
# Exploring Resilience as a Predictor of Outcomes in Psychological Therapies

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## Declaration

I, the author, confirm that this thesis is my own work and that I am aware of the University of Sheffield guidance on unfair means (www.sheffield.ac.uk/study-skills/assessment/academic-integrity/academic-integrity). This thesis is submitted in partial fulfilment of the requirements for the degree of Doctorate in Clinical Psychology. This work has not been submitted for any other degree or to any other institution. No funding has been received for this thesis. No conflicts of interest stated.

## Structure and Word Count

### Section One: Literature Review

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## Lay Summary

Recent research suggests that tailoring therapies to individual needs can improve treatment outcomes. Understanding which patient characteristics influence outcomes is crucial in guiding clinicians towards tailoring interventions. Research reported in this thesis investigated whether an individual's level of resilience (their ability to bounce back from difficulties) before therapy is linked to their recovery afterwards.

Section one presents a systematic review of 19 studies assessing the association between pre-treatment resilience and therapy outcomes. Two meta-analyses were conducted to estimate the overall association. The first meta-analysis indicated that higher resilience was associated with better outcomes. However, a second meta-analysis that considered how severe people's symptoms were at the start of therapy found no clear link between resilience and outcomes. This discrepancy may be attributed to the small number of studies in the second analysis or suggest that the resilience-outcome relationship partially depends on baseline symptom severity. Importantly, the evidence from these meta-analyses is of very low certainty and must therefore be interpreted with caution. Further research is required to clarify these associations.

Section two presents a secondary analysis of data from a randomised controlled trial evaluating the effectiveness of cognitive-behavioural therapy and person-centred experiential therapy for depression. The study investigated whether pre-treatment resilience predicted treatment outcomes in these therapies. Items from the resilience questionnaire (CD-RISC-25) used in the trial were pared down to increase sensitivity to the phenomenon. Results indicated that participants with higher resilience before therapy had better outcomes immediately after treatment when considering the full group who entered the trial (including those who did not complete therapy). However, resilience did not predict outcomes for participants who received a minimum dose of therapy. Overall, findings suggest resilience might influence the

likelihood of participants engaging with therapy. Resilience did not predict 12-month outcomes. Further research is needed to better understand these associations.

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**Contents**

# Section One: Literature Review

## Patient Resilience as a Predictor of Outcomes in Psychological Interventions: A Systematic Review and Meta-Analysis

## Abstract

**Objectives:** This systematic review aimed to synthesise evidence regarding the association between pre-treatment resilience and the outcomes of psychological interventions.

**Methods:** A systematic search of published and unpublished literature was conducted within Scopus, PsycInfo, MEDLINE, and Lens. Search terms included variations of "resilience," "psychological therapy," "outcome," and various mental health conditions. Studies were grouped by the type of effect size reported (correlational or partial correlational). Two random-effects meta-analyses assessed the association between pre-treatment resilience and treatment outcomes. Certainty of evidence was assessed using the GRADE approach.

**Results:** Nineteen studies were identified, with 10 providing sufficient data for meta-analysis. Quality appraisal revealed two strong, five moderate, and 12 weak-quality studies. A meta-analysis of correlational data indicated a significant positive association between pre-treatment resilience and outcomes ($r$ = .25). In contrast, a meta-analysis of partial correlational effect sizes found a nonsignificant association ($r_p$ = –.09). Both meta-analyses were limited by a small number of studies and received a very low certainty of evidence GRADE rating. Moderator analyses were precluded by limited statistical power.

**Conclusions:** This systematic review suggests that higher pre-treatment resilience is associated with better psychological therapy outcomes in correlational studies. However, this association appears nonsignificant in studies controlling for baseline symptom severity, thereby reporting partial correlations. The very low certainty of evidence (GRADE) across both meta-analyses necessitates caution in interpreting these findings, rendering them insufficient to inform clinical practice. Future research requires well-powered primary studies and systematic reviews exploring moderators to better explain the association between resilience and outcomes.

**Keywords:** patient resilience; outcome; psychological therapy.

**Practitioner Points:**

- Pre-treatment resilience is associated with better psychological therapy outcomes; however, this relationship appears nonsignificant when baseline symptom severity is accounted for.
- Current evidence is insufficient to inform clinical decisions, such as treatment personalisation at the pre-treatment stage.
- Further research is required to establish the association between pre-treatment resilience and therapy outcomes with greater certainty.

## Introduction

Several decades of meta-analytic findings demonstrate that evidence-based psychological therapies are effective in the treatment of mental health disorders (Barkham & Lambert, 2021). Nevertheless, the overall magnitude of therapeutic benefits remains modest. A recent field-wide umbrella review of 102 meta-analyses encompassing 3,782 randomised controlled trials (RCTs) and 650,514 patients found that the overall effect size of psychological therapies for mental disorders in adults was small (Leichsenring et al., 2022). Across a range of investigated psychotherapies and disorders, including depression, obsessive-compulsive disorder, post-traumatic stress disorder, borderline personality disorder, eating disorders, schizophrenia spectrum disorders, and bipolar disorder, the reported standardised mean difference was 0.34 in favour of psychotherapies compared to treatment-as-usual (Leichsenring et al., 2022). Furthermore, a meta-analysis of 309 RCTs investigating the effectiveness of psychological therapies for depression compared to various control conditions found a medium overall effect size ($g = 0.72$), however, this reduced to a small effect size ($g = 0.48$) after the exclusion of studies with a high risk of bias (Cuijpers et al., 2020). Framing these findings in terms of the proportion of patients who experience improvement, a meta-analysis of 228 RCTs by Cuijpers et al. (2021) reported a response rate of 41% for psychotherapies targeting depression, indicating that a significant proportion of patients do not achieve meaningful improvement. These findings highlight the need to investigate how existing treatments could be optimised to enhance their effectiveness.

The implementation of personalised approaches in psychological therapies holds promise for improving their effectiveness. Support for treatment personalisation derives from a contrast between aggregate-level findings indicating that different therapies yield comparable outcomes across patient groups, compared to individual-level findings, which highlight variability in how specific patients respond to specific treatments (Barkham &

Lambert, 2021). For example, a meta-analysis of 306 RCTs and 51,853 patients evaluating psychological therapies for depression found a 9% higher variance in the treatment groups compared to control groups, indicating individual differences in how patients responded to treatments (Kaiser et al., 2022).

The personalisation of psychological therapies is a complex and multifaceted process. Cohen et al. (2021) proposed an organising framework that categorises various approaches through which psychological treatments can be personalised. The Three Dimensions of Personalisation (3DP) framework outlines three dimensions along which personalisation can be executed. The "Time" dimension denotes the stage of treatment at which personalisation happens (before, during or after treatment). The "Level of Intervention" dimension illustrates that personalisation can happen from macro-level decisions (type of treatment modality and intensity) to micro-level decisions (selecting treatment components and adapting delivery style). The "Structure" dimension represents the method of personalisation, from less formal decisions based on a clinician's experience to highly structured decisions based on statistical models. Emerging evidence suggests that personalised treatments are associated with improved outcomes, although the observed effect sizes are small. For instance, a recent meta-analytic review of nine RCTs including 5,134 patients found better outcomes for personalised interventions compared to standard treatment, reporting a pooled effect size of $d = 0.22$ in favour of personalised treatment (Nye et al., 2023).

Although several factors that lead to treatment success have been identified and divided into common (e.g. therapeutic alliance) versus specific (e.g. cognitive change) factors, the overall findings are inconsistent. Zilcha-Mano (2021) proposed a novel approach to research in this area by distinguishing between trait-like and state-like components of factors influencing treatment outcomes. This distinction is grounded in the observation that any construct measured over time comprises both a trait-like and a state-like component. For

example, one could consider the construct of insight into interpersonal patterns. The trait-like component reflects baseline individual characteristics and accounts for between-individual variance. As such, individuals may differ in their pre-treatment levels of insight. In contrast, the state-like component reflects dynamic changes that occur over the course of treatment, accounting for within-individual variance. This can be exemplified by improvements in a person's insight throughout therapy. Crucially, trait-like and state-like components exhibit distinct associations with the outcome variable (e.g. end-of-treatment depression severity), and should therefore be conceptualised and investigated as separate constructs (Zilcha-Mano, 2021).

Insight into trait-like components associated with treatment outcomes can guide personalisation decisions at the pre-treatment stage. For instance, trait-like components can be combined to create a "map" illustrating an individual's strengths and deficits (Zilcha-Mano, 2021). Such a map could help identify treatment targets by highlighting areas where interventions might aim to address deficits, enhance strengths, or both. Although research investigating this approach is still in its early stages, preliminary evidence appears promising. Illustrating an approach focused on individual deficits, a small uncontrolled trial by Fisher et al. (2019) involving 32 completers utilised patients' baseline symptom profiles to develop individualised treatment plans based on the Unified Protocol (Barlow et al., 2011). A large pre-post treatment effect size was reported ($g = 1.86$) for reductions in anxiety and depression. Furthermore, Cheavens et al. (2012) demonstrated the value of building on individual strengths in an RCT where patients were assigned to one of two types of CBT: one targeting strengths and the other targeting deficits. A faster rate of symptom change was found for patients whose strengths were targeted ($d = 0.69$). These preliminary findings highlight the potential benefits of incorporating individual strengths and deficits into personalised treatment planning. To do so effectively, it is essential to identify trait-like

components that are reliably associated with treatment outcomes, thereby enabling the development and refinement of individualised trait-like maps.

Psychological resilience presents a candidate variable in the search for strength-related components. Resilience is commonly described as "the ability to bounce back or overcome some form of adversity" (Vella & Pai, 2019, p. 233). Psychological resilience is conceptualised as a multidimensional construct including personality traits, specifically optimism and trait mindfulness, and a behavioural style characterised by active coping via positive cognitive reappraisal, seeking social support, employing humour and engaging in prosocial behaviour (Wu et al., 2013). Most research to date has examined psychological resilience primarily as a protective factor against the development of mental health problems in the context of adversity. For instance, a recent meta-analysis of 97 studies employing both cross-sectional and longitudinal designs investigated the relationship between positive cognitive reappraisal (a core component of psychological resilience) and mental health (Riepenhausen et al., 2022). In cross-sectional studies, the authors identified a small pooled effect size ($r = –.22$) for the association between positive cognitive reappraisal and psychiatric symptoms. This indicates that greater use of positive cognitive reappraisal is linked to fewer reported psychiatric symptoms. In the same review, findings from longitudinal studies suggested that resilience functions as a protective factor against the development of psychiatric symptoms in the context of exposure to stressors. These findings indicate that resilience appears to moderate the relationship between risk factors (e.g. stress), and psychopathology, and is therefore theorised to buffer individuals from developing psychiatric symptoms in response to adverse experiences. Moreover, evidence suggests that the relationship between resilience and mental health problems extends beyond a purely preventive role.

Recent research indicates that resilience constitutes a relevant factor among individuals with existing mental health conditions, as demonstrated by substantial variability in resilience levels across this group. In a meta-analysis comprising eight studies and 1,439 individuals with various mental health problems, a large, pooled effect size ($r$ = .55) was reported for the association between resilience and better quality of life (Chuang et al., 2023). This suggests that individuals with mental health conditions differ in their resilience levels, and that those with higher levels of resilience tend to report a better quality of life despite ongoing psychiatric symptoms. The findings of a meta-analysis comprising five studies and 1,247 patients seeking psychological treatment mirrored this outcome (Bartholomew et al., 2020). Here, a moderate association ($r$ = –.40) was observed between resilience and psychological distress at baseline (pre-treatment), indicating that more resilient individuals experienced lower levels of psychological distress in the context of existing mental health conditions.

Given the observed associations between resilience and mental health symptoms, it is pertinent to investigate whether baseline resilience may serve as a prognostic indicator of psychological treatment outcomes. Accordingly, the following research question guided this review: How does patients' pre-treatment resilience impact outcomes in psychological interventions? The present review aimed to synthesise existing evidence on this association through a meta-analytic summary of the existing data. To quantify this relationship, separate meta-analyses were conducted based on the primary studies' methodological features. Studies that employed a correlational analysis were included in a correlational meta-analysis, while studies employing linear modelling were included in a separate meta-analysis synthesising partial correlational effect sizes. Finally, the present review planned to evaluate the moderating effect of study quality (risk of bias) and the conceptualisation of resilience as assessed by different measures. The latter was guided by a recently developed framework

categorising resilience measures based on whether they conceptualise resilience as: (1) an attribute/resource, (2) a process, or (3) an outcome (Fisher & Law, 2021). Utilising moderator analysis, the present review sought to explore whether the scales' conceptualisation of resilience impacted the association between baseline resilience and treatment outcomes.

## Method

### Review Protocol

The reporting of this review followed the Preferred Reporting Items for Systematic reviews and Meta-Analyses guidelines (PRISMA; Page et al., 2021; Appendix A). The protocol was registered on the 13th of November 2024 on the PROSPERO database (ID: CRD42024610095).

### Eligibility Criteria

Study eligibility criteria were outlined using the population, intervention, comparison, outcomes, and study (PICOS) framework (Eriksen & Frandsen, 2018). The inclusion and exclusion criteria are presented in Table 1.

**Table 1**

*Inclusion and Exclusion Criteria*

| | Inclusion | Exclusion |
|---|---|---|
| Population | ● Individuals aged ≥ 18 years.<br>● Individuals who received a psychological intervention for a mental health condition or psychological distress. | ● Individuals aged < 18 years.<br>● Individuals who did not receive a psychological intervention for a mental health condition or psychological distress. |
| Intervention | ● Any psychological intervention used to treat a mental health condition or psychological distress, in any modality (individual, group, | ● Studies that include interventions that do not involve a psychological component. |

| | Inclusion | Exclusion |
|---|---|---|
| | computerised, etc.) | |
| Comparator | ● Not applicable | ● Not applicable |
| Outcome | ● Resilience measured using a standardised measure at pre-treatment.<br>● Post-treatment outcomes of psychological interventions measured using a validated measure.<br>● The statistical significance and magnitude of the association between pre-treatment resilience and post-treatment outcomes is reported. | ● Studies where resilience is not measured using a standardised measure at pre-treatment.<br>● Studies where post-treatment outcomes of psychological interventions are not measured.<br>● Studies where the association between pre-treatment resilience and post-treatment outcomes is not reported. |
| Setting | ● Any usual setting (outpatient, inpatient, community, etc), where psychological interventions are delivered in any country. | |
| Study design | ● Randomised controlled trials, longitudinal studies, prospective and retrospective cohort studies.<br>● Grey literature in the form of dissertations and theses.<br>● Studies published in English, Slovak, or Hungarian. | ● Qualitative studies.<br>● Grey literature in the form of conference proceedings, presentations or media articles.<br>● Studies not published in English, Slovak, or Hungarian. |

**Search Strategy**

A librarian was consulted in developing the search terms. The Scopus, PsycInfo, and MEDLINE databases were searched on the 15th of November 2024, using variations of the following search terms (the complete search strategy is outlined in Appendix B):

1. Resilience; AND
2. Psychological therapy OR psychological intervention OR psychotherapy OR treatment OR therapy OR cognitive therapy OR cognitive behavioural OR counselling OR psychodynamic; AND
3. Outcome OR predict OR response; AND
4. Anxiety OR depression OR affective disorder OR mood disorder OR bipolar OR post-traumatic stress OR PTSD OR personality disorder OR obsessive-compulsive OR OCD OR eating disorder OR psychotic disorder OR psychosis OR schizophrenia OR phobia.

Grey literature was searched via the Lens database on the 18th of December 2024. Using the Lens database for the grey literature search represented a deviation from the original protocol, necessitated by the cessation of the university's subscription to the BASE research platform during the course of the review. No date restriction was applied in any of the searches.

**Study Selection**

Search results from all databases were imported into the EndNote reference management software. Results from all databases were combined, and duplicates were removed. Study titles and abstracts were screened by the first author for eligibility. The first author retrieved and screened the full texts of the selected studies. A second reviewer (AH, trainee clinical psychologist) independently screened a randomly selected 10% of full texts ($k$ = 25). Interrater reliability between the two reviewers indicated “perfect agreement” ($\kappa$ = 1.0; Landis & Koch, 1977). Forward and backward citation searching was performed on all included studies to identify additional relevant studies. The study selection process is outlined using a PRISMA diagram (Moher et al., 2009; Figure 1) created using an R package and Shiny app (Haddaway et al., 2022).

**Data Extraction**

Data was extracted and tabulated using a custom-made spreadsheet created by the first author. Information regarding general study characteristics was extracted, including publication type, study design and setting, sample clinical features, size and mean age, percentage of female participants, ethnicity, treatment modality, delivery and duration. Study characteristics related to outcomes were also extracted, including timing and type of outcome measurement, resilience measure used, analysis and information regarding the association between baseline resilience and outcome.

**Quality Assessments**

The quality appraisal of included studies was conducted using the Quality Assessment Tool for Quantitative Studies developed by the Effective Public Health Practice Project (EPHPP; Thomas et al., 2004), a departure from the originally planned CASP checklist. This change was implemented due to the EPHPP tool's applicability to a wider range of intervention study designs and the availability of evidence supporting its psychometric properties (Deeks et al., 2003). The EPHPP tool evaluates studies based on six components: (1) selection bias, (2) study design, (3) confounders, (4) blinding, (5) data collection methods, and (6) withdrawals and drop-outs. Each of the six components is rated as strong, moderate or weak, with each study receiving an overall rating depending on the six component ratings. Studies with no weak ratings are rated strong. Studies with one weak rating are rated moderate. Those with two or more weak ratings are rated weak. The EPHPP tool includes two additional components to aid quality assessment (intervention integrity and analyses), however, these do not contribute to the overall score. The EPHPP tool was reported to have adequate content and construct validity (Thomas et al., 2004), fair inter-rater reliability in individual component scoring (ICC = 0.60) and excellent inter-rater reliability in the final grade assigned to each study (ICC = 0.77; Armijo‐Olivo et al., 2012). The first author

conducted the quality assessment. The second reviewer (AH) independently assessed a subset of studies ($k = 5$) chosen from each category of the overall rating. A Kappa coefficient of 0.8 was found between the two raters, indicating "substantial agreement" (Landis & Koch, 1977). Disagreements were discussed between the raters, and a consensus was reached on all ratings.

The certainty of evidence for the meta-analytic findings was evaluated utilising the GRADE approach (Atkins et al., 2005). The first author completed the initial ratings, which were then discussed with two research supervisors (GH, MB) to reach a consensus. The starting point of the GRADE approach is to assign an initial level of certainty based on the quality of designs across the studies included in the meta-analysis (Schünemann et al., 2024). Subsequently, the initial rating can be downgraded based on five domains: (1) risk of bias, (2) imprecision of estimates, (3) inconsistency of effects, (4) indirectness, and (5) publication bias (Al Duhailib et al., 2024). The final GRADE rating has four levels of certainty (Table 2).

