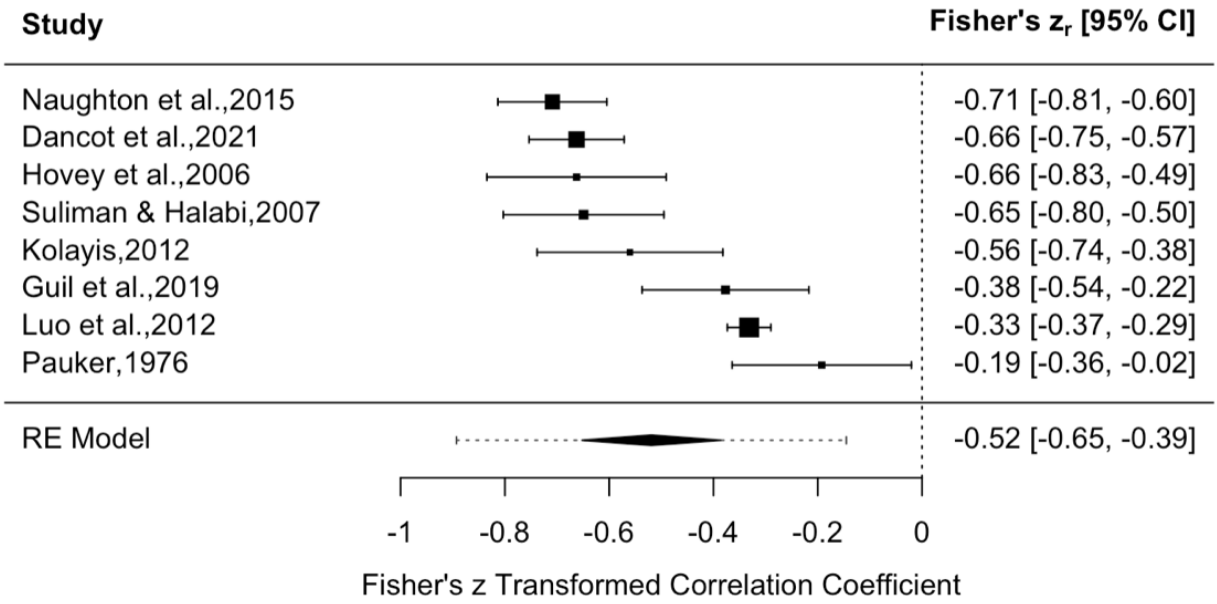
The meta-analysis aims to determine the effect size of the correlation between state anxiety and self-esteem. Pearson's *r* correlation coefficients were standardised using the Fisher *z* transformation to enable the comparison of correlations between different scales. A random-effects model meta-analysis was conducted using the 'metafor' package (Viechtbauer, 2010) for R (version 4.3.2; R Core Team, 2023) in R Studio (version 2023.12.1.402; Posit team, 2024). Heterogeneity between studies was assessed through examining the following statistics in conjunction: tau-squared (τ^2) using Restricted Maximum Likelihood (RML) estimation, the Q-test, and the I^2 Higgins and Thompson statistic. Plots of influence diagnostics are used to check for outliers or influential cases where any problematic studies will be investigated to determine the reason for the results. Forest and funnel plots were produced to visualise the effect sizes and test for publication bias, respectively.

Results

The meta-analysis was conducted on $k = 8$ studies ($N = 3{,}741$) with the *z*-transformed correlation coefficients for each study presented in a forest plot (Figure 2). The estimated average *z*-transformed correlation coefficient based on the random-effects model was significantly different from zero ($\hat{\theta} = -0.52$, 95% CI[–0.65, –0.39], $z = -7.66$, $p < .001$), indicating that across studies there was a negative correlation between state anxiety and self-esteem. Assuming that this sample is one of the 95% that produce confidence intervals containing the true population effect size, the *z*-transformed correlation coefficient could be as small as –0.39 or as large as –0.65. The estimated average correlation coefficient (back-transformed into *r* for interpretation) was $r = -0.48$, which is considered a low negative correlation (Asuero et al., 2006).

Figure 2

Forest Plot Showing the Observed Z-Transformed Correlation Coefficients and the Estimate of the Random-Effects Model.



The estimated total amount of heterogeneity was $\tau^2 = 0.03$ CI[0.01, 0.15], with the *Q*-test indicating heterogeneity was significantly different from zero ($Q(7) = 98.04$, $p < .001$). Additionally, the percentage of the variability in effect sizes attributable to heterogeneity was $I^2 = 91.20\%$ CI[78.55, 97.96], which is a substantial amount. Plots of influence diagnostics (Figure 3) indicated no outliers or influential cases. The funnel plot (Figure 4) was used to assess the presence of publication bias. With only 8 studies included in the analysis, it is difficult to interpret the funnel plot directly to assess asymmetry, however the regression test indicated there was not significant funnel plot asymmetry ($z = –0.036$, $p = 0.972$).

Figure 3

Plots of Influence Diagnostics.