**Table 2.**

*GRADE Certainty of Evidence Levels*

| Certainty | Explanation |
|---|---|
| Very low | The true effect is probably markedly different from the estimated effect |
| Low | The true effect might be markedly different from the estimated effect |
| Moderate | The authors believe that the true effect is probably close to the estimated effect |
| High | The authors have a lot of confidence that the true effect is similar to the estimated effect |

**Effect Size Extraction and Calculation**

In studies reporting a bivariate correlation coefficient between baseline resilience and treatment outcome, the effect size was directly extracted. A partial correlation coefficient was

calculated from studies that reported a standardised regression coefficient ($\beta$) and its standard error, alongside the number of predictors and observations from a regression model. If the statistics reported in the study were insufficient, the author was contacted to request the relevant data. Ten authors were contacted, and five responded with the requested data. Studies were excluded if the authors did not respond within 4 weeks of the request. For studies that reported multiple effect sizes, only one effect size was extracted according to a decision hierarchy. If a study reported multiple effect sizes due to multiple outcome measures, self-report measures were prioritised over clinician-reported outcome measures, reflecting a national emphasis on promoting patient-centred reporting of mental health issues and recovery in the UK (Slade & Longden, 2015). Problem-specific measures related to the target problem were prioritised over generic measures. When the target problem was indeterminate and a measure of depression was reported alongside measures of other mental health difficulties, the depression measure was prioritised, as this was the most commonly occurring disorder among studies. If multiple effect sizes were reported due to treatment outcomes being measured at multiple time points, the time point nearest to the end of treatment was used.

**Meta-Analytic Strategy**

Effect sizes were grouped according to whether they were reported as bivariate correlations or as regression weights (partial correlations). Two separate meta-analyses were conducted: one including studies that reported bivariate correlations, and the other including studies that reported partial correlations. As the strength of partial correlations depends on the other variables included in the regression model, they are not directly comparable to bivariate correlations (Hunter & Schmidt, 2015). Moreover, combining correlational and partial correlational effect sizes by using beta estimation procedures has been shown to introduce substantial bias in meta-analytic results (Roth et al., 2018). The interpretation of the partial

correlation meta-analysis results was contextualised in relation to the broader constructs represented by the variables that were partialled out in the regression models of the included studies (Aloe, 2014).

Therefore, the correlational meta-analysis included studies that examined the association between baseline resilience and end-of-treatment mental health outcomes. In contrast, the partial correlational meta-analysis included studies that employed linear mixed models to assess whether baseline resilience moderated the effect of the therapeutic intervention on changes in mental health symptoms from pre- to post-treatment. Here, the unique contribution of baseline resilience on treatment outcomes was extracted, while the effect of variables pertaining to baseline symptom severity was partialled out.

A random effects model was used in both meta-analyses due to clinical and methodological heterogeneity among study populations and designs (Borenstein et al., 2021). Heterogeneity was assessed using a combination of visual inspection of forest plots, quantitative analyses using the $Q$, $I^2$ and tau statistics and reporting of the prediction interval.

The $Q$ test tests the hypothesis that the true effect size varies across studies, meaning that the observed variation in effect sizes is due to both sampling error and genuine between-study heterogeneity (Borenstein, 2023). A significant result ($p < .05$) allows for the rejection of the null hypothesis that the true effect size is precisely the same in all studies. Importantly, a nonsignificant result should not be automatically interpreted as evidence of the absence of heterogeneity due to the risk of Type II error (Borenstein, 2023). This risk is further elevated in meta-analyses with few studies, where the $Q$ test has low statistical power (Paul & Donner, 1992).

The $I^2$ statistic describes the proportion of total variance attributable to between-study variability rather than sampling error (Higgins, 2003). The $I^2$ statistic does not indicate the magnitude of variation in effect size, a common misinterpretation often reinforced by the use

of terms such as “low,” “moderate,” and “high” (Borenstein, 2023). To avoid this misconception, such descriptors were not used in the present review.

Tau-squared denotes the variance of true effects, and tau is the standard deviation of true effects, with smaller values indicating less variability. While the tau statistics provide the absolute amount of dispersion of true effects, they do not provide context, and their interpretation is not intuitive (Borenstein, 2023).

To complement the reporting of heterogeneity with a more interpretable metric, the prediction interval was reported. The prediction interval estimates the range within which the true effects of future studies are expected to lie, presented on the same scale as the pooled effect size. This facilitates a clearer understanding of the potential clinical implications of heterogeneity (Borenstein, 2023).

***Meta-Analysis of Correlational Data***

The meta-analysis was conducted using the Meta-Essentials Workbook 5 (Correlational data), version 1.5 (Suurmond et al., 2017), using inverse variance weighting based on the DerSimonian and Laird (DL) method (DerSimonian & Laird, 1986) and using an adjustment based on the Hartung–Knapp–Sidik–Jonkman (HKSJ) approach (Knapp & Hartung, 2003). Fisher’s *z* transformation was applied in the calculations to approximate normality and stabilise the variance of raw correlation coefficients (Fisher, 1921). Given the small number of studies in the correlational meta-analysis ($k = 7$), the Hartung–Knapp–Sidik–Jonkman (HKSJ) approach was utilised (Knapp & Hartung, 2003). This decision was based on evidence that the DL method may produce a high false positive rate in meta-analytic results when the number of studies is small (< 20) and moderate or substantial heterogeneity is present (InHout et al., 2014). The DL method for constructing confidence intervals (CIs) assumes a normal distribution of the mean effect across studies, which can result in CIs that are too narrow and potentially biased (Schulz et al., 2022). This

bias increases as the number of studies in the analysis decreases. The HKSJ method uses alternative point and interval estimators based on the *t*-distribution with *k*-1 degrees of freedom, which was found to result in more adequate error rates and more robust CIs compared to the DL method (Borenstein et al., 2021; InHout et al., 2014).

Moderator analyses were not feasible for either meta-analysis due to limited statistical power and the associated increased risk of Type II error resulting from the small number of studies included (Deeks et al., 2024).

### *Meta-Analysis of Partial Correlational Data*

The strategy for conducting the meta-analysis of partial correlational data followed a stepwise procedure outlined by Schulz et al. (2022) for meta-analyses including two to four studies, as only three studies were available. Accordingly, the degree of statistical heterogeneity would be assessed as a first step, using the *Q* statistic to determine whether calculation of a pooled effect size would be meaningful. If the *Q* test were significant, estimation of an overall effect size would not be deemed appropriate, and a qualitative evidence synthesis based on the pattern of effect estimates would be performed (Schulz et al., 2022). If no substantial heterogeneity were found, a meta-analysis would be conducted using the Meta-Essentials Workbook 6 (Partial correlational data), version 1.5 (Suurmond et al., 2017), applying the DL method with a HKSJ adjustment (Schulz et al., 2022).

## Publication Bias

To reduce publication bias, studies were sourced from grey literature. In addition, further tests were conducted to assess the potential impact of publication bias on the findings of both meta-analyses. Publication bias was assessed through visual inspection of funnel plots, using the trim-and-fill method, and complemented by Egger's regression test. For meta-analytic results that reached statistical significance, the fail-safe *N* using the Orwin (1983) method was used to estimate the number of studies with an average effect size that

would reduce the pooled effect size to an arbitrary level. The criterion value of $r = .09$ was set as the arbitrary level, representing a negligible effect size (< .10) based on Cohen's guidelines (Cohen, 1988). It is important to note that due to the small number of studies in both meta-analyses, the statistical power of publication bias tests was limited (Sterne et al., 2011), warranting caution in their interpretation.

## Results

The initial search retrieved 7,566 results. Removing duplicates identified 5,670 studies; the titles and abstracts of these were screened. Common reasons for exclusion were studies conducted in animals, populations of children or adolescents, studies of neuropharmacology, qualitative study design, and cross-sectional studies that did not involve a psychological intervention. Two hundred and fifty-eight studies were assessed for eligibility, of which 17 met the inclusion criteria. Forward and backward citation searches identified an additional 10 studies, of which two met the inclusion criteria. Therefore, 19 studies were included. The study selection process is outlined using a PRISMA diagram (Figure 1).

### Study Characteristics

General study characteristics are described in Table 3, and outcomes in Table 4.

#### *Design and Sample Characteristics*

A total of 17 studies were published in peer-reviewed journals, one was an unpublished bachelor's dissertation, and one was an unpublished doctoral thesis. A variety of study designs were used including cohort studies ($k = 8$), secondary analyses of randomised controlled trials (RCT) ($k = 3$), non-randomized trials ($k = 2$), and one of each ($k = 1$) of the following designs: RCT, longitudinal single-group design, quasi-experimental pre-post, prospective observational study, prospective clinical pilot study, and a prospective observational study. Five studies were conducted in the USA, four in Germany, two in

Canada, two in Australia, two in Spain, and one of each in Norway, Korea, Brazil, and Lithuania. A total of 13 studies were conducted in outpatient settings, three online, two in inpatient settings, and one in the participants' own homes. The samples included participants with a variety of clinical and non-clinical features; depression ($k$ = 7), post-traumatic stress disorder (PTSD; $k$ = 2), and one of each ($k$ = 1) of obsessive-compulsive disorder (OCD), bipolar disorder, borderline personality disorder, cancer patients, university students, public safety personnel, pregnant women, and no clinical information. Two studies included "mixed" samples with a range of mental health conditions. Sample sizes ranged from 8 to 2,165 participants ($M$ = 277, $SD$ = 470.6).

***Interventions***

Cognitive-behavioural therapy (CBT) was the most studied intervention modality ($k$ = 9). Studies in inpatient settings ($k$ = 2) reported using multimodal treatments including CBT and unspecified psychotherapy combined with medical and social interventions. Five studies used interventions that combined elements of multiple modalities. Other modalities included one of each ($k$ = 1) of positive psychology intervention, dialectical behaviour therapy (DBT), clinical management with problem-solving therapy, narrative care interview, and eye movement desensitisation and reprocessing (EMDR). Interventions were delivered in an individual ($k$ = 11) and group ($k$ = 4) format, while the online interventions were self-directed ($k$ = 3). One study included a treatment comprising a single session. In the remaining 18 studies, treatment duration ranged from 1 to 24 weeks ($M$ = 9.8, $SD$ = 5.4).

***Outcomes***

Study characteristics related to outcomes are presented in Table 4. A total of 17 studies assessed the outcomes directly at the end of treatment (EoT), one at two weeks after and one at three months after treatment ended. Three studies also assessed outcomes at follow-up at three ($k$ = 1) and six ($k$ = 2) months. Resilience was measured using eight

different validated self-report measures, with the most common being the Brief Resilience Scale (BRS; Smith et al., 2008; $k = 6$) and the Resilience Scale (RS; Wagnild & Young, 1993; $k = 4$).

**Figure 1**

*PRISMA Diagram of the Study Selection Process*

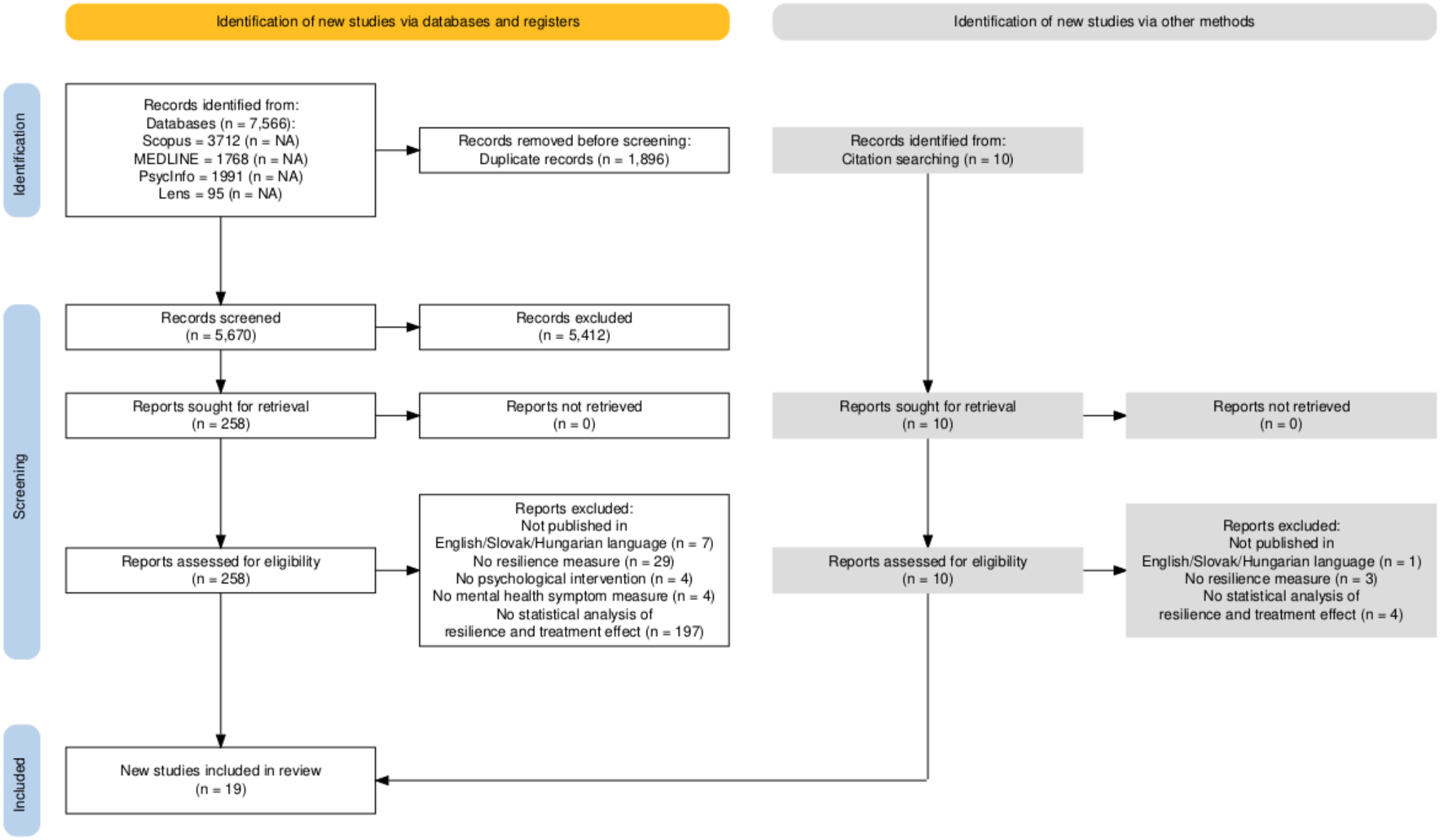


**Table 3**

*General Study Characteristics*

| Study | Publication Type | Design | Study Setting | Clinical Features | *N* Analysed (Female) | Mean Age (SD/Range) | Ethnicity | Treatment Modality & Delivery | Duration |
|---|---|---|---|---|---|---|---|---|---|
| **Bossarte et al. (2023)** | Journal article | Observational cohort study | Outpatients at Veterans Health Administration (USA) | Depression | 658 (26.8%) | 19-34 (24.3%)<br>35-49 (32.1%)<br>50-59 (23.3%)<br>60+ (20.3%) | White 65.0%<br>Black 16.0%<br>Hispanic 11.2%<br>Other 7.8% | Pharmacotherapy + unspecified psychotherapy; delivery NR | 3 months |
| **Chiang et al. (2024)** | Journal article | Retrospective cohort study | Outpatients at two bipolar disorder clinics (USA) | Bipolar disorder | 100 (58, 58%) | 31.9 (NR) | NR | Pharmacotherapy + psychotherapy (elements of CBT, IPT, MI) delivery NR | 6 weeks (1 session per week) |
| **Chilver & Gatt (2022)** | Journal article | RCT | University of New South Wales, online (Australia) | University students (no clinical info) | 326 (70%) | 19.7 (3.2) | NR | Positive psychology intervention vs. active control; self-directed online | 6 weeks |
| **Demyen (2024)** | Bachelor's dissertation | Longitudinal single-group design | Mental health research unit for public safety personnel, online (Canada) | Public safety personnel (no clinical info) | 285 (55.8%) | 43 (10.8) | White 90.5%<br>Asian 2.1%<br>Indigenous 3.2%<br>N/A 2.5% | Transdiagnostic internet-CBT; self-guided | 8 weeks |
| **Durden et al. (2023)** | Journal article | Exploratory, non-randomised, single-armed trial | Online (USA) | Convenience sample of participants recruited online | 256 (184, 72%) | 39 (13.4) | Non-Hispanic Black 22%<br>Non-Hispanic White 58%<br>Other 20% | Text-based app intervention including elements of CBT, IPT, DBT; online guided self-help | 8 weeks |
| **Guillén et al.** | Journal | Prospective | Three specialist | Borderline | 152 (not | 28.9 (9.4) | White 100% | DBT vs STEPPS vs | ~6 months |

| Study | Publication Type | Design | Study Setting | Clinical Features | *N* Analysed (Female) | Mean Age (SD/Range) | Ethnicity | Treatment Modality & Delivery | Duration |
|---|---|---|---|---|---|---|---|---|---|
| **(2021)** | article | cohort | PD services (Spain) | personality disorder | reported) | | | TAU-CBT (equal no. of sessions); individual + group | |
| **Hollister et al. (2022)** | Journal article | Non-randomized clinical trial | At participants' home (USA) | Older Adults with Depression | 85 (45, 52.94%) | 69.3 (7.4) | Native Alaskan 1.8%<br>Asian 1.8%<br>Black 0.0%<br>White 87.5%<br>More than one race 7.1%<br>N/A 1.8% | Clinical management with problem-solving therapy; individual | 12 weeks; 1 hr weekly sessions |
| **Holm et al. (2019)** | Journal article | Retrospective cohort study | OCD treatment clinic (Norway) | OCD | 89 (70.8%) | 31.7 (10.7) | NR | Bergen concentrated exposure treatment; individual treatment in a group setting (1:1 therapist to patient ratio) | 4 days of treatment + 3 weeks self-guided |
| **Ianakieva (2021)** | Doctorate thesis | Quasi-experimental (pre-post) | Outpatient hospital cancer centre (Canada) | Cancer treatment completers | 27 (44%) | 62.8 (12.3) | White 74.07%<br>African 3.70%<br>Afro-Caribbean 3.70%<br>Asian 7.41%<br>Indigenous 3.70%<br>South Asian 7.41% | Narrative care interview (appreciative inquiry approach); individual | 1 session (30 - 90 mins) |
| **Javidi et al. (2021)** | Journal article | Prospective cohort | Outpatient primary care | Depression, anxiety, | 349 (215, 61.6%) | 35.9 (13.1) | NR | CBT; NR | 12 sessions |

| Study | Publication Type | Design | Study Setting | Clinical Features | *N* Analysed (Female) | Mean Age (SD/Range) | Ethnicity | Treatment Modality & Delivery | Duration |
|---|---|---|---|---|---|---|---|---|---|
| | | | service (Australia) | PTSD, OCD, phobia | | | | | |
| **Jeon et al. (2017)** | Journal article | Prospective clinical pilot study | Outpatient psychiatric clinic (Korea) | PTSD | 8 (50%) | 28.5 (15.6) | NR | EMDR; individual | 8 sessions at 2-week intervals over 5 months |
| **Kemna et al. (2024)** | Journal article | Secondary analysis of RCT | Outpatients across seven university hospitals (Germany) | Refugees and asylum seekers with depression | 164 (58, 35%) | 29 (11) | Last residence country: Afghanistan 25% Iran 16% Syria 28% Turkey 7.2% Other 24% | Stepped care model, different intervention levels (watchful waiting; online CBT, peer-to-peer group, group CBT, pharmacological treatment, individual psychotherapy) | 12 weeks |
| **Konradt et al. (2018)** | Journal article | Secondary analysis of RCT | Outpatient (Brazil) | Depression | 68 | 24 (18-29) | NR | CBT vs narrative CT; individual | 7 sessions |
| **Marschollek & Bonnet (2021)** | Journal article | Prospective observational study | Inpatient psychiatric ward (Germany) | Depression | 60 (58.3%) | 47.3 (± 12.8) | NR | Pharmacotherapy + psychotherapy + movement & occupational approaches + social counseling + psychiatric nursing; individual + group | 5 weeks |
| **Meule et al. (2023)** | Journal article | Retrospective cohort study | Inpatient psychiatric ward | Depression | 2165 (1440, | 37.9 (18.1) | NR | CBT + pharmacotherapy; | Mean = 60 days, SD = |

| Study | Publication Type | Design | Study Setting | Clinical Features | *N* Analysed (Female) | Mean Age (SD/Range) | Ethnicity | Treatment Modality & Delivery | Duration |
|---|---|---|---|---|---|---|---|---|---|
| | | | (Germany) | | 66.5%) | | | individual + group | 32.4 |
| **Pakalniškienė et al. (2016)** | Journal article | Prospective cohort | Psychotherapy day centre (Lithuania) | Depression and anxiety | 95 (77, 81.1%) | 33.4 (10.5) | NR | Pharmacotherapy + psychotherapy + art, music and movie therapy group + relaxation group + social skills training; individual + group | 6 weeks (average 78 meetings) |
| **Polizzi et al. (2024)** | Journal article | Secondary analysis of RCT | Army medical center (USA) | Active duty army soldiers with PTSD | 268 (24) | 33.2 (7.4) | Black 28.0% Hispanic 23.1% White 40.3% Other 8.6% | Cognitive processing therapy (CPT); individual vs group | 90min group CPT or 60min individual CPT twice weekly for 6 weeks |
| **Puertas-Gonzalez et al. (2024)** | Journal article | Cohort | Outpatient health centre (Spain) | Pregnant women (no psychological disorder) | 56 (56, 100%) | 34.3 (4.5) | NR | Cognitive Behavioural Stress Management Therapy; NR | 8 weekly sessions (1.5 - 2 hr) |
| **Strupf et al. (2023)** | Journal article | Secondary analysis of RCT | Outpatient (Germany) | Refugees and asylum seekers with depression | 77 (35) | 32.6 (9.1) | NR | Culturally adapted CBT group | 16 sessions over 12 weeks |

*Note.* EoT = end of treatment; SD = standard deviation; NR = not reported; RCT = randomised controlled trial; CBT = cognitive behavioural therapy; PTSD = post-traumatic stress disorder, OCD = obsessive-compulsive disorder; BPD = borderline personality disorder

**Table 4**

*Study Characteristics Related to Outcomes*

| Study | Timing of Outcome Measurement | Resilience Measure | Outcome Measure | Analysis | Outcomes |
|---|---|---|---|---|---|
| **Bossarte et al. (2023)** | EoT | A summary measure of resilience comprising various scales | Depression (QIDS-SR) | Machine learning, Receiver Operator Characteristics (ROC) – Area Under Curve (AUC) | Patients classified as responders or non-responders. The prediction model had a test sample (AUC-ROC = .657, SE = .042). Most important predictor clusters: episode characteristics, personality/psychological resilience, recent stressors, treatment characteristics. The second most important predictor cluster included 21 interrelated predictors in the personality, cognition & resilience domains. These predictors had a 5.2 % aggregate mean absolute SHAP value (32 % of the total); associated with increased probability of treatment response. Within this cluster, resilience was positively associated with treatment response. |
| **Chiang et al. (2024)** | EoT | RBD | Depression + mania (ASRS) | Multilevel modeling | Higher BL resilience associated with greater difference in depression trajectory during treatment. For every point increase in resilience, depression decreased by −0.25 (SE = 0.05, $p < .0001$). BL resilience not associated with changes in mania (estimate = –0.03, SE = 0.04, $p = .50$). |
| **Chilver & Gatt (2022)** | EoT | RRC-ARM | Depression (DASS-21) | Linear mixed model | BL resilience did not moderate the effect of intervention on reductions in depression symptoms: $\beta = 0.17$, SE ($\beta$) = 0.10. 7 predictors, 326 observations. |
| **Demyen (2024)** | EoT | BRS | Depression (PHQ-9) Anxiety (GAD-7) PTSD (PCL-5) | Multiple regression | Overall regression model (mental health usage, treatment credibility, engagement, BL resilience) was significant for the PHQ-9 [$F(4, 143) = 5.388$, $p < .001$, $R^2 = .131$], and PCL-5 [$F(4, 141) = 3.168$, $p = .016$, $R^2 = .082$], and not significant for GAD-7 [$F(4, 143) = 2.419$, $p = .051$, $R^2 = .063$]. Significant negative association between BL resilience and residual change scores on PHQ-9 ($r = –.335$, $p < .001$) and PCL-5 ($r = –.270$, $p < .001$). |

| Study | Timing of Outcome Measurement | Resilience Measure | Outcome Measure | Analysis | Outcomes |
|---|---|---|---|---|---|
| **Durden et al. (2023)** | EoT | BRS | Stress (PSS) | Multiple linear regression | Stepwise linear regression model estimated with variables of age, sexual orientation, education level, health insurance, BL stress, BL burnout, BL resilience, concurrent mental health treatment [$F(13, 201) = 11.32$, $p < .001$, $R^2 = 39\%$]. Normal BL levels of resilience predicted significantly higher decrease in EoT stress compared to low resilience (low BL resilience = reference level; normal BL resilience: estimate = –2.8, 95% CI [–4.4, –1.2], $p < .001$. High BL resilience did not significantly predict change in stress compared to low BL resilience: high BL res: estimate = –0.53, 95% CI [–3.5, 2.4], $p = .7$. |
| **Guillén et al. (2021)** | EoT | RS-15 | Quality of Life Index (QLI), Depression (BDI-II) | Pearson's correlation | BL resilience moderately and positively correlated with QoL post-treatment ($r = .38$, $p < .001$) and moderately and negatively correlated with depression severity ($r = –.45$, $p < .001$). |
| **Hollister, et al. (2022)** | EoT | RS-14 | Depression (HAM-D) | Mixed effects linear regression with random intercepts and slopes | BL resilience not significantly associated with changes in depression: Estimate = 0.022, 95% CI [–0.058, –0.102], $p = .59$. $\beta = 0.15$, SE ($\beta$) = 0.27. 10 predictors, 383 observations. |
| **Holm et al. (2019)** | 1 week after 4-day treatment + FU at 3 months | DRS-15-R | OCD (Y-BOCS) | Pearson's correlation | Logistic regression (predictors: age, gender, BL OCD, and BL resilience) for remission at EoT was not significant, $\chi^2$ (4, $N = 89$) = 5.08, $p = .28$. BL resilience was not significantly related to remission (B = 0.05; SE B = 0.04, eB = 1.05, $p = .26$).<br><br>Logistic regression (predictors: age, gender, BL OCD, and BL resilience) for remission at FU was significant, $\chi^2$ (4, $N = 89$) = 10.45, $p < .05$. BL resilience significantly related to remission at FU (B = 0.11, SE B = 0.04, eB = 1.11, $p = .01$).<br><br>Pearson's correlation of BL resilience and EoT OCD severity was not significant ($r = –.18$, $p = .09$), while BL resilience and FU OCD |

| Study | Timing of Outcome Measurement | Resilience Measure | Outcome Measure | Analysis | Outcomes |
|---|---|---|---|---|---|
| | | | | | significant ($r$ = –.32, $p$ < .01). |
| **Ianakieva (2021)** | 2 weeks post-interventio n | BRS | Depression (PHQ-9), Anxiety (GAD-7) | Spearman's correlation (for non-normal data) | Spearman's correlation for BL resilience and EoT anxiety significant ($\rho$ = –.49, $p$ < .05), and EoT depression significant ($\rho$ = –.57, $p$ < .05). |
| **Javidi et al. (2021)** | EoT | CD-RISC-25 | Psychological Distress (K10) | AUC | AUCs significant for BL resilience and EoT distress: AUC = .68, $p$ < .001, SE = .028, 95% CI [.624, .735]. Cut points, sensitivities, and specificities are not provided as no stable, unique figures could be identified. |
| **Jeon et al. (2017)** | 3-months after EoT | CD-RISC-25 | PTSD (CAPS) | Spearman’s correlation | Higher BL resilience scores correlated with significant reduction in PTSD ($\rho$ = .91, $p$ = .002). |
| **Kemna et al. (2024)** | EoT | BRS | Depression (MADRS) | Pearson's correlation | Pearson's correlation of BL resilience and EoT MADRS ($r$ = –.34). |
| **Konradt et al. (2018)** | EoT + FU at 6 months | RS-25 | Depression (HAM-D) Anxiety (HAM-A) | Pearson's correlation | BL resilience negatively correlated with depression severity at EoT ($r$ = –.30, $p$ = .015), and FU ($r$ = –.35, $p$ = .005). BL resilience negatively correlated with anxiety severity at EoT ($r$ = –.29, $p$ = .016). |
| **Marscholl ek & Bonnet (2021)** | EoT (7 days pre-discharge) | RS-11 | Depression (BDI-FS) | Multiple regression, mediation analysis to assess predictors | BL resilience negatively predicted treatment success: $b$ = −0.09; 95% CI [−0.17, −0.02], $p$ = .02. When controlling for BL depression severity, resilience was no longer significant: $b$ = 0.07, 95% CI [−0.02, 0.15], $p$ = .15. Mediation analysis showed that the effect of BL resilience on the treatment success was completely mediated by BL depression severity. Low BL resilience associated with high BL depression which predicted a positive treatment success. High BL resilience associated with low BL depression which predicted no relevant/negative treatment success. |
| **Meule et al. (2023)** | EoT (at discharge) | BRS | Depression (PHQ–9) | Cross-lagged panel model to examine the predictive | Higher BL res predicted larger decreases in EoT depressive symptoms (standardised estimate = –.09, $p$ < .001). |

| Study | Timing of Outcome Measurement | Resilience Measure | Outcome Measure | Analysis | Outcomes |
|---|---|---|---|---|---|
| | | | | effects of BL resilience | |
| **Pakalniški enė et al. (2016)** | EoT + FU at 6 months | RSA | Psychological distress (CORE-OM) | Cross-lagged panel model | BL resilience did not predict symptoms after treatment (estimate = –.12, nonsignificant) and FU (estimate = –.03, nonsignificant). |
| **Polizzi et al. (2024)** | EoT | RSES | PTSD (PSS-I, PCL‑S) | Pearson's correlation | Pearson's correlation was not significant for BL RSES and EoT PCL-S ($r$ = −.003, $p$ = .97). |
| **Puertas-Gonzalez et al. (2024)** | EoT | CD-RISC-10 | Stress (PSS) | Linear mixed model | Significant group (low vs high resilience) x time interaction regarding EoT stress [$F$(1, 54) = 5.19, $p$ = .026]. Low resilience group had significant reductions in EoT stress ($p$ = .002; $d$ = 0.72), no significant differences for high resilience group ($p$ = .791; $d$ = 0.06). $\beta$ = 4.99; SE ($\beta$) = 2.19; 3 predictors, 112 observations. |
| **Strupf et al. (2023)** | EoT | BRS | Depression (PHQ-9) | Bivariate regression | BL resilience not a significant predictor for PHQ-9 change: $b$ = –0.72, 95% CI [–2.14, 0.70], $\beta$ = –0.12; SE ($\beta$ ) = 0.71; $p$ = .31. |

*Note.* Resilience measures: RBD = Resilience Questionnaire for Bipolar Disorder (Echezarraga et al., 2017); RRC-ARM = Resilience Research Centre Adult Resilience Measure (Liebenberg & Moore, 2018); BRS = Brief Resilience Scale (Smith et al., 2008); RS-(25, 15, 14, 11) = Resilience Scale (25-, 15-, 14-, and 11-item version; Wagnild & Young, 1993); DRS-15-R = Dispositional Resilience Scale 15-Revised (Hystad et al., 2010); CD-RISC-25 = Connor-Davidson Resilience Scale, 25-item version (Connor & Davidson, 2003); CD-RISC-10 = Connor-Davidson Resilience Scale, 10-item version (Campbell-Sills & Stein, 2007); RSA = Resilience Scale for Adults (Friborg et al., 2003); RSES = Response to Stressful Experiences Scale (Johnson et al., 2011).

Outcome measures: QIDS-SR = Quick Inventory of Depression Symptomology Self-Report (Rush et al., 2003); ASRS = Affective Self Rating Scale (Adler & Brodin, 2011); DASS-21 = 21-item version Depression Anxiety Stress Scale (Crawford & Henry, 2003); PHQ-9 = Patient Health Questionnaire-9 (Kroenke et al., 2001); GAD-7 = General

Anxiety Disorder-7 (Spitzer et al., 2006); PCL-5 = Posttraumatic Stress Disorder Checklist for DSM-5 (Blevins et al., 2015); PCL‑S = PTSD Checklist – Specific (Wilkins et al., 2011); PSS = Perceived Stress Scale (Cohen et al., 1983); BDI-FS, BDI-II = Beck Depression Inventory: Fast Screen (Kliem et al., 2014) and II version (Beck et al., 1996); QLI = Quality of Life Index - Spanish version (Mezzich et al., 2000); HAM-D = Hamilton Depression Rating Scale (Hamilton, 1967); HAM-A = Hamilton Anxiety Rating Scale (Hamilton, 1959); Y-BOCS = Yale–Brown Obsessive Compulsive Scale (Goodman et al., 1989); K10 = Kessler Psychological Distress Scale (Kessler et al., 2003); CAPS = Clinician-Administered PTSD Scale for DSM-5 (Blake et al., 1995); MADRS = Montgomery-Asberg Depression Rating Scale (Montgomery & Åsberg, 1979); CORE-OM = Clinical Outcomes in Routine Evaluation – Outcome Measure (Evans et al., 2002).

Other: EoT = end of treatment; BL = baseline; FU = follow-up; TAU = treatment as usual; ITT = intention-to-treat analysis

**Quality Appraisal and GRADE Assessments**

The quality appraisal of the included studies is reported in Appendix C. Two studies were rated strong, five studies were rated moderate, and 12 studies were rated weak.

All studies used validated outcome measures, scoring strongly on this component. Five studies used data from a randomised controlled design (rated as strong), while the design of the remaining 14 studies was rated as moderate. Most studies ($k$ = 12) recruited participants via clinic referrals, resulting in a moderate rating for selection bias. Selection bias was rated as weak for the remaining studies due to convenience sampling and lack of reporting.

A total of 13 studies scored weak for blinding, mostly due to insufficient reporting. The rating of confounders was mixed; six studies received a strong rating as they reported controlling confounders through design features or analytic procedures. Four studies were rated as moderate and nine as weak due to a lack of reporting on confounders. The reporting of withdrawals and drop-outs was mostly adequate, with high retention rates resulting in strong ($k$ = 5) and moderate ($k$ = 2) ratings, however, 10 studies were rated weak due to a high dropout rate.

The initial GRADE rating was assigned as “high” for both meta-analyses, as both contained a mixture of study designs, including RCTs and cohort studies. This grading was aligned with Cochrane recommendations stating that when using the GRADE approach in combination with a quality appraisal tool that covers risk of bias due to lack of randomisation, all studies may start as high certainty of evidence (Schünemann et al., 2018). Both meta-analyses were downgraded by one level due to limitations related to risk of bias, as over half of the studies included in both analyses received an overall weak quality appraisal rating. Further changes to grading based on imprecision, inconsistency, indirectness,

and publication bias are outlined alongside the results for each meta-analysis below. Tables describing GRADE ratings for all domains can be found in Appendix D.

## Meta-Analysis

### *Meta-Analysis of Correlational Data*

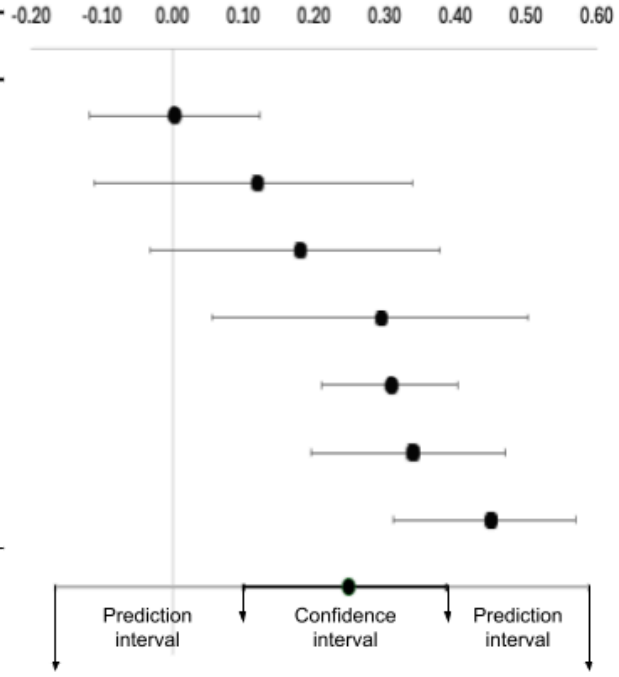
Seven studies comprising data from $N = 1{,}167$ participants provided data for the meta-analysis of correlational data quantifying the association between baseline resilience and treatment outcomes. The forest plot displaying this association is presented in Figure 2, with individual studies ordered according to increasing effect size. A pooled effect was calculated using the DL method with a HKSJ adjustment. This produced a significant, small, pooled effect size of $r = .25$, 95% CI [.10, .39], $p < .001$, GRADE = moderate (no imprecision downgrading; Appendix D1). The results denoted a significant association between baseline resilience and treatment outcomes, meaning that higher baseline resilience levels were linked to better outcomes of psychological interventions.

The $Q$ test was significant, $Q_{total}\,(6) = 29.67$, $p < .001$, indicating the presence of true, between-study heterogeneity. The $I^2 = 79.78\%$ statistic estimated that 79.78% of the observed variance in studies was due to variance in true effects. The tau-squared statistic was 0.03, reflecting the variance of true effects, and Tau was 0.16, reflecting the standard deviation (SD) of true effects. The 95% prediction interval reports how much the true effects vary and over what specific interval; these values were [–.17, .59]. This means that in 95% of populations comparable to those in this meta-analysis, the true association between baseline resilience and treatment outcomes would fall in the range of –.17 and .59. GRADE was downgraded by one level to low, due to unexplained heterogeneity (Appendix D1).