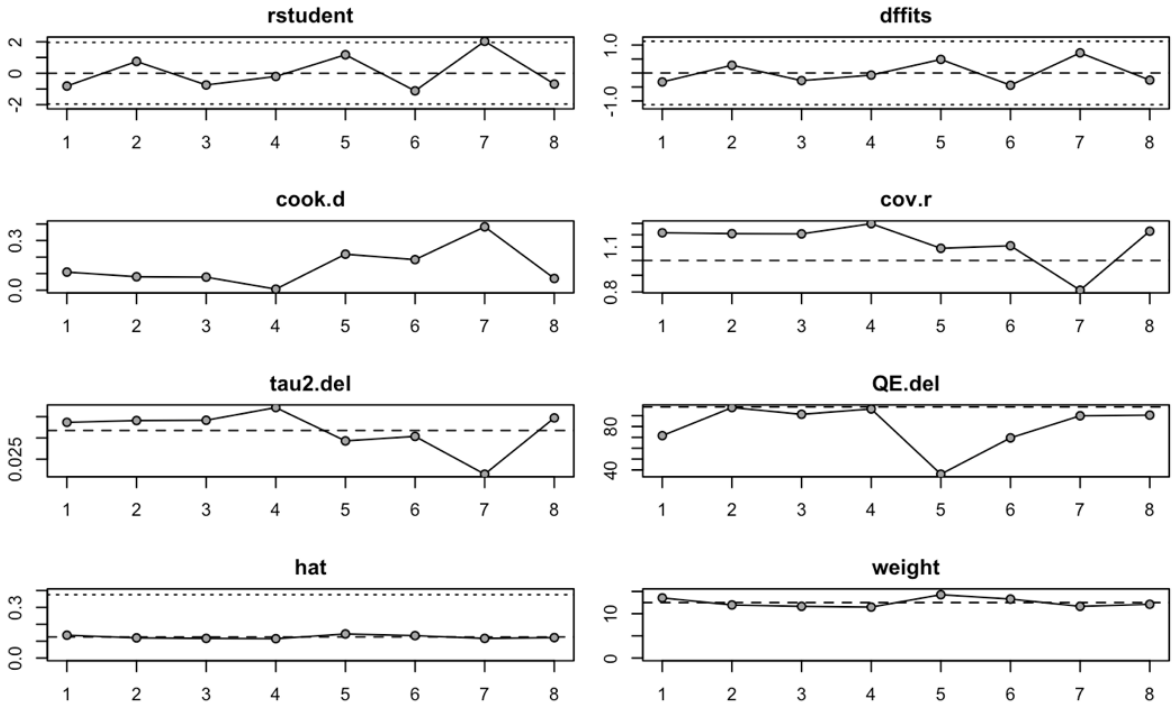
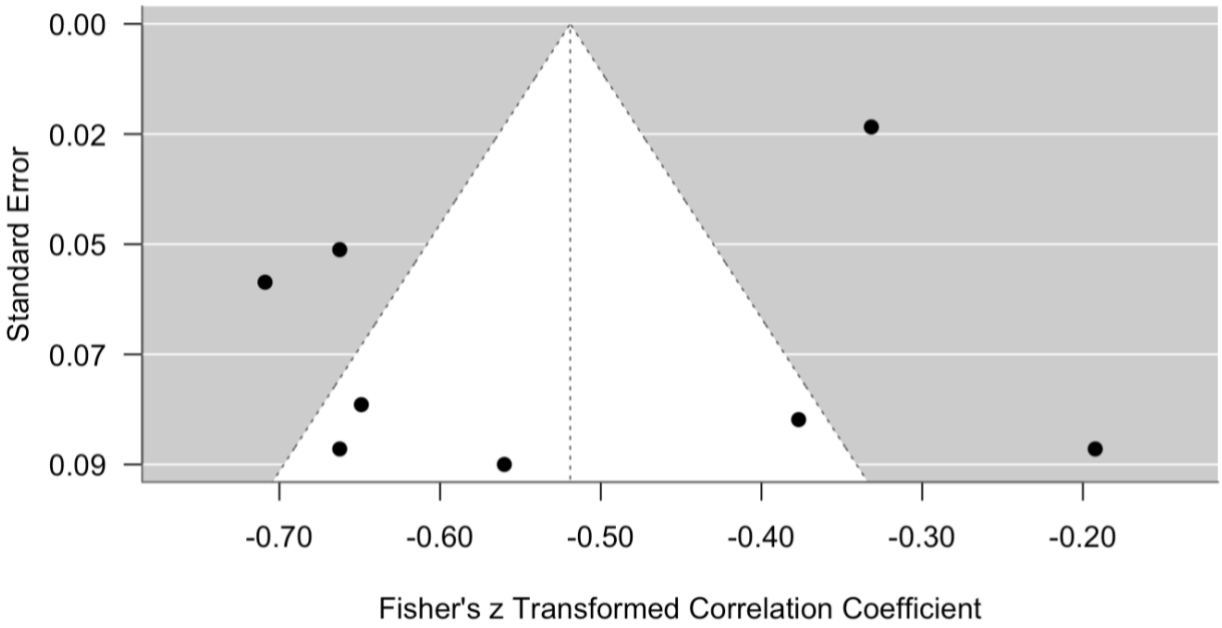


Figure 4

Funnel Plot.



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