**Figure 2.**

*Forest Plot for Correlational Meta-Analysis of Resilience and Treatment Outcomes*

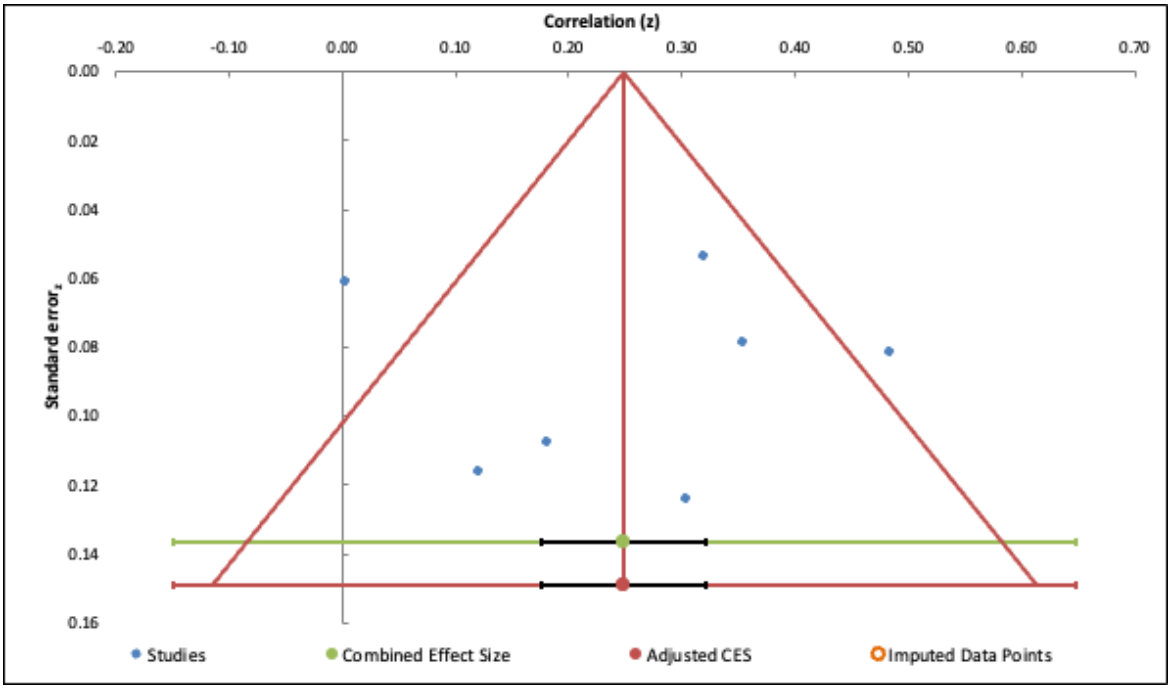
| Study | *r* | 95% CI |
|---|---|---|
| Polizzi et al. (2024) | .003 | [–.12, .12] |
| Strupf et al. (2023) | .12 | [–.11, .34] |
| Holm et al. (2019) | .18 | [–.03, .38] |
| Konradt et al. (2018) | .30 | [.06, .50] |
| Javidi et al. (2021) | .31 | [.21, .40] |
| Kemna et al. (2024) | .34 | [.20, .47] |
| Guillen et al. (2021) | .45 | [.31, .57] |
| **Combined effect size** | **.25** | **[.10, .39]** |




**Publication Bias.** Visual inspection of the funnel plot suggested slight asymmetry and therefore risk of publication bias (Figure 3); however, Egger's regression was nonsignificant ($t = 0.14$, $p = .89$), and the trim-and-fill method did not yield any imputed data points. Fail-safe *N* analysis using the Orwin (1983) method found that 13 studies with null results would be needed to reduce the pooled effect size to an arbitrary level of $r = .09$, denoting a negligible effect size. However, these results need to be interpreted in the context of the small number of studies and unexplained heterogeneity found in this meta-analysis. Sterne et al. (2011) recommend a minimum of 10 studies to achieve sufficient power for meaningful tests of funnel plot asymmetry. These limitations indicate that the presence of publication bias cannot be ruled out, resulting in a downgrading of the GRADE rating by one level to "very low" (Appendix D1).

**Figure 3.**

*A Funnel Plot of the Correlational Meta-Analysis Employing the Trim-and-Fill Method*




### *Meta-Analysis of Partial Correlational Data*

Three studies comprising data from $N = 467$ participants provided data for the meta-analysis of partial correlational data. Studies included in this meta-analysis used linear mixed models to investigate the association between baseline resilience and treatment outcomes, examining whether the baseline resilience level moderated the effect of the intervention on changes in mental health symptoms over time. For the quantitative synthesis, partial correlation coefficients were extracted from these studies to quantify the unique contribution of baseline resilience to outcomes after partialling out the effect of variables pertaining to baseline symptom severity. Following the procedure proposed by Schulz et al. (2022), the $Q$ test was used to assess statistical heterogeneity as the first step. The $Q$ test was nonsignificant, $Q_{total}$ (2) = 3.18, $p$ = .20, indicating that a calculation of a pooled effect was meaningful. Next, a pooled effect was calculated using the DL method with a HKSJ

adjustment. This method produced a nonsignificant, small, pooled effect size of $r_p = –.09$, 95% CI [–.30, .12], $p = .06$.

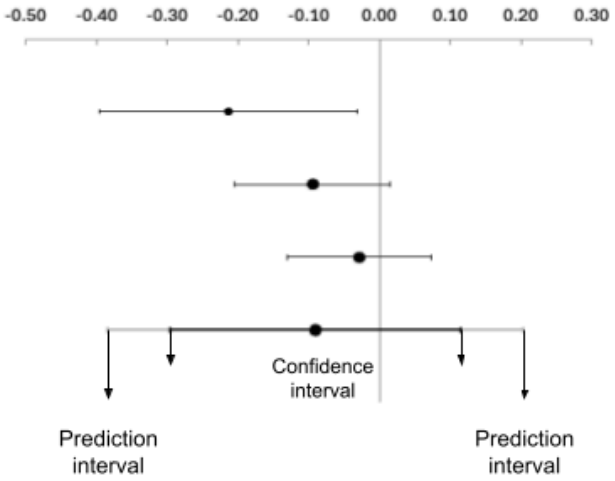
The final results of the meta-analysis of partial correlational data from $N = 467$ participants across three studies are displayed in Figure 4. The association between baseline resilience and treatment outcomes was nonsignificant, $r_p = –.09$, 95% CI [–.30, .12], $p = .06$, GRADE = low (imprecision downgrading by one level; Appendix D2). The confidence interval included zero, indicating imprecision and no clear evidence for a specific direction (positive or negative) of the association.

The $Q$ test was nonsignificant $Q_{total}$ (2) = 3.18, $p = .20$; however, considering the small number of studies ($k = 3$) that exhibited methodological and clinical heterogeneity, this result could be due to the low power of the test, resulting in a type II error. This means that we cannot rule out the existence of true between-study heterogeneity. The $I^2 = 37.13\%$ statistic estimated that 37.13% of the observed variance in studies was due to variance in true effects. The tau-squared statistic was < 0.001, reflecting the variance of true effects, and Tau was 0.05, reflecting the SD of true effects. The 95% prediction interval reports how much the true effects vary and over what specific interval; these values were [–.38, .20]. This means that in 95% of populations comparable to those in this meta-analysis, the true association between baseline resilience and treatment outcomes would fall in the range of –.38 and .20. However, as the accuracy of the heterogeneity statistics increases with an increasing number of studies in the meta-analysis, the present results might contain a significant degree of inaccuracy and therefore have to be interpreted with caution. Therefore, the GRADE rating was downgraded by one level to “very low” (Appendix D2).

**Figure 4.**

*Forest Plot for Partial Correlational Meta-Analysis of Resilience and Treatment Outcomes*

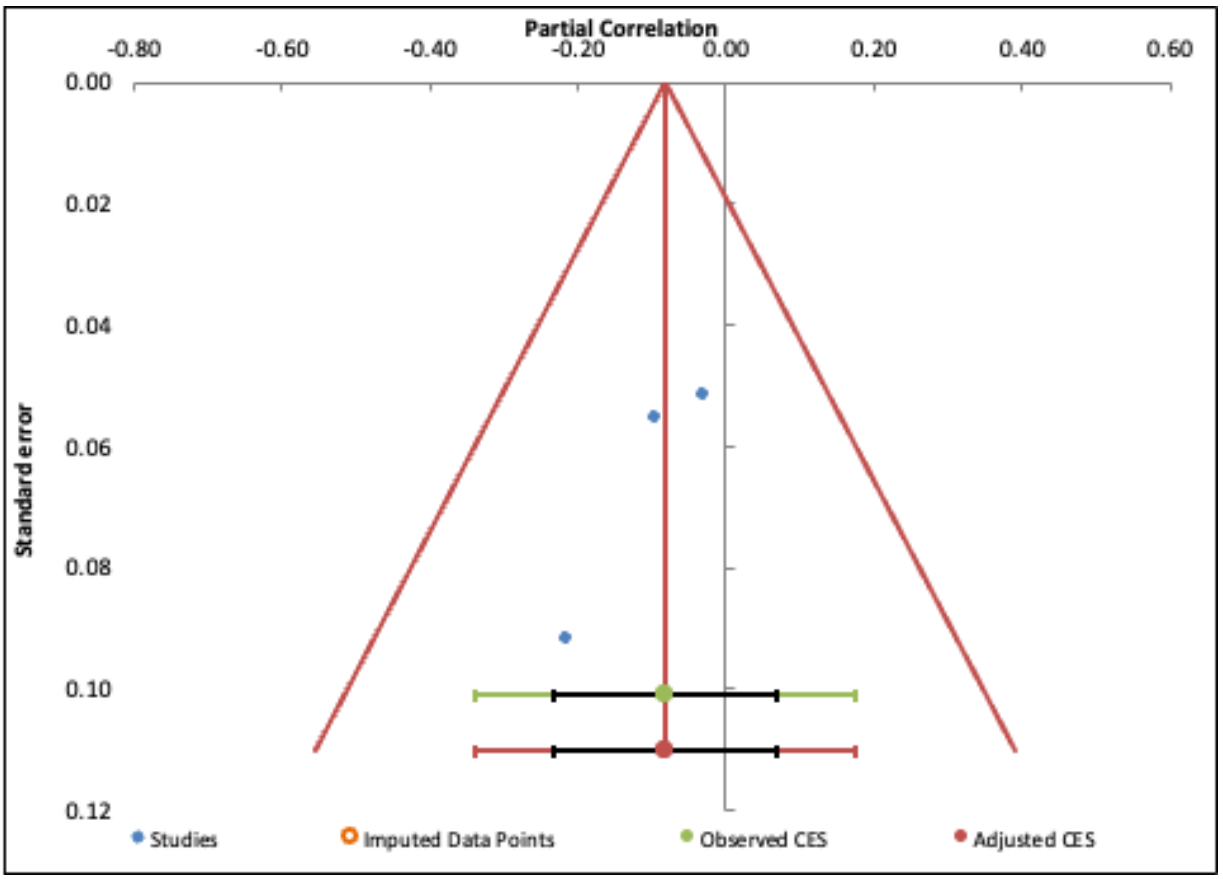
| Study | $r_p$ | 95% CI |
|---|---|---|
| Puertas-Gonzales et al. (2024) | –.21 | [–.40, –.03] |
| Chilver & Gatt (2022) | –.09 | [–.20, .01] |
| Hollister et al. (2022) | –.03 | [–.13, .07] |
| **Combined effect size** | **–.09** | **[–.30, .12]** |




**Publication Bias.** Visual inspection of the funnel plot suggested slight asymmetry and therefore risk of publication bias (Figure 5); however, Egger's regression was nonsignificant ($t = –2.49$, $p = .24$), and the trim-and-fill method did not yield any imputed data points. Fail-safe *N* analysis was not employed as the meta-analytic findings were nonsignificant. These results need to be interpreted in the context of a small number of studies included in the analysis, as a minimum of 10 studies is recommended for a meaningful assessment of publication bias (Sterne et al., 2011). The potential for publication bias, indicated by these limitations, could not be ruled out. Although publication bias warrants a downgrading in the GRADE assessment, the certainty was already rated "very low," precluding a meaningful further reduction (Appendix D2).

**Figure 5.**

*A Funnel Plot of the Partial Correlational Meta-Analysis Employing the Trim-and-Fill Method*




## Discussion

The present systematic review and meta-analysis synthesised findings from published and unpublished studies assessing the relationship between pre-treatment (baseline) resilience and the outcomes of psychological interventions. Nineteen studies met the inclusion criteria, most of which employed cohort designs. The studies investigated a range of mental health conditions, with depression being the most frequently represented. A variety of psychological interventions were included, most commonly CBT. Ten studies provided sufficient data for quantitative synthesis. Two separate meta-analyses were conducted to accommodate studies reporting either (1) bivariate correlations or (2) partial correlations, thereby ensuring appropriate synthesis based on the type of data reported. The meta-analysis of correlational effect sizes comprised seven studies and yielded a statistically significant, small pooled effect size ($r$ = .25) for the association between baseline resilience and treatment outcomes,

indicating that higher baseline resilience was associated with better treatment outcomes. In contrast, the meta-analysis synthesising partial correlational effect sizes and comprising three studies found a nonsignificant association ($r_p = –.09$).

The discrepancy between the findings of the two meta-analyses is most plausibly explained by two principal reasons. First, the partial-correlational meta-analysis was likely underpowered due to the small number of included studies. This limits the interpretation of the nonsignificant finding, suggesting a true association may exist but went undetected. A second possible explanation may lie in the methodological differences between the analytical approaches employed in the primary studies. The correlational meta-analysis quantified the simple association between baseline resilience and treatment outcomes, without accounting for confounding variables, notably baseline symptom severity. By contrast, the partial correlational meta-analysis comprised studies that used linear mixed models to assess longitudinal change, a method that employed the statistical control of baseline symptom severity. Consequently, the significant finding in the correlational meta-analysis may reflect the influence of the baseline relationship between resilience and symptom severity, given that individuals with higher resilience often present with lower symptom levels at the outset. This interpretation aligns with findings from a meta-analysis by Bartholomew et al. (2020), who reported a moderate negative association between resilience and psychological distress at baseline. However, pinpointing the exact reasons for the nonsignificant partial correlation meta-analysis findings warrants further research. Nevertheless, given the overall GRADE rating of “very low” certainty for both meta-analyses, these findings must be interpreted with caution.

Substantial heterogeneity was observed in the correlational meta-analysis, as reflected in a wide 95% prediction interval [–.17, .59], ranging from no effect to a large effect, indicating considerable between-study variability. Notably, the prediction interval included

zero, suggesting that the association between baseline resilience and treatment outcomes may differ across settings, with resilience potentially linked to both better and worse outcomes depending on contextual factors. Considerable heterogeneity was anticipated, given the diversity of clinical populations, intervention types, and methodological approaches represented in the included studies. In the partial correlational meta-analysis, statistical tests for heterogeneity were non-significant; however, given the small sample size and limited power, substantial heterogeneity remained plausible. This was supported by a similarly wide 95% prediction interval [–.38, .20], ranging from no effect to a moderate effect, which included zero. This is consistent with the diversity observed across the included studies, as in the correlational meta-analysis. Ideally, the observed variability in both meta-analyses would be explored through moderator analysis. However, this was not feasible given the limited number of studies, resulting in inadequate power to detect meaningful subgroup differences.

**Strengths and Limitations**

The present review is the first systematic review and meta-analysis investigating the association between baseline resilience and treatment outcomes. A strength of the present review lies in its adherence to current best-practice guidelines for conducting systematic reviews of quantitative studies. Transparency was ensured through the preregistration of a review protocol, which was followed throughout the review, with all deviations documented and explained. Multiple databases, grey literature, backward and forward searches were completed, aiming to mitigate the impact of publication bias. The risk of bias assessment was conducted using a validated tool (EPHPP; Thomas et al., 2004), enhancing the transparency and consistency of the process and enabling a comprehensive evaluation across diverse study designs.

The present review's methodological strength was enhanced by employing meta-analytic techniques. Acknowledging the limitation of a small number of included

studies, statistical synthesis was nevertheless crucial. Borenstein et al. (2021) highlight that in the absence of quantitative synthesis, readers are prone to forming intuitive, ad hoc conclusions (e.g., through vote counting), which elevates the risk of misinterpreting the underlying data. Consequently, despite the non-ideal sample size, meta-analytic methodology was chosen as the most robust approach available, prioritising transparency, replicability, and consistency. Moreover, application of the Hartung–Knapp–Sidik–Jonkman adjustment (Knapp & Hartung, 2003) aimed to address some of the challenges inherent in meta-analyses based on a limited number of studies, particularly the increased risk of false positive results. Heterogeneity was contextualised using the prediction interval, which enhances the interpretability of the findings. By estimating the range within which the true effects of future studies are likely to fall, and reporting this on the same scale as the pooled effect size, the prediction interval facilitates a clearer understanding of the potential clinical implications of heterogeneity. Finally, applying the GRADE approach to assess the certainty of evidence for each meta-analysis enabled a systematic methodological evaluation across five key domains: risk of bias, imprecision of estimates, inconsistency of effects, indirectness, and publication bias. This structured assessment strengthens the transparency and credibility of the conclusions by providing a clear rationale for the overall confidence placed in the findings.

The scope of the present review was notably limited by the fact that 9 of the 19 included studies did not report sufficient statistical data for effect size calculation, potentially omitting valuable findings from the synthesis. Although the absence of this information likely arose because the association between baseline resilience and treatment outcomes was not the primary aim of most original studies, the consistent reporting of data essential for effect size calculation in future research would greatly enhance the power of subsequent meta-analyses and represents a relatively minor demand on researchers. To this end, it is recommended that reports of regression analyses routinely provide one of the following: (a) the partial

correlation coefficient and its standard error; (b) the standardised beta coefficient and its standard error; or (c) the t-value for the predictor, along with the number of predictors and observations in the regression model.

The small number of studies incorporated into the present meta-analyses limited the statistical power needed to conduct moderator analyses. Consequently, a systematic investigation into the sources of the observed heterogeneity was precluded. For instance, it was not feasible to investigate whether clinical features, including mental health condition type or treatment type, moderated the relationship between baseline resilience and outcomes. Moreover, this low power impacts the interpretation of the publication bias tests. Specifically, while Egger's regression and the trim-and-fill analysis did not yield statistically significant results in either meta-analysis, the lack of power means that publication bias cannot be definitively excluded as a potential influence on the overall findings.

A further limitation of the meta-analyses in the present review concerned the methodological quality (i.e. risk of bias) within the included studies. In the correlational meta-analysis comprising seven studies, two were rated as strong (low risk of bias), two as moderate (moderate risk of bias), and three as weak (high risk of bias). The partial correlational meta-analysis, comprising three studies, included one rated as moderate (moderate risk of bias) and two as weak (high risk of bias). The potential impact of this heterogeneity in methodological quality was compounded by the inability to explore whether risk of bias moderated the observed associations. Collectively, these methodological shortcomings resulted in a "very low" GRADE certainty rating for the evidence from both meta-analyses, underscoring the need for caution when interpreting the pooled effect estimates.

**Clinical and Research Implications**

Understanding the predictive role of pre-treatment resilience in psychological treatment outcomes was the central aim of this review. Resilience is conceptualised as having both trait-like and state-like components; for instance, a meta-analysis by Bartholomew et al. (2022) recently highlighted that psychological treatment can lead to increases in participants' state-like resilience. In contrast, the present review specifically investigated the trait-like aspect of resilience, aiming to determine if a single pre-treatment assessment could inform personalised treatment decisions. Discovering a significant association would be valuable for tailoring interventions, allowing baseline resilience to be integrated into comprehensive individual strengths and deficits profiles (Zilcha-Mano, 2021) and thus identifying potential intervention targets.

The correlational meta-analysis revealed a significant association between baseline resilience and treatment outcomes, offering preliminary evidence that baseline resilience may be a predictor of intervention success. While the partial correlational meta-analysis did not find a significant association, this meta-analysis was constrained by the small number of included studies, which limited the statistical power to detect a true effect. Nevertheless, given the "low certainty" GRADE rating for both meta-analyses, their findings are preliminary and do not provide sufficient evidence to inform clinical decisions. A conclusive understanding of the association between baseline resilience and treatment outcomes will therefore require further research.

To further elucidate this association, future research could pursue two main avenues: dedicated studies specifically designed to assess the predictive utility of resilience for treatment outcomes, or the inclusion of resilience as a secondary predictor in broader treatment efficacy research, which may offer a more economical approach. Building on such primary evidence, future systematic reviews could examine whether the type of resilience measure used moderates the association between pre-treatment resilience and treatment

outcomes. This is pertinent because, as Fisher and Law (2021) observed, existing resilience measures contain disparate content reflecting qualitatively different conceptualisations of the construct. They proposed an organising framework that categorises resilience measures based on whether they conceptualise resilience as: (1) an attribute/resource, (2) a process, or (3) an outcome, advocating for researchers to align measure selection with research aims. Applying this framework in future reviews is crucial because using a measure inconsistent with the research question, for instance, assessing resilience as an outcome at pre-treatment, may not accurately capture true baseline capacity, potentially distorting the observed association with treatment outcomes. Consequently, applying this framework could clarify whether specific conceptualisations of resilience are differentially linked to treatment response.

## Conclusion

The present systematic review and meta-analysis investigated the association between pre-treatment resilience and psychological intervention outcomes, synthesising evidence from 19 studies. Quantitative synthesis was possible for 10 studies, leading to two separate meta-analyses. The meta-analysis of simple correlation coefficients from seven studies indicated a small, significant, positive association ($r$ = .25), suggesting that higher baseline resilience was linked to better outcomes. In contrast, the meta-analysis pooling partial correlation coefficients from three studies found a nonsignificant association ($r_p$ = –.09). The partial correlational finding must be interpreted cautiously due to limited statistical power. Beyond this limitation, the divergent findings may also reflect the variation in how baseline characteristics were handled across the analyses, as the relationship between baseline resilience and symptom severity can impact the association with treatment outcomes. Both meta-analyses yielded "very low" certainty evidence (GRADE) due to significant methodological shortcomings, rendering these preliminary findings insufficient to inform clinical decisions. To conclusively clarify the role of resilience, future research needs

well-powered primary studies and systematic reviews that explore moderators, including different operationalisations of resilience. Overall, the current evidence suggests a potential link but is highly limited and uncertain, requiring substantial further research for a definitive determination of the prognostic value of resilience.

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# Appendices

## Appendix A

## PRISMA 2020 Checklist

| Section and Topic | Item # | Checklist item | Location where item is reported |
|---|---|---|---|
| **TITLE** | | | |
| Title | 1 | Identify the report as a systematic review. | x |
| **ABSTRACT** | | | |
| Abstract | 2 | See the PRISMA 2020 for Abstracts checklist. | x |
| **INTRODUCTION** | | | |
| Rationale | 3 | Describe the rationale for the review in the context of existing knowledge. | x |
| Objectives | 4 | Provide an explicit statement of the objective(s) or question(s) the review addresses. | x |
| **METHODS** | | | |
| Eligibility criteria | 5 | Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses. | x |
| Information sources | 6 | Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted. | x |
| Search strategy | 7 | Present the full search strategies for all databases, registers and websites, including any filters and limits used. | x |
| Selection process | 8 | Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process. | x |
| Data collection process | 9 | Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process. | x |
| Data items | 10a | List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect. | x |
| | 10b | List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information. | x |
| Study risk of bias assessment | 11 | Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process. | x |
| Effect measures | 12 | Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results. | x |
| Synthesis methods | 13a | Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)). | x |
| | 13b | Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions. | x |
| | 13c | Describe any methods used to tabulate or visually display results of individual studies and syntheses. | x |

| Section and Topic | Item # | Checklist item | Location where item is reported |
|---|---|---|---|
| | 13d | Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used. | x |
| | 13e | Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression). | x |
| | 13f | Describe any sensitivity analyses conducted to assess robustness of the synthesized results. | x |
| Reporting bias assessment | 14 | Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases). | x |
| Certainty assessment | 15 | Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome. | x |
| **RESULTS** | | | |
| Study selection | 16a | Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram. | x |
| | 16b | Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded. | x |
| Study characteristics | 17 | Cite each included study and present its characteristics. | x |
| Risk of bias in studies | 18 | Present assessments of risk of bias for each included study. | x |
| Results of individual studies | 19 | For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots. | x |
| Results of syntheses | 20a | For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies. | x |
| | 20b | Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect. | x |
| | 20c | Present results of all investigations of possible causes of heterogeneity among study results. | x |
| | 20d | Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results. | x |
| Reporting biases | 21 | Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed. | x |
| Certainty of evidence | 22 | Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed. | x |
| **DISCUSSION** | | | |
| Discussion | 23a | Provide a general interpretation of the results in the context of other evidence. | x |
| | 23b | Discuss any limitations of the evidence included in the review. | x |
| | 23c | Discuss any limitations of the review processes used. | x |
| | 23d | Discuss implications of the results for practice, policy, and future research. | x |
| **OTHER INFORMATION** | | | |

| Section and Topic | Item # | Checklist item | Location where item is reported |
|---|---|---|---|
| Registration and protocol | 24a | Provide registration information for the review, including register name and registration number, or state that the review was not registered. | x |
| | 24b | Indicate where the review protocol can be accessed, or state that a protocol was not prepared. | x |
| | 24c | Describe and explain any amendments to information provided at registration or in the protocol. | x |
| Support | 25 | Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review. | x |
| Competing interests | 26 | Declare any competing interests of review authors. | x |
| Availability of data, code and other materials | 27 | Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review. | x |

## Appendix B

## Search Strategy

Scopus and Lens:

[Article title/abstract/keywords]: resilien*

[Article title/abstract/keywords]: AND: “psycho* therap*” OR “psycholog* intervention*” OR psychotherap* OR treatment OR therap* OR (cognit* W/2 therap*) OR “cognit* behav*” OR counselling OR psychodynamic

[Article title/abstract/keywords]: AND: outcome* OR predict* OR response

[Article title/abstract/keywords]: AND: anxiet* OR depress* OR "affective disorder" OR "mood disorder" OR bipolar OR "post traumatic stress" OR ptsd OR "personality disorder" OR "obsessive compulsive" OR ocd OR "eating disorder" OR "psychotic disorder" OR psychos* OR schizophrenia OR phobi*

- Filters applied: Language = English, Slovak, Hungarian

MEDLINE:

(resilience.mp. or exp Resilience, Psychological/) OR (resilien*.mp.)

AND (Psychotherapy/ OR psychological therapy.mp. OR Cognitive Behavioral Therapy/ OR psycho* therap*.mp. OR psychological intervention.mp. or Psychosocial Intervention/ OR psychotherap*.mp. OR treatment.mp. OR therapy.mp. OR (cognit* adj2 therap*).mp. OR cognit* behav*.mp. OR counselling.mp. OR Counseling/ OR Psychotherapy, Psychodynamic/ OR psychodynamic.mp. OR Psychoanalytic Therapy/)

AND (Treatment Outcome/ OR Patient Reported Outcome Measures/ OR outcome.mp. OR predict.mp. OR predict*.mp. OR response.mp.)

AND (Anxiety/ or anxiety.mp. or Anxiety Disorders/ OR Depression, Postpartum/ or Depression/ or depression.mp. OR depress*.mp. OR anxiet*.mp. OR affective disorder.mp.

or Mood Disorders/ OR Bipolar Disorder/ or bipolar.mp. OR Stress Disorders, Post-Traumatic/ or post traumatic stress.mp. OR ptsd.mp. OR personality disorder.mp. or Personality Disorders/ OR Obsessive-Compulsive Disorder/ or obsessive compulsive.mp. OR ocd.mp. OR eating disorder.mp. or "Feeding and Eating Disorders"/ OR psychotic disorder.mp. or Psychotic Disorders/ OR psychos*.mp. OR Schizophrenia/ or schizophrenia.mp. OR Phobic Disorders/ or phobi*.mp. or Phobia, Social/)

PsycInfo:

(exp "Resilience (Psychological)"/ or resilience.mp.) OR resilien*.mp.

AND (exp Cognitive Behavior Therapy/ or exp Psychotherapy/ or psychological therapy.mp. OR psycho* therap*.mp. OR psychological intervention.mp. OR psychotherap*.mp. OR exp Interdisciplinary Treatment Approach/ or exp "Treatment Process and Outcome Measures"/ or exp Treatment Effectiveness Evaluation/ or exp Assertive Community Treatment/ or exp Treatment/ or exp Treatment Outcomes/ or exp Outpatient Treatment/ OR therapy.mp. OR (cognit* adj2 therap*).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh word] OR cognit* behav*.mp. OR exp Counseling/ or counselling.mp. OR psychodynamic.mp. or exp Psychodynamics/)

AND (exp Illness Anxiety Disorder/ or exp Generalized Anxiety Disorder/ or exp Anxiety Management/ or exp Anxiety Disorders/ or exp Anxiety/ or Anxiety.mp. or exp Social Anxiety/ or exp Performance Anxiety/ or exp Health Anxiety/ OR anxiet*.mp. OR exp "Depression (Emotion)"/ or exp Major Depression/ or exp Postpartum Depression/ or Depression.mp. OR depress*.mp. OR affective disorder.mp. or exp Affective Disorders/ OR Mood Disorders.mp. OR bipolar.mp. or exp Bipolar Disorder/ or exp Bipolar II Disorder/ or exp Bipolar I Disorder/ OR exp Posttraumatic Stress Disorder/ or exp Trauma/ or post traumatic stress.mp. or exp Posttraumatic Stress/ OR ptsd.mp. OR personality disorder.mp. or

exp Personality Disorders/ OR exp Obsessive Compulsive Disorder/ or obsessive compulsive.mp. OR ocd.mp. OR eating disorder.mp. or exp Eating Disorders/ OR psychotic disorder.mp. or exp Psychosis/ OR psychos*.mp. OR exp Schizophrenia/ or exp Paranoid Schizophrenia/ or Schizophrenia.mp. OR exp Agoraphobia/ or exp Panic Disorder/ or phobi*.mp. OR Phobia.mp. or exp Phobias/)

AND (exp "Treatment Process and Outcome Measures"/ or exp Patient Reported Outcome Measures/ or outcome.mp. OR predict.mp. OR predict*.mp. OR response.mp.)

## Appendix C

## Quality Appraisal

| Study | Selection bias | Study design | Confounders | Blinding | Data collection methods | Withdrawals and drop-outs | Global rating |
|---|---|---|---|---|---|---|---|
| **Bossarte et al. (2023)** | 3 | 2 | 1 | 3 | 1 | 1 | 3 |
| **Chiang et al. (2024)** | 2 | 2 | 3 | 2 | 1 | N/A | 2 |
| **Chilver & Gatt (2022)** | 3 | 1 | 3 | 2 | 1 | 3 | 3 |
| **Demyen (2024)** | 3 | 2 | 2 | 3 | 1 | 3 | 3 |
| **Durden et al. (2023)** | 3 | 2 | 3 | 3 | 1 | 1 | 3 |
| **Guillén et al. (2021)** | 2 | 2 | 3 | 3 | 1 | 2 | 3 |
| **Hollister, et al. (2022)** | 2 | 2 | 2 | 3 | 1 | 1 | 2 |
| **Holm et al. (2019)** | 2 | 2 | 1 | 2 | 1 | N/A | 1 |
| **Ianakieva (2021)** | 2 | 2 | 2 | 3 | 1 | 3 | 3 |
| **Javidi et al. (2021)** | 3 | 2 | 3 | 3 | 1 | 3 | 3 |
| **Jeon et al. (2017)** | 3 | 2 | 3 | 3 | 1 | 1 | 3 |
| **Kemna et al. (2024)** | 2 | 1 | 1 | 2 | 1 | 3 | 2 |
| **Konradt et al. (2018)** | 3 | 1 | 1 | 1 | 1 | 3 | 3 |

| Study | Selection bias | Study design | Confounders | Blinding | Data collection methods | Withdrawals and drop-outs | Global rating |
|---|---|---|---|---|---|---|---|
| **Marschollek & Bonnet (2021)** | 2 | 2 | 2 | 3 | 1 | 1 | 2 |
| **Meule et al. (2023)** | 2 | 2 | 3 | 3 | 1 | 3 | 3 |
| **Pakalniškienė et al. (2016)** | 2 | 2 | 3 | 3 | 1 | 3 | 3 |
| **Polizzi et al. (2024)** | 2 | 1 | 1 | 2 | 1 | 2 | 1 |
| **Puertas-Gonzalez et al. (2024)** | 2 | 2 | 3 | 3 | 1 | 3 | 3 |
| **Strupf et al. (2023)** | 2 | 1 | 1 | 2 | 1 | 3 | 2 |

*Note.* Quality ratings: 3 = Weak; 2 = Moderate; 1 = Strong

# Appendix D

## GRADE Evidence Rating for Meta-Analyses

### Appendix D1

### GRADE Evidence Rating for Correlational Meta-Analysis

| | Number of studies in MA | Certainty assessment | | | | | Pooled effect size [95% CI] | Final GRADE rating |
|---|---|---|---|---|---|---|---|---|
| | | Risk of bias | Imprecision | Inconsistency | Indirectness | Publication bias | | |
| | $k = 7$ | Serious[a] | Adequate[b] | Unexplained heterogeneity present[c] | Serious Indirectness[d] | Cannot be assessed with certainty[e] | $r = .25$, 95% CI [.10, .39] | Very low |
| **GRADE rating** | | Downgraded by one level = Moderate | Not downgraded = Moderate | Downgraded by one level = Low | Downgraded by one level = Very low | Downgraded = Very low | | |

*Note.* [a] The proportion of information from studies with results at high risk of bias (42.86%) is sufficient to affect the interpretation of results.

[b] 95% confidence interval of adequate precision [.10, .39], i.e. situated within a meaningful range, and the lower limit of CI was above the threshold of a small effect ($r = 0.10$; Cohen, 1988).

[c] Heterogeneity statistics indicated the presence of heterogeneity in findings. This could not be explained (moderator analyses not being feasible due to low study number).

[d] Indirectness identified due to variability amongst study populations and interventions.

[e] Accuracy of publication bias uncertain due to small number of studies and unexplained heterogeneity.

**Appendix D2**

**GRADE Evidence Rating for Partial Correlational Meta-Analysis**

| | Number of studies in MA | Certainty assessment | | | | | Pooled effect size [95% CI] | Final GRADE rating |
|---|---|---|---|---|---|---|---|---|
| | | Risk of bias | Imprecision | Inconsistency | Indirectness | Publication bias | | |
| | $k = 3$ | Serious[a] | Inadequate[b] | Unexplained heterogeneity present[c] | Serious indirectness[d] | Cannot be assessed with certainty[e] | $r_p = –.09$, 95% CI [–.30, .12] | Very low |
| **GRADE rating** | | Downgraded by one level = Moderate | Downgraded by one level = Low | Downgraded by one level = Very low | Downgraded = Very low | Downgraded = Very low | | |

*Note.* [a] The proportion of information from studies with results at high risk of bias (66.67%) is sufficient to affect the interpretation of results.

[b] 95% confidence interval of inadequate precision [–.30, .12]; i.e. not situated within a meaningful range as it includes the null effect (0) and spans across values representing a range from a medium negative association to a small positive association (Cohen, 1988).

[c] Heterogeneity statistics did not indicate the presence of heterogeneity, however, there were concerns regarding the accuracy of these statistics due to very small number of studies.

[d] Indirectness identified due to variability amongst study populations and interventions.

[e] Accuracy of publication bias uncertain due to small number of studies.

# Section Two: Empirical Study

## Resilience as a Predictor of Outcomes in Cognitive Behavioural Therapy and Person-Centred Experiential Therapy for Depression

## Abstract

**Objectives:** This study investigated whether pre-treatment resilience predicted depression treatment outcomes in cognitive-behavioural therapy (CBT) and person-centred experiential therapy (PCET).

**Design:** A secondary analysis of data from a randomised controlled trial investigating the non-inferiority of PCET to CBT in depression treatment (PRaCTICED; Barkham et al., 2021).

**Methods:** The CD-RISC-25 (Connor & Davidson, 2003) was evaluated in the trial population using exploratory and confirmatory factor analyses, identifying a subset of 12 items best representing resilience. Correlational analyses assessed the predictive utility of pre-treatment resilience using the CD-RISC-25 and 12-item subset, for outcomes at 6- and 12-months post-randomisation. These associations were re-evaluated using regression analyses controlling for baseline depression severity. Moderation analysis assessed whether the resilience-outcome relationship differed by therapy type.

**Results:** Correlational analyses showed that higher pre-treatment resilience was significantly associated with lower depression severity at 6 and 12 months, with the 12-item subset demonstrating improved predictive utility over the CD-RISC-25. Regression analyses controlling for baseline depression severity indicated higher resilience significantly predicted 6-month outcomes in the intention-to-treat population, but not in the per-protocol population, possibly due to reduced statistical power or the interaction between resilience and treatment adherence. Resilience did not independently predict 12-month outcomes. Therapy type did not moderate the resilience-outcome relationship.

**Conclusions:** Pre-treatment resilience demonstrated a predictive association with end-of-treatment therapy outcomes, particularly within the intention-to-treat population. However, its limited long-term predictive utility and sensitivity to analysis population (e.g.

per-protocol vs. intention-to-treat) indicate that further research is needed to definitively establish its prognostic utility in depression treatment.

**Keywords:** patient resilience, psychological therapy, depression, outcome.

**Practitioner Points:**

- Verifying the psychometric properties of the CD-RISC-25 in new clinical populations is crucial for optimising its predictive utility.
- Pre-treatment resilience is associated with better end-of-treatment outcomes in CBT and PCET for depression in intention-to-treat populations; however, its predictive utility beyond baseline depression severity for per-protocol populations and long-term outcomes remains unclear.
- Further research is essential to clarify this relationship and its implications for clinical decisions, including treatment personalisation.

## Introduction

Over 400 randomised controlled trials (RCTs) investigating the effectiveness of psychological therapies for depression have been conducted to date, showing that overall, therapy is effective in treating depression (Cuijpers, 2015; Munder et al., 2018). However, in a meta-analysis of 228 RCTs, Cuijpers, Karyotaki, et al. (2021) reported a response rate of 41%, indicating that a significant proportion of patients do not achieve meaningful improvement. These findings underscore the importance of investigating how existing treatments could be optimised to enhance their effectiveness (Cuijpers, Karyotaki, et al., 2021). Contemporary psychological therapies for depression include cognitive behavioural therapy (CBT), behavioural activation (BA), interpersonal psychotherapy, psychodynamic therapy, non-directive supportive counselling, "third wave" therapies, problem-solving therapy and life-review therapy. Meta-analytic evidence indicates that all of these therapeutic modalities have comparable benefits. For example, a network meta-analysis of 331 RCTs investigating these interventions found that all demonstrated significant effects compared to care-as-usual and waitlist controls, with standardised mean differences ranging from –0.32 to –0.81 (Cuijpers, Quero, et al., 2021). Non-directive supportive counselling was the only therapy showing lower effectiveness; however, this finding was no longer significant when only studies with a low risk of bias were included. Nevertheless, while such aggregate-level findings suggest that different therapies yield comparable outcomes across patient groups, individual-level findings highlight variability in how specific patients respond to specific treatments (Barkham & Lambert, 2021).

A recent meta-analysis of 306 RCTs evaluating psychological therapies for depression found a 9% higher variance in treatment groups compared to control groups, indicating individual differences in how patients responded to different treatments (Kaiser et al., 2022). This indicates that identifying factors that lead to differential outcomes is crucial for

enhancing treatment effectiveness. Consequently, contemporary research has focused on personalising psychological therapies as a promising strategy for improving outcomes. A recent meta-analytic review of nine RCTs and 5,134 patients found better outcomes for personalised interventions compared to standard treatment, reporting an effect size of $d$ = 0.22 in favour of personalised therapies (Nye et al., 2023). This indicates that personalised treatments are linked to improved outcomes, although the magnitude of these effects is relatively small.

Achieving a personalised approach to treating depression necessitates identifying patient characteristics linked to differential outcomes across therapeutic modalities. Towards this aim, previous research has examined factors implicated in the onset and development of depression. Although the exact mechanisms are not yet fully understood, stress is an established contributing factor (Yang et al., 2015). Given the ubiquity of stressful events, an individual's coping ability may influence their likelihood of developing depression in the aftermath of stress. This "ability to adapt successfully in the face of stress and adversity" (Wu et al., 2013, p. 1) is commonly referred to as resilience. A substantial body of literature indicates that resilience plays a protective role against the development of depression and other mental health conditions (Southwick & Charney, 2012). For instance, Sheerin et al. (2018) conducted a longitudinal study to assess whether resilience moderates the association between exposure to stressful life events and the subsequent development of depression and generalised anxiety disorder (GAD). Investigating a large epidemiological twin sample, the study found that higher levels of resilience at baseline were associated with a reduced likelihood of developing depression and GAD, even among individuals reporting high levels of stress. This buffering effect remained significant after adjusting for prior psychopathology and demographic variables, providing robust evidence that resilience plays a protective role

in the context of stress exposure. Moreover, evidence suggests that the relationship between resilience and depression extends beyond a preventive role.

Emerging research indicates that resilience is relevant even for individuals with established depression, evidenced by the variability in resilience levels observed among individuals experiencing this condition. The findings of a meta-analysis comprising five studies and 1,247 patients seeking psychological treatment for mental health problems, including depression, found a moderate negative association ($r = –.40$) between resilience and psychological distress at the pre-treatment (baseline) timepoint (Bartholomew et al., 2020). This indicates that more resilient patients experienced less psychological distress in the context of existing mental health problems. Recent studies have investigated whether baseline resilience could predict the outcomes of therapies for depression. A study by Konradt et al. (2018) analysed data from an RCT of two types of brief cognitive therapy and reported a weak but significant correlation ($r = –.30$) between baseline resilience and post-treatment depression, which remained significant after adjusting for baseline depression severity. In a retrospective analysis of inpatient records, Meule et al. (2023) employed a cross-lagged panel model to examine the outcomes of multimodal treatment (CBT and medication), finding that higher baseline resilience predicted larger decreases in depressive symptoms.

In contrast, a study investigating the outcomes of combined case management and problem-solving therapy in older adults found that although improvements in resilience predicted improvement in depression, baseline resilience did not predict outcomes (Hollister et al., 2022). In a secondary analysis of an RCT, Kemna et al. (2025) examined predictors of symptom improvement among refugees and asylum seekers with depression receiving stepped care. Their multiple regression model revealed that while factors including baseline

symptom severity, PTSD, and physical health comorbidity predicted outcomes, baseline resilience failed to achieve statistical significance.

In summary, the existing literature presents a mixed picture regarding the relationship between pre-treatment resilience and treatment outcomes, highlighting the need for further investigation.

**Resilience Measurement**

Over 15 self-report resilience measures have been developed to date, reflecting diverse conceptual frameworks and approaches to operationalising the construct (Windle et al., 2011). To assist researchers in selecting the appropriate resilience measures, Fisher and Law (2021) conducted a content analysis review in which they endorsed an organising framework originally developed by Fisher et al. (2018). This framework distinguishes three approaches to conceptualising resilience: (1) as an attribute/resource, (2) as a process, and (3) as an outcome (Fisher et al., 2018). In line with this framework, measures based on the attribute/resource conceptualisation are most appropriate for assessing individual resilience capacity at pre-treatment. In addition to the measure's conceptual basis, the authors emphasised the importance of assessing its psychometric robustness and the breadth of its supporting evidence base.

Windle et al. (2011) conducted a methodological systematic review of 15 commonly used resilience scales, evaluating their measurement properties using comprehensive quality criteria developed by Terwee et al. (2007). Although none of the scales met the criteria for a "gold standard" rating, three received the highest overall scores: the Connor-Davidson Resilience Scale (CD-RISC-25; Connor & Davidson, 2003), the Resilience Scale for Adults (RSA; Friborg et al., 2003), and the Brief Resilience Scale (BRS; Smith et al., 2008). Of these, only the CD-RISC-25 and the RSA are grounded in the attribute/resource conceptualisation of resilience (Fisher & Law, 2021), making them particularly suitable for

assessing resilience at pre-treatment. Among the two, the CD-RISC-25 stands out due to its substantial evidence base, extensive use across clinical, military, and community populations, and robust psychometric properties. For example, a recent reliability generalisation meta-analysis comprising nine studies reported high internal consistency across diverse populations, settings, and language versions (Wojujutari et al., 2024). More recently, a review of the CD-RISC-25's psychometric properties comprising 44 studies reported high test-retest reliability and convergent, divergent, and predictive validity across different demographic groups, including diverse cultural backgrounds, non-clinical and clinical populations (Sharif-Nia et al., 2024). Nonetheless, the review highlighted inconsistencies in the scale's factor structure across studies, with the number of factors ranging from one to five, despite the original scale being proposed as comprising five factors.

Beyond inconsistencies in factor structure, prior research has demonstrated variation in the number of items deemed appropriate for retention from the original 25-item CD-RISC. For example, Campbell-Sills and Stein (2007) used a sample of 1,560 US undergraduate students, extracting a one-factor, 10-item scale. Velickovic et al. (2020) assessed the CD-RISC in a sample of 2,599 Swedish individuals recruited from a national health research project, extracting a unidimensional factor structure and retaining 22 items. Another study combining exploratory factor analysis (EFA) with Rasch analysis to assess the scale in a convenience sample of 444 Chilean participants yielded a unidimensional, 22-item solution (Arias González et al., 2015). These findings underscore the importance of re-evaluating the factor structure and item composition of the CD-RISC-25 whenever applied to novel or demographically distinct samples.

**The Present Study**

The present study investigated whether baseline resilience could predict the outcomes of psychological therapies for depression, utilising data from the PRaCTICED trial (Barkham

et al., 2021). In PRaCTICED, resilience was assessed at pre-treatment using the CD-RISC-25. To the best of the author's knowledge, the psychometric properties of the CD-RISC-25 have not previously been evaluated in a UK sample of adults with depression. Therefore, the present study first re-evaluated the scale's properties within the trial population to identify items that most effectively represent the construct of resilience. Subsequently, the predictive utility of both the full CD-RISC-25 and a selected item subset was assessed to determine the extent to which baseline resilience predicted treatment outcomes.

The present study additionally sought to explore whether the predictive utility of baseline resilience for psychological treatment outcomes varied across the two trial modalities: cognitive behavioural therapy (CBT) and person-centred experiential therapy (PCET). A key distinction lies in CBT's direct targeting of positive cognitive reappraisal, a core facet of resilience (Riepenhausen et al., 2022), which is not a primary focus of PCET. It was therefore hypothesised that baseline resilience would exhibit greater predictive utility for PCET outcomes, as the therapeutic mechanisms inherent to CBT might mitigate or supersede the unique contribution of pre-treatment resilience.

**Hypotheses**

1. A subset of items from the CD-RISC-25, identified through factor analysis, will yield a more parsimonious factor structure and greater predictive utility for treatment outcomes in adults with depression relative to the original 25-item scale.
2. Pre-treatment resilience will predict the outcomes of CBT and PCET for depression at 6- and 12-months post-randomisation. Participants with higher resilience scores will have better outcomes at both time points.
3. Therapy type will moderate the predictor-outcome relationship; baseline resilience will be a stronger predictor of outcomes in PCET compared to CBT.

## Method

## Design

This study was a secondary analysis of data collected during the PRaCTICED trial (Barkham et al., 2021). The PRaCTICED trial received NHS ethical approval and was registered at the ISRCTN Registry, ISRCTN06461651. PRaCTICED was a pragmatic, non-inferiority, randomised controlled trial that investigated whether person-centred experiential therapy (PCET) is clinically effective, cost-effective and non-inferior to cognitive behavioural therapy (CBT) in treating moderate and severe depression. Results from the trial demonstrated that at 6 months post-randomisation, the effectiveness of PCET in reducing depression symptoms was non-inferior to CBT. However, at 12 months post-randomisation, CBT was associated with greater symptom reduction compared to PCET, with effect sizes of $d = 0.27$ (intention-to-treat population; ITT) and $d = 0.34$ (per-protocol population; PP).

The present study was pre-registered on AsPredicted (registration 180417) and received ethical approval from the University of Sheffield (Appendix A). The study comprised two parts.

### *Part 1: Identifying Salient Items of the CD-RISC-25*

The Connor-Davidson Resilience Scale (CD-RISC; Connor & Davidson, 2003) was subjected to exploratory and confirmatory factor analysis to identify a subset of items that most strongly represented resilience within the trial population.

### *Part 2: Resilience as a Predictor of Therapy Outcomes*

In the second part, the study investigated whether baseline (pre-treatment) resilience predicted therapy outcomes at 6- and 12-months post-randomisation. This association was evaluated using both the full CD-RISC-25 scale and the subset of most salient items. The difference between PCET vs. CBT in this association was explored to establish if therapy type moderated the predictor–outcome association.

## Service User Involvement

The PRaCTICED trial involved a Public and Patient Involvement (PPI) panel that was consulted on the strategy, implementation and future analysis of the trial data. As the PPI group had disbanded by the time of the present study, additional input from this panel was not feasible.

## Overview of the PRaCTICED Trial

The PRaCTICED trial was conducted in the Sheffield Improving Access to Psychological Therapies (IAPT) service (recently re-named Sheffield Talking Therapies), which serves a population of approximately 560,000 people. The area is ranked as the 57th most deprived local authority in England out of 317 (Ministry of Housing, Communities and Local Government, 2019). The service delivers CBT and PCET alongside other approved therapy modalities. A total of 510 participants took part in the trial, of whom 256 were randomly assigned to receive CBT and 254 were assigned PCET. They were offered up to 20 weekly sessions of one-to-one therapy in line with the National Institute for Health and Care Excellence guidelines (NICE, 2022). All trial counsellors ($n$ = 18) and CBT therapists ($n$ = 27) were trained in their modality and were accredited by the appropriate professional bodies. All therapists received ongoing supervision throughout the trial.

## Measures

For the present study, only measures related to depression and resilience are described. The depression severity measure (PHQ-9; Kroenke et al., 2001) was collected at baseline, and 6- and 12-months post-randomisation. The resilience measure (CD-RISC-25) was only collected at baseline.

### *Patient Health Questionnaire-9 (PHQ-9; Kroenke et al., 2001)*

The PHQ-9 (Appendix B) is a 9-item depression measure based on the criteria of depressive disorder outlined in the DSM-IV (American Psychiatric Association, 1994). It is a

severity measure with a total score that can range from 0 to 27, with each item being scored on a 4-point Likert scale from 0 (not at all) to 3 (nearly every day). Scores of 5, 10, 15, and 20 represent cutoffs for mild, moderate, moderately severe, and severe depression. The internal reliability of the PHQ-9 was reported as excellent, with Cronbach's α values of .89 and .86 and excellent test-retest reliability (Kroenke et al., 2001).

***25-Item Connor-Davidson Resilience Scale (CD-RISC-25; Connor & Davidson, 2003)***

The CD-RISC-25 is a 25-item scale designed to measure one's level of resilience (Appendix C). The total score can range from 0 to 100, with a higher score representing higher resilience. Each item is scored on a 5-point Likert scale from 0 (not true at all) to 4 (true nearly all of the time). A recent reliability generalisation meta-analysis of the CD-RISC-25 comprising nine studies reported an overall estimate of Cronbach's alpha of 0.89, indicating a high overall reliability of the scale across varied populations and settings (Wojujutari et al., 2024). Furthermore, the CD-RISC-25 has demonstrated good test–retest reliability (intraclass correlation coefficient = .87) and good convergent validity with other measures of stress and hardiness (Connor & Davidson, 2003).

**Participants**

Participants were recruited in two stages and could participate in the trial if they met the inclusion criteria. Those service users who did not meet the criteria received the usual treatment offered by the IAPT service. The inclusion criteria were: aged 18 years or older, meeting diagnostic criteria for moderate or severe depression, deemed to require stepped-up care within the Sheffield IAPT service, and having no strong preference for either treatment such that they would be unwilling to accept one of the treatments if randomised to it. Exclusion criteria were: the presence of an organic condition, psychosis, alcohol or substance dependence or elevated clinical risk of suicide.

**Analysis**

### *Demographics*

Baseline demographic and clinical information was described, including participants' age, gender, ethnicity, neighbourhood deprivation, employment status, and baseline depression severity. Neighbourhood deprivation was determined using the participants' postcode and locating this on the English Index of Multiple Deprivation (IMD; Ministry of Housing, Communities and Local Government, 2019). Intention-to-treat (ITT) analyses included all participants. Per-protocol (PP) analyses only included participants who received the therapy modality they were randomised to, and received a minimum of four sessions before the 6-months post-randomisation timepoint (Saxon et al., 2017).

### *Missing Data*

Missing data was imputed for the whole sample using non-parametric imputation using the R package *missForest* (Stekhoven, 2013). The MissForest algorithm is based on the machine learning approach Random Forest, suitable for imputing missing variables in mixed-type datasets (i.e. containing categorical and continuous variables). This was a deviation from the pre-registered study protocol. Multiple imputation was chosen over other methods of handling missing data (e.g. listwise or pairwise deletion, variable mean imputation), as it minimises wastefulness and the related loss of power and reduces the likelihood of bias arising through missingness mechanisms (van Ginkel et al., 2020). A list of variables used in the imputation model can be viewed in Appendix D. As a sensitivity analysis, all analyses were recalculated using only those participants with complete information (i.e. complete case analysis using non-imputed data); the results are reported in the appendices.

### *Factor Analysis of the CD-RISC-25*

The total sample ($n$ = 510) was randomly divided into two subsamples, each comprising 255 participants. An exploratory factor analysis (EFA) was conducted with

subsample 1 to establish which items of the CD-RISC-25 were most strongly linked to the underlying factor of resilience. The item set derived from EFA was tested on the second subsample via confirmatory factor analysis (CFA). As the CD-RISC-25 comprises 25 items, the 255 sample size allowed adherence to the widely accepted rule of having 10 cases/observations per item on a questionnaire (Wang & Wang, 2012). All analyses were recalculated using complete cases ($n$ = 462), randomly divided into two samples with $n$ = 231 each for EFA and CFA. Factor analyses were conducted with the Jamovi (2024, Version 2.6) statistical software.

**EFA: Preliminary Analyses.** Bartlett's test of sphericity was used to ensure that the correlation matrix was not random. The Kaiser-Meyer-Olkin (KMO; Kaiser, 1970) statistic was used to evaluate sampling adequacy; an overall KMO value larger than .5 indicates a sufficient sample size, and Kaiser & Rice's (1974) criteria were used to quantify this. KMO values were also produced for individual items; values below .5 indicate the item should be considered for removal from the analysis. A polychoric inter-item correlation matrix was produced and inspected for items with very small (< .3) correlations with most other items, as such items might not fit with the overall pool of items. The correlation matrix was also checked for items that correlated very highly (> .9) with others, indicating multicollinearity.

**EFA: Factor Extraction.** Visual scree test and parallel analysis (Horn, 1965) were used to determine the appropriate number of factors to extract, as parallel analysis is considered amongst the most accurate methods of factor extraction (Zwick & Velicer, 1986). Next, exploratory factor analysis (EFA) was conducted using the weighted least squares mean and variance adjusted (WLSMV) estimation method based on polychoric correlations, as it is most appropriate for ordinal data (Barendse et al., 2015), given its robustness under conditions of non-normality and non-linearity (Watkins, 2018). Goodness of fit was evaluated using the collective context of the following indices. The standardised root mean square

residual (SRMR) measures the average difference between the observed correlations and the model's predicted correlations; values close to .08 or below indicate a good fit (Hu & Bentler, 1999). The root mean square error of approximation (RMSEA) quantifies the discrepancy between the model-implied covariance matrix and the sample covariance matrix, assessing how far the hypothesised model is from a perfect model; values below .10 are considered acceptable (Browne & Cudeck, 1992). The comparative fit index (CFI) and Tucker-Lewis Index (TLI) compare the hypothesised model to a baseline model with uncorrelated variables (TLI adding a penalty for model complexity); values close to or above .90 are considered acceptable (Bentler, 1990). The Chi-squared test was reported, but not relied upon because it tests for perfect fit and is more likely to detect trivial deviations from perfect fit with increasing sample sizes and numbers of indicators (Brown, 2015).

**EFA: Item selection.** To select the most salient items, the cumulative context of factor loadings and reliability statistics was considered. Items with the lowest factor loadings and item-rest correlations were considered for removal. The impact of item removal on the overall scale's Cronbach's (1951) alpha was also considered; items whose deletion would either increase the alpha value or maintain it at an acceptable level (> .7) were considered for removal. EFA was repeated on the final item set to ensure that model fit was acceptable (Field, 2018).

**CFA.** CFA was used to test the model fit of the selected item set in the second half of the sample, using a weighted least squares mean and variance adjusted (WLSMV) estimation method. Goodness of fit indices were interpreted using the conventional guidelines, with the following values indicating acceptable fit: RMSEA < .10 (Browne & Cudeck, 1992), SRMR close to .08 or below (Hu & Bentler, 1999), CFI and TLI close to or above .90 (Bentler, 1990). The reliability of the item set was evaluated via Cronbach's alpha; a value above .7 was considered acceptable (Kline, 1999).

### *Resilience and Outcomes*

**Power Analysis.** Power analyses were conducted using G*Power (Faul et al., 2009). As this study was a secondary analysis of an RCT and the sample size could not be altered, post hoc power analysis was conducted for both the intention-to-treat (ITT) and the per-protocol (PP) samples.

The correlation power analysis indicated that with the ITT sample of 510, it would be possible to detect a minimum effect size of $r = .3$, with alpha set at .05, at 99% power. For the PP sample of 306, the same minimum effect size would be detectable at 99% power.

The regression power analysis indicated that with the ITT sample of 510 and two predictor variables, it would be possible to detect a minimum effect size of $f^2 = 0.02$, with alpha set at .05, at 82% power. For the PP sample of 306 and two predictor variables, the same minimum effect size would be detectable at 59% power, therefore, the PP analyses were underpowered (Cohen, 1992).

The moderation power analysis indicated that with the ITT sample of 510 and three predictor variables, it would be possible to detect a minimum effect size of $f^2 = 0.02$, with alpha set at .05, at 77% power. For the PP sample of 306 and two predictor variables, the same minimum effect size would be detectable at 52% power. Therefore, the moderation analyses were underpowered (Cohen, 1992).

**Regression Analyses.** All analyses investigating the link between baseline resilience and treatment outcomes were performed using IBM SPSS Statistics (Version 29). At all stages, both ITT and PP analyses were performed. As a preliminary step, Pearson's correlation coefficient was calculated between baseline resilience and depression severity at 6 and 12 months.

Two multiple regression analyses were conducted to assess whether baseline resilience predicted treatment outcomes at 6- and 12-months post-randomisation. In each

analysis, baseline resilience served as the independent variable, with baseline depression severity included as a control, while depression severity at 6 and 12 months were dependent variables.

A moderation analysis was conducted using the PROCESS macro (Model 1; Hayes, 2022) for SPSS to explore whether therapy type (CBT, PCET) moderated the relationship between resilience and treatment outcomes. Baseline depression severity was included as a covariate, and continuous predictor variables were mean-centred.

**Statistical Assumptions.** The assumptions of linearity and homoscedasticity were ascertained via visual inspection of the scatter plot of residuals, and the assumption of normality via visual inspection of histograms and normal probability plots. The assumption of no multicollinearity was assessed by examining the correlation coefficient between baseline resilience and baseline depression severity; if this value was below .9, it indicated no major concerns. Multicollinearity was further assessed by inspection of the variance inflation factor (VIF) and tolerance statistics; a VIF below 10 and tolerance greater than .2 indicated this assumption was met (Bowerman & O'Connell, 1990).

Outliers and model fit were assessed via the inspection of standardised residuals, using the normal distribution of *z*-scores as guidance (Field, 2018). Thus, we would expect 95% of standardised residuals to have a value lower than 1.96 for the model to be a good representation of the data, and 99% should be below 2.58 to indicate an acceptable level of error. 99.9% should be below 3.29, therefore, any standardised residuals above this value were flagged as outliers.

Influential cases were assessed by inspecting Mahalanobis distances, Cook's distances and standardised DFBeta values. Mahalanobis distances indicate the distance of each case from the multivariate centre of the predictor space. A cut-off point based on the critical value of chi-square for $p = .05$ and two predictors (5.99) was used; cases exceeding this value were

flagged as multivariate outliers. Mahalanobis distances were cross-referenced with indicators of the influence of cases on the regression model. Cook's distance is a measure of the overall influence of a case on the model; any cases with a value greater than 1 indicate undue influence (Cook & Weisberg, 1995). DFBeta values identify cases exerting a large influence on the model parameters by calculating the change in model estimates as a result of excluding each case. Standardised DFBeta values above 1 were considered to have a substantial influence.

**Assessing the Resilience-Outcome Association Using the Reduced CD-RISC Item Set.** The correlation and regression analyses were repeated using the reduced CD-RISC item set as an independent variable.

## Results

### *Demographics*

Baseline demographic and clinical information for the full sample is described in Table 1.

**Table 1**

*Sociodemographic Characteristics of Participants at Baseline*

| Baseline characteristic | Complete sample ($n$ = 510) |
|---|---|
| Age (M; SD) | 38.2 (13.1) |
| Gender (%) | |
| Female | 293 (57.5%) |
| Male | 217 (42.5%) |
| Ethnicity (%) | |
| White | 451 (88.4%) |
| Other | 33 (6.5%) |

| Baseline characteristic | Complete sample ($n$ = 510) |
|---|---|
| Missing data ($n$) | 26 (5.1%) |
| IMD (M, SD) | 5.2 (3.3) |
| Missing data ($n$) | 1 (0.2%) |
| Employment Status (%) | |
| Employed | 266 (52.2%) |
| In Education | 34 (6.7%) |
| Retired | 13 (2.5%) |
| Unemployed | 124 (24.3%) |
| Unpaid Voluntary Work | 1 (0.2%) |
| Missing data ($n$) | 72 (14.1%) |
| CIS-R Depression Severity (%) | |
| Moderate | 237 (46.5%) |
| Severe | 270 (52.9%) |
| Missing data ($n$) | 3 (0.6%) |
| PHQ-9 Baseline Score (M, SD) | 18.9 (4.1) |
| CD-RISC-25 Baseline Score (M, SD) | 38.7 (13.5) |
| Missing data ($n$) | 48 (9.4%) |
| Treatment Type (%) | |
| CBT | 256 (50.2%) |
| PCET | 254 (49.8%) |

*Note.* IMD = Index of Multiple Deprivation (IMD; Ministry of Housing, Communities and Local Government, 2019); CIS-R = Clinical Interview Schedule-Revised (Brugha et al., 1994); PHQ-9 = Patient Health Questionnaire-9 (Kroenke et al., 2001); CD-RISC-25 = Connor-Davidson Resilience Scale, 25-item version (Connor & Davidson, 2003); CBT = cognitive behavioral therapy; PCET = person-centred experiential therapy.

### *Exploratory Factor Analysis (EFA) of the CD-RISC-25*

**Preliminary Analyses.** For a sample size of 255, Bartlett's test was significant: $\chi^2$ (300, $N$ = 255) = 2,007, $p$ < .001, indicating that the correlation matrix was not random. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was .87, indicating a "meritorious" sample size (Kaiser & Rice, 1974). The individual item KMO values were all above .5. Therefore, it was determined that conducting an EFA was appropriate. The Cronbach's $\alpha$ value of the 25-item scale was .88. The polychoric correlation matrix was inspected for correlations below .3 or above .9; no correlations greater than .9 were found. Items 2, 3, 9, and 13 only had a correlation coefficient higher than .3 with one other item (Q2 with Q13 = .58, and Q3 with Q9 = .48). This indicated a poor fit with the rest of the items, therefore, these items were removed.

**Factor Extraction.** The parallel analysis and scree plot indicated that one factor should be extracted (Appendix E1). Exploratory factor analysis (EFA) was conducted using the weighted least squares mean and variance adjusted (WLSMV) estimation method, extracting one factor. Table 2 illustrates the factor loadings for the extracted one-factor solution. Model fit was acceptable: $\chi^2$ (189, $N$ = 255) = 504, $p$ < .001, RMSEA = .08, 90% CI [.07, .09], CFI = .91, TLI = .90, SRMR = .06), supporting the adequacy of the one-factor model for the data.

**Table 2**

*Factor Loadings of the One-Factor Solution of the Exploratory Factor Analysis Using WLSMV*

| CD-RISC-25 item | Factor 1 loading ($\beta$) |
|---|---|
| Q17 I think of myself as a strong person when dealing with life's challenges and difficulties | .74 |

| CD-RISC-25 item | Factor 1 loading ($\beta$) |
|---|---|
| Q12 Even when things look hopeless, I don't give up | .69 |
| Q5 Past successes give me confidence in dealing with new challenges and difficulties | .68 |
| Q11 I believe I can achieve my goals, even if there are obstacles | .67 |
| Q22 I feel in control of my life | .65 |
| Q24 I work to attain my goals no matter what roadblocks I encounter along the way | .64 |
| Q19 I am able to handle unpleasant or painful feelings like sadness, fear, and anger | .64 |
| Q8 I tend to bounce back after illness, injury or other hardships | .63 |
| Q14 Under pressure, I stay focused and think clearly | .63 |
| Q4 I can deal with whatever comes my way | .62 |
| Q7 Having to cope with stress can make me stronger | .62 |
| Q23 I like challenges | .62 |
| Q15 I prefer to take the lead in solving problems rather than letting others make all the decisions | .62 |
| Q16 I am not easily discouraged by failure | .57 |
| Q21 I have a strong sense of purpose in life | .57 |
| Q25 I take pride in my achievements | .50 |
| Q18 I can make unpopular or difficult decisions that affect other people, if it is necessary | .49 |
| Q1 I am able to adapt when changes occur | .47 |
| Q20 In dealing with life's problems, sometimes you have to act on a hunch without knowing why | .46 |
| Q6 I try to see the humorous side of things when I am faced with problems | .44 |
| Q10 I give my best effort no matter what the outcome may be | .30 |

*Note.* $N = 255$. Adapted from "Connor, K. M., & Davidson, J. R. T. (2003). Development of a new resilience scale: The Connor-Davidson Resilience Scale (CD-RISC). *Depression and Anxiety, 18*(2), 76–82. https://doi.org/10.1002/da.10113."

**Item Removal.** As a unidimensional solution was determined, Cronbach's $\alpha$ was calculated for the whole scale (21 items), yielding a value of .89. Table 3 shows the item reliability statistics. Inspection of item factor loadings, item-rest correlations and the impact of item deletion on Cronbach's α highlighted 12 items that best represented the underlying resilience factor. Specifically, items 4, 5, 7, 8, 11, 12, 14, 17, 19, 22, 23, and 24 had the highest factor loadings (> .61), and item-rest correlations (> .53). Additionally, their deletion would have lowered overall Cronbach's $\alpha$ more than the deletion of the rest of the items. Considering these metrics collectively, the decision was made to retain these 12 items as the final set. Items were removed one by one, and the impact of each item's deletion on Cronbach's $\alpha$ was monitored. EFA (WLSMV) was rerun on the final 12-item set to inspect the impact of item deletion on the factor solution. Parallel analysis indicated a one-factor solution (Appendix E2). The 12-item set demonstrated improved indices of fit: $\chi^2$ (54, $N$ = 255) = 133.5, $p < .001$, RMSEA = .08, 90% CI [.06, .09], CFI = .96, TLI = .95, SRMR = .04, with factor loadings between .60 and .73.

**Table 3**

*Item Reliability Statistics*

| Item | Item-rest correlation | Chronbach's α if item deleted |
|---|---|---|
| Q4 I can deal with whatever comes my way | .54 | .887 |

| Item | Item-rest correlation | Chronbach's α if item deleted |
|---|---|---|
| Q5 Past successes give me confidence in dealing with new challenges and difficulties | .60 | .885 |
| Q7 Having to cope with stress can make me stronger | .55 | .887 |
| Q8 I tend to bounce back after illness, injury or other hardships | .56 | .886 |
| Q11 I believe I can achieve my goals, even if there are obstacles | .60 | .885 |
| Q12 Even when things look hopeless, I don't give up | .62 | .884 |
| Q14 Under pressure, I stay focused and think clearly | .54 | .887 |
| Q17 I think of myself as a strong person when dealing with life's challenges and difficulties | .66 | .883 |
| Q19 I am able to handle unpleasant or painful feelings like sadness, fear, and anger | .56 | .886 |
| Q22 I feel in control of my life | .54 | .887 |
| Q23 I like challenges | .55 | .887 |
| Q24 I work to attain my goals no matter what roadblocks I encounter along the way | .57 | .886 |
| Q1 I am able to adapt when changes occur | .40 | .891 |
| Q6 I try to see the humorous side of things when I am faced with problems | .37 | .892 |
| Q10 I give my best effort no matter what the outcome may be | .25 | .895 |
| Q15 I prefer to take the lead in solving problems rather than letting others make all the decisions | .52 | .887 |
| Q16 I am not easily discouraged by failure | .49 | .888 |
| Q18 I can make unpopular or difficult decisions that affect other people, if it is necessary | .43 | .890 |
| Q20 In dealing with life's problems, sometimes you have to act on a hunch without knowing why | .41 | .890 |

| Item | Item-rest correlation | Chronbach's α if item deleted |
|---|---|---|
| Q21 I have a strong sense of purpose in life | .45 | .889 |
| Q25 I take pride in my achievements | .43 | .890 |

*Note.* $N = 255$. Adapted from "Connor, K. M., & Davidson, J. R. T. (2003). Development of a new resilience scale: The Connor-Davidson Resilience Scale (CD-RISC). *Depression and Anxiety, 18*(2), 76–82. https://doi.org/10.1002/da.10113."

***Confirmatory Factor Analysis (CFA) of the Reduced 12-Item Set***

To evaluate the psychometric properties of the unidimensional 12-item set, a CFA using WLSMV estimation was conducted on the randomly selected second half of the imputed sample ($n = 255$). The 12-item set demonstrated good model fit: $\chi^2$ (54, $N = 255$) = 167, $p < .001$, CFI = .95, TLI = .94, SRMR = .05). The RMSEA was at the higher boundary of the acceptable range for model fit: RMSEA = .09, 90% CI [.08, .11]. As RMSEA was shown to systematically overestimate misfit in models with df < 75 and few (one-to-two) factors (Kenny et al., 2014), as is the case here, this index was considered acceptable in the context of other indices indicating good model fit. The results of the CFA thus support the model obtained via EFA. All 12 items loaded strongly (> .55) on a single factor (Table 4). The final 12-item set also demonstrated good internal consistency with a Cronbach's $\alpha$ of .88, which was equivalent to the original 25-item scale ($\alpha = .88$), and well above the acceptable level of .7 (Kline, 1999). Therefore, the results suggested that the 12-item set demonstrated acceptable structural validity while providing a concise and efficient metric.

**Table 4**

*Standardised Loadings for the One-Factor 12-Item Set*

| Item | Factor 1 loading ($\beta$) |
|---|---|
| Q11 I believe I can achieve my goals, even if there are obstacles | .79 |
| Q24 I work to attain my goals no matter what roadblocks I encounter along the way | .77 |
| Q4 I can deal with whatever comes my way | .73 |
| Q12 Even when things look hopeless, I don't give up | .69 |
| Q5 Past successes give me confidence in dealing with new challenges and difficulties | .69 |
| Q17 I think of myself as a strong person when dealing with life's challenges and difficulties | .68 |
| Q14 Under pressure, I stay focused and think clearly | .66 |
| Q23 I like challenges | .64 |
| Q7 Having to cope with stress can make me stronger | .58 |
| Q22 I feel in control of my life | .58 |
| Q8 I tend to bounce back after illness, injury or other hardships | .56 |
| Q19 I am able to handle unpleasant or painful feelings like sadness, fear, and anger | .55 |

*Note.* $N = 255$. Adapted from "Connor, K. M., & Davidson, J. R. T. (2003). Development of a new resilience scale: The Connor-Davidson Resilience Scale (CD-RISC). *Depression and Anxiety, 18*(2), 76–82. https://doi.org/10.1002/da.10113."

**Complete Case Factor Analysis.** The complete case EFA and CFA yielded a one-factor solution and a reduced 12-item set. The final item set differed from the imputed set by two items; the complete case analysis found items 4, 5, 8, 11, 12, 14, 15, 16, 17, 19, 23

and 24 to be the most salient (Appendix F), therefore this set was used for the complete case regression analyses using the reduced CD-RISC item set.

***Resilience and Treatment Outcomes***

Table 5 illustrates Pearson's correlation coefficients between baseline resilience (CD-RISC-25) and depression (PHQ-9) severity at 6 and 12 months. In the ITT sample, there was a significant correlation between baseline resilience and depression severity at 6 months ($r = –.20$, $p < .001$) and at 12 months ($r = –.19$, $p < .001$). In the PP sample, the correlation between baseline resilience and depression severity at 6 months was not significant ($r = –.09$, $p = .10$), while at 12 months, the correlation was significant ($r = –.16$, $p = .005$). The correlation between baseline resilience and baseline depression severity was significant (Table 6). Complete case analyses showed similar results (Appendix G).

**Table 5**

*Pearson's Correlations Between Baseline Resilience and Depression Outcomes at 6- and 12-Months Post-Randomisation*

| Variable | 6 Month ITT PHQ-9 ($n = 510$) | 6 Month PP PHQ-9 ($n = 306$) | 12 Month ITT PHQ-9 ITT ($n = 510$) | 12 Month PP PHQ-9 ($n = 306$) |
|---|---|---|---|---|
| CD-RISC-25 | –.20*** ($p < .001$) | –.09 ($p = .10$) | –.19*** ($p < .001$) | –.16** ($p = .005$) |

*Note.* ** $p < .01$. *** $p < .001$. PHQ-9 = Patient Health Questionnaire. CD-RISC-25 = 25-item Connor-Davidson Resilience Scale

**Table 6**

*Pearson's Correlations Between Baseline Resilience and Baseline Depression Severity*

| Variable | ITT Baseline PHQ-9 ($n$ = 510) | PP Baseline PHQ-9 ($n$ = 306) |
|---|---|---|
| CD-RISC-25 | –.36*** ($p$ < .001) | –.35*** ($p$ < .001) |

*Note.* *** $p$ < .001. PHQ-9 = Patient Health Questionnaire. CD-RISC-25 = 25-item Connor-Davidson Resilience Scale

**ITT Multiple Regression Analysis for 6-Month Outcomes.** A multiple regression analysis was performed using the ITT sample, with depression severity at 6 months post-randomisation as the dependent variable and resilience and baseline depression severity as independent variables. Table 7 describes the results of the regression analysis. The multiple regression model significantly explained 13% of the variance in depression outcomes at 6 months ($F$(2, 507) = 39.96, $p$ < .001, *adjusted* $R^2$ = .13). Inspection of the beta weights revealed that resilience did not make a significant contribution to the prediction of depression outcomes when controlled for baseline depression severity. All statistical assumptions were met (Appendix H1). Complete case analyses mirrored these results (Appendix H2).

**Table 7**

*Summary of ITT Regression Analysis for 6-Month Outcomes (n = 510)*

| Variable | $B$ [95% CI] | Std. Error $B$ | Std. Coefficient $\beta$ | $t$ | $p$ |
|---|---|---|---|---|---|
| Baseline PHQ-9 | 0.48 [0.35, 0.60] | 0.06 | 0.33*** | 7.5 | < .001 |
| Baseline | –0.04 [–0.7, 0.004] | 0.02 | –0.08 | –1.77 | .08 |

*Note. Adj.* $R^2$ = .13. ***$p$ < .001. PHQ-9 = Patient Health Questionnaire. CD-RISC-25 = 25-item Connor-Davidson Resilience Scale

**PP Multiple Regression Analysis for 6-Month Outcomes.** A multiple regression analysis was performed using the PP sample ($n$ = 306) with depression outcomes at 6-months post-randomisation as the dependent variable and resilience and baseline depression severity as the independent variables. Table 8 describes the results of the regression analysis. The multiple regression model significantly explained 12% of the variance in depression outcomes at 6 months ($F(2, 303) = 22.28$, $p < .001$, *adjusted* $R^2$ = .12). Inspection of the beta weights revealed that resilience did not make a significant contribution to the prediction of depression outcomes when controlled for baseline depression severity. All assumptions were met. Complete case analyses mirrored these results (Appendix H3).

**Table 8**

*Summary of PP Regression Analysis for 6-Month Outcomes (n = 306)*

| Variable | *B* [95% CI] | Std. Error *B* | Std. Coefficient *β* | *t* | *p* |
|---|---|---|---|---|---|
| Baseline PHQ-9 | 0.55 [0.38, 0.72] | 0.09 | 0.37*** | 6.44 | < .001 |
| Baseline CD-RISC-25 | 0.02 [–0.4, 0.07] | 0.03 | 0.04 | 0.62 | .54 |

*Note. Adj.* $R^2$ = .12. ***$p$ < .001. PHQ-9 = Patient Health Questionnaire. CD-RISC-25 = 25-item Connor-Davidson Resilience Scale

**ITT Multiple Regression Analysis for 12-Month Outcomes.** A multiple regression analysis was performed using the ITT sample, with depression outcomes at 12-months post-randomisation as the dependent variable and baseline resilience and depression severity as the independent variables. Table 9 describes the results of the regression analysis. The multiple regression model significantly explained 13% of the variance in depression outcomes at 12 months ($F(2, 507) = 39.53$, $p < .001$, *adjusted* $R^2 = .13$). Inspection of the beta weights revealed that resilience did not make a significant contribution to the prediction of depression outcomes when controlled for baseline depression severity. All statistical assumptions were met (Appendix H4). Complete case analyses mirrored these results (Appendix H5).

**Table 9**

*Summary of ITT Regression Analysis for 12-Month Outcomes (n = 510)*

| | *B* [95% CI] | Std. Error *B* | Std. Coefficient *β* | *t* | *p* |
|---|---|---|---|---|---|
| Baseline PHQ-9 | 0.51 [0.38, 0.64] | 0.07 | 0.33*** | 7.5 | < .001 |
| Baseline CD-RISC-25 | –0.03 [–0.8, 0.01] | 0.02 | –0.07 | –1.65 | .10 |

*Note. Adj.* $R^2 = .13$. ***$p < .001$. PHQ-9 = Patient Health Questionnaire. CD-RISC-25 = 25-item Connor-Davidson Resilience Scale

**PP Multiple Regression Analysis for 12-Month Outcomes.** A multiple regression analysis was performed using the PP sample ($n = 306$) with depression outcomes at

12-months post-randomisation as the dependent variable and resilience and baseline depression severity as the independent variables. Table 10 describes the results of the regression analysis. The multiple regression model significantly explained 14% of the variance in depression outcomes at 12 months ($F(2, 303) = 26.14$, $p < .001$, *adjusted* $R^2 = .14$). Inspection of the beta weights revealed that resilience did not make a significant contribution to the prediction of depression outcomes when controlled for baseline depression severity. All assumptions were met. Complete case analyses mirrored these results (Appendix H6).

**Table 10**

*Summary of PP Regression Analysis for 12-Month Outcomes (n = 306)*

| | *B* [95% CI] | Std. Error *B* | Std. Coefficient *β* | *t* | *p* |
|---|---|---|---|---|---|
| Baseline PHQ-9 | 0.56 [0.40, 0.73] | 0.09 | 0.37*** | 6.58 | < .001 |
| Baseline CD-RISC-25 | –0.02 [–0.71, 0.04] | 0.03 | –0.03 | –0.51 | .61 |

*Note. Adj.* $R^2 = .14$. ***$p < .001$. PHQ-9 = Patient Health Questionnaire. CD-RISC-25 = 25-item Connor-Davidson Resilience Scale

**Moderation Analyses.** The ITT and PP moderation analyses for 6- and 12-month outcomes indicated that treatment type did not significantly moderate the effect of baseline resilience on depression outcomes at either timepoint (Appendix I). Complete case analyses mirrored these results (Appendix J).

***Assessing the Resilience-Outcome Association Using the Reduced CD-RISC 12-Item Set***

The results of correlational analyses between baseline resilience measured using the reduced CD-RISC 12-item set and 6- and 12-month depression outcomes mirrored those using the complete CD-RISC-25 scale in both imputed and complete case analyses. The reduced 12-item set yielded slightly higher correlation coefficients compared to the full scale (Table 11). The correlation between baseline resilience and baseline depression severity was significant (Table 12). Complete case analyses showed similar results (Appendix K).

**Table 11**

*Pearson's Correlations Between Baseline Resilience (Using CD-RISC-25 and the Reduced CD-RISC 12-Item Set) and Depression Outcomes at 6- and 12-Months Post-Randomisation*

| Variable | 6 Month ITT PHQ-9 Imputed ($n$ = 510) | 6 Month PP PHQ-9 Imputed ($n$ = 306) | 12 Month ITT PHQ-9 Imputed ($n$ = 510) | 12 Month PP PHQ-9 Imputed ($n$ = 306) |
|---|---|---|---|---|
| CD-RISC-25 | –.20*** ($p$ < .001) | –.09 ($p$ = .10) | –.19*** ($p$ < .001) | –.16** ($p$ = .005) |
| CD-RISC Reduced 12-Item Set | –.23*** ($p$ < .001) | –.12* ($p$ = .04) | –.20*** ($p$ < .001) | –.16** ($p$ = .005) |

*Note.* * $p$ < .05. ** $p$ < .01. *** $p$ < .001. PHQ-9 = Patient Health Questionnaire. CD-RISC = Connor-Davidson Resilience Scale

**Table 12**

*Pearson's Correlations Between Baseline Resilience Using Reduced CD-RISC 12-Item Set and Baseline Depression Severity*

| Variable | ITT Baseline PHQ-9 ($n$ = 510) | PP Baseline PHQ-9 ($n$ = 306) |
|---|---|---|
| CD-RISC Reduced | –.39*** ($p$ < .001) | –.38*** ($p$ < .001) |

| 12-Item Set |
|---|

*Note.* *** $p < .001$. PHQ-9 = Patient Health Questionnaire. CD-RISC-25 = 25-item Connor-Davidson Resilience Scale

**ITT Multiple Regression Analysis of 6-Month Outcomes.** Table 13 describes the results of multiple regression analysis using the reduced CD-RISC 12-item set as the predictor. The multiple regression model significantly explained 14% of the variance in depression outcomes at 6 months ($F(2, 507) = 41.07$, $p < .001$, *adjusted* $R^2 = .14$). Inspection of the beta weights revealed that resilience and baseline depression severity made significant unique contributions to the prediction of depression outcomes, such that higher levels of baseline resilience and lower levels of baseline depression were associated with lower levels of depression at 6 months. The model met all statistical assumptions.

However, resilience was not a significant predictor in the PP 6-month analysis, nor the ITT and PP analyses of 12-month outcomes; in these analyses, the regression coefficient produced by the 12-item set was nearly identical to that produced by the full scale (Appendix L). Resilience did not significantly predict outcomes in any of the complete case analyses (Appendix M).

**Table 13**

*Summary of ITT Regression Analysis for 6-Month Outcomes (n = 510)*

| | *B* [95% CI] | Std. Error *B* | Std. Coefficient *β* | *t* | *p* |
|---|---|---|---|---|---|
| Baseline PHQ-9 | 0.46 [0.34, 0.60] | 0.06 | 0.32*** | 7.24 | < .001 |

| | | | | | |
|---|---|---|---|---|---|
| CD-RISC Reduced 12-Item Set | –0.08 [–0.15, –0.01] | 0.04 | –0.10* | –2.25 | .03 |

*Note. Adj.* $R^2$ = .14. *$p$ < .05 ***$p$ < .001. PHQ-9 = Patient Health Questionnaire.

## Discussion

The present study presents a secondary analysis of data from an RCT that investigated the non-inferiority of PCET compared to CBT in treating moderate and severe depression (PRaCTICED, Barkham et al., 2021). The present study aimed to assess whether baseline resilience could predict the outcomes of psychological therapies for depression at two time points: 6- and 12-months post-randomisation. An additional aim was to identify a subset of items from the resilience scale used in the trial (CD-RISC-25) that most effectively represented the construct of resilience for this sample, and to evaluate whether this enhanced its predictive utility. A secondary aim was to explore whether the predictive role of resilience differed between the two therapy modalities.

The present study examined the psychometric properties of the CD-RISC-25 within a previously untested population comprising UK adults with depression. Exploratory and confirmatory factor analyses identified a 12-item subset of the CD-RISC-25 as optimally capturing the construct of resilience in the trial sample. Compared to the original 25-item scale, the 12-item set demonstrated similarly high internal consistency and a more parsimonious, unidimensional factor structure. These findings align with previous research on the CD-RISC-25, which has reported high internal consistency (Wojujutari et al., 2024) and a unidimensional factor structure in some samples (Campbell-Sills & Stein, 2007; Velickovic et al., 2020; Arias González et al., 2015). However, the identification of a 12-item subset is a novel finding, differing from previously proposed shorter versions derived in distinct

populations: a 10-item scale in US undergraduates (Campbell-Sills & Stein, 2007) and 22-item scales in Swedish and Chilean non-clinical samples (Velickovic et al., 2020; Arias González et al., 2015). The variation in optimal item number underscores the sensitivity of the scale's structure to sample characteristics. The 12 items retained in the present study reflect tenacity, self-efficacy in coping with stress, and an internal locus of control. Conversely, items representing leadership tendencies, social support, and spirituality showed lower utility in representing resilience. The removal of items related to spirituality is noteworthy, aligning with findings from the Swedish study by Velickovic et al. (2020) and potentially reflecting a culture-specific component of resilience. The diversity of findings across studies highlights the importance of re-evaluating the CD-RISC-25's psychometric properties when applied to distinct samples.

The 12-item subset of the CD-RISC-25 demonstrated improved predictive utility for depression symptom severity at 6 and 12 months compared to the original scale. This finding supports the first hypothesis of the present study. The improved predictive utility was evidenced by stronger correlations between baseline resilience scores and depression severity at both time points. Specifically, the observed significant, negative correlations confirmed that higher baseline resilience was associated with lower depression severity at 6 and 12 months. This aligns with previous research by Konradt et al. (2018), who reported a significant, negative correlation ($r = –.30$) between baseline resilience and end-of-treatment depression severity in a secondary analysis of an RCT comparing two cognitive therapies.

Nevertheless, in regression analyses controlling for baseline depression severity, baseline resilience predicted depression symptom severity significantly only at the 6-month timepoint within the intention-to-treat (ITT) population. Resilience was not a significant predictor in the 6-month per-protocol (PP) analysis, nor did it significantly predict depression symptom severity at 12 months in either the ITT or PP populations. Consequently, these

results do not fully support the second hypothesis, which posited that higher baseline resilience would predict better outcomes at both 6- and 12-months post-randomisation.

The discrepancy in 6-month findings between the significant ITT analysis and the nonsignificant PP analysis, when controlling for baseline depression severity, is likely due to the PP analysis's lower statistical power (59% for detecting a small effect size). Therefore, the nonsignificant outcome in the PP population does not rule out the existence of a real effect but may indicate that the analysis lacked the sensitivity to detect it. Alternatively, the divergent findings may stem from the distinct composition of the ITT and PP populations, determined by adherence to the minimum therapy dose criterion. The ITT population comprised all randomised participants, including those who received at least four sessions (thereby fulfilling the PP criteria), and those who did not, for various reasons, including early withdrawal or poor adherence.

Given that higher baseline resilience predicted lower depression severity in the ITT population, it is plausible that this association is partly influenced by participants who did not receive the minimum therapy dose. Specifically, individuals with lower baseline resilience may have demonstrated reduced engagement or adherence to therapy, failing to reach the four-session threshold, and consequently exhibiting higher depression severity at 6 months. In contrast, the PP analysis is restricted to participants who received at least four sessions. Within this more adherent group, the effects of the intervention itself might have become the primary driver of improvement in depression severity, potentially diminishing the relative importance or observable effect of baseline resilience at 6 months.

In contrast, Konradt et al. (2018) reported that the correlation between resilience and outcomes remained statistically significant after controlling for baseline depression severity. Importantly, their sample consisted exclusively of participants who completed the intervention. Although not directly comparable, the significant finding in a completer sample

by Konradt et al. (2018) contrasts with the nonsignificant result observed in the baseline-severity-controlled PP analysis in the present study. Regrettably, Konradt et al. (2018) did not report specific adjusted data, thus precluding a more detailed comparison with the present analyses.

The observation that the significant negative correlation between baseline resilience and depression outcomes at 12 months became nonsignificant after controlling for baseline depression severity may be explained by the confounding influence of the relationship between baseline resilience and baseline depression. A significant negative correlation (ITT: $r = –.39$; PP: $r = –.38$) between these two baseline measures confirms that participants with higher baseline resilience tended to enter the study with lower depression severity. Therefore, a considerable part of the bivariate relationship observed between baseline resilience and later depression severity is likely attributable to this initial difference in baseline depression levels. Although baseline resilience and baseline depression were correlated, the magnitude of the correlation between them indicated that they were not entirely overlapping. However, when baseline depression severity is statistically controlled in regression models predicting outcomes, its strong influence may appear to mask any unique predictive contribution from resilience. Nevertheless, this finding contradicts results by Konradt et al. (2018), who reported a significant inverse relationship between baseline resilience and depression severity at their 6-month follow-up that remained statistically significant after controlling for baseline depression. To the best of the author's knowledge, no other studies investigated the predictive utility of baseline resilience on longer-term outcomes for depression.

Finally, a significant moderating effect of therapy type (CBT vs PCET) on the relationship between baseline resilience and outcomes was not found at either timepoint, which was in contrast to the secondary hypothesis of the present study. This indicates that the predictive utility of resilience does not differ between these two therapy modalities.

**Strengths, Limitations and Future Research**

The present study benefited from several strengths inherent in the RCT design of the original study. First, strict inclusion and exclusion criteria defined a clear population of adults with moderate and severe depression, enhancing the applicability of the findings to this specific group. Second, a high degree of treatment adherence and fidelity was ensured through trained therapists adhering to treatment manuals, supervision, and independent rating of session recordings using benchmark scales. This rigour strengthened the internal validity of the observed intervention effects. Moreover, the ecological validity of the results was bolstered by the PRaCTICED trial's implementation within a routine psychological therapy service (IAPT) and its adherence to standard service treatment protocols.

The present study was strengthened by several methodological approaches. First, the CD-RISC-25 was re-evaluated in a sample of UK adults with depression to identify a subset of items with improved predictive utility for depression outcomes. Comparing the predictive utility of the original scale with the 12-item subset enhanced the study's sensitivity to detect an association between baseline resilience and treatment outcomes. Secondly, analysing data within both the ITT and PP populations provided valuable insights. This approach allowed for evaluation of predictive potential in a real-world-like setting (ITT) while also examining the association among those receiving a minimum therapeutic dose (PP), revealing a noteworthy difference in the predictive utility of resilience between these two populations at the 6-month timepoint. Future research should investigate the association between baseline resilience and treatment engagement or adherence (e.g. dropout) to elucidate the mechanisms underlying the link between baseline resilience and treatment outcomes.

The present study was limited by a lack of statistical power, specifically in the PP regression analyses, potentially precluding the identification of a significant association between baseline resilience and outcomes. Furthermore, the psychometric evaluation of the

CD-RISC-25 was limited to factor analysis (i.e. test-retest reliability and responsiveness were not assessed), which restricts the generalisability of findings beyond the trial population. Consequently, the identified 12-item subset is not recommended for use as a standalone scale beyond this study. Future research should conduct a comprehensive psychometric evaluation of the CD-RISC-25 in UK populations with depression to establish the optimal factor structure and item combination for this group. As highlighted by Windle et al. (2011), evaluating the scale's test-retest reliability and floor/ceiling effects warrants particular attention, given the scarcity of research on these properties.

The absence of Patient and Public Involvement (PPI) during the study's design phase constitutes a notable limitation. Future PPI engagement will be crucial for refining the terminology used to communicate findings. For example, the term "resilience" carries diverse connotations and could be perceived in potentially harmful ways, particularly if a "lack of resilience" is interpreted as a personal failing rather than a modifiable characteristic or a construct influenced by systemic factors. To address this, a PPI group of individuals with lived experience will be consulted during the dissemination process to ensure the study findings are communicated sensitively and effectively.

**Clinical Implications**

The differing factor structure and item performance of the CD-RISC-25 in this population underscore the necessity of verifying its psychometric properties when applied to new clinical groups. Such scrutiny is crucial for maximising the scale's clinical utility. A more sensitive measure of resilience could enable precise assessment at intake, potentially informing the need for resilience-building interventions to enhance treatment effectiveness.

Regarding the predictive utility of baseline resilience for treatment outcomes, the findings present a mixed picture. While some association was observed, the unique predictive ability of resilience beyond that of baseline depression severity remains uncertain. Further

research is essential to clarify this relationship and its implications for clinical decisions, including treatment personalisation. Notably, investigating whether lower baseline resilience predicts therapy dropout warrants attention. If confirmed, brief pre-treatment interventions aimed at bolstering resilience could be a valuable strategy for improving treatment effectiveness.

## Conclusion

The present study investigated whether pre-treatment resilience predicted depression severity at 6- and 12-months post-randomisation in an RCT that explored CBT and PCET in the treatment of depression. The CD-RISC-25 was evaluated in the trial population, identifying a subset of 12 items that best represented resilience. The 12-item subset demonstrated improved predictive utility compared to the original scale, therefore maximising the scale's sensitivity to detect an association between resilience and treatment outcomes.

While correlational analyses revealed a significant inverse relationship between baseline resilience and depression severity at both timepoints, regression analyses controlling for baseline depression presented a more nuanced picture. For 6-month outcomes, higher levels of resilience significantly predicted lower depression in the ITT population but not in the PP population, a discrepancy potentially attributable to reduced statistical power or the interaction between resilience and engagement with treatment. Resilience did not independently predict 12-month outcomes, suggesting its limited prognostic value for long-term outcomes beyond that of baseline depression severity. The type of treatment did not moderate the resilience-outcome association. While these findings hint at a potential association of resilience with treatment outcomes, further research is crucial to definitively establish the prognostic utility of resilience in depression treatment.

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# Appendix A

## University of Sheffield Ethics Approval

The University Of Sheffield.

Downloaded: 07/02/2024
Approved: 03/01/2024

Adriana Nitranska
Registration number: 220237697
Psychology
Programme: Doctorate in Clinical Psychology

Dear Adriana

**PROJECT TITLE:** Resilience as a Predictor of Cognitive Behavioural Therapy and Person-Centred Experiential Therapy Outcomes in the Treatment of Depression: A quantitative secondary analysis of the PRaCTICED trial data
**APPLICATION:** Reference Number 058235

This letter confirms that you have signed a University Research Ethics Committee-approved self-declaration to confirm that your research will involve only existing research, clinical or other data that has been robustly anonymised. You have judged it to be unlikely that this project would cause offence to those who originally provided the data, should they become aware of it.

As such, on behalf of the University Research Ethics Committee, I can confirm that your project can go ahead on the basis of this self-declaration.

If during the course of the project you need to deviate significantly from the above-approved documentation please inform me since full ethical review may be required.

Yours sincerely

Department Of Psychology Research Ethics Committee
Departmental Ethics Administrator

## Appendix B

## Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001)

# Appendix C

## 25-Item Connor-Davidson Resilience Scale (CD-RISC-25; Connor & Davidson, 2003)

## Appendix D

## List of Variables Used in the Imputation Model

- Clinical Interview Schedule - Revised (CIS-R; Brugha et al., 1994) depression severity (moderate/severe)
- Treatment type (CBT/PCET)
- Age, gender, ethnicity, IMD score, employment status, referral sector
- Baseline scores on the following questionnaires: Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001), Generalised Anxiety Disorder Questionnaire (GAD-7; Spitzer et al., 2006), Work and Social Adjustment Scale (WSAS; Mundt et al., 2002), Beck Depression Inventory-II (BDI-II; Beck et al., 1996)
- 6-month scores on: PHQ-9, GAD-7, WSAS
- 12-month scores on: PHQ-9, GAD-7, WSAS
- CD-RISC-25 individual item scores
- First and final session scores on the PHQ-9, GAD-7, WSAS, and IAPT phobia scale
- Waiting time for therapy
- Total session number of CBT/PCET at 6 months
- Total session number of CBT/PCET at 12 months
- Total session number of CBT/PCET after 12 months

# Appendix E

## Exploratory Factor Analysis Figures and Tables

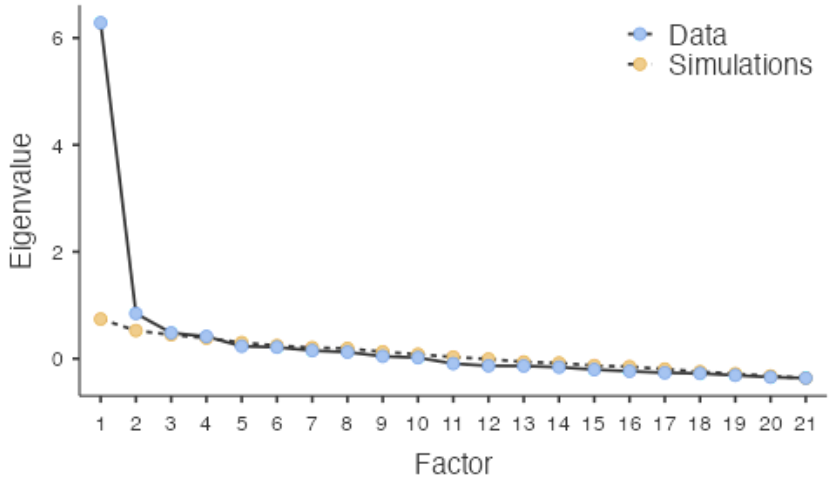
### Appendix E1

*Parallel Analysis (Items 2, 3, 9, and 13 Removed, Imputed Sample)*

Initial Eigenvalues

| Factor | Eigenvalue |
|---|---|
| 1 | 6.2837 |
| 2 | 0.8452 |
| 3 | 0.4821 |
| 4 | 0.4148 |
| 5 | 0.2324 |
| 6 | 0.2140 |
| 7 | 0.1506 |
| 8 | 0.1222 |
| 9 | 0.0436 |
| 10 | 0.0188 |
| 11 | -0.0926 |
| 12 | -0.1336 |
| 13 | -0.1370 |
| 14 | -0.1596 |
| 15 | -0.2049 |
| 16 | -0.2353 |
| 17 | -0.2648 |
| 18 | -0.2764 |
| 19 | -0.3114 |
| 20 | -0.3454 |
| 21 | -0.3624 |

Scree Plot




## Appendix E2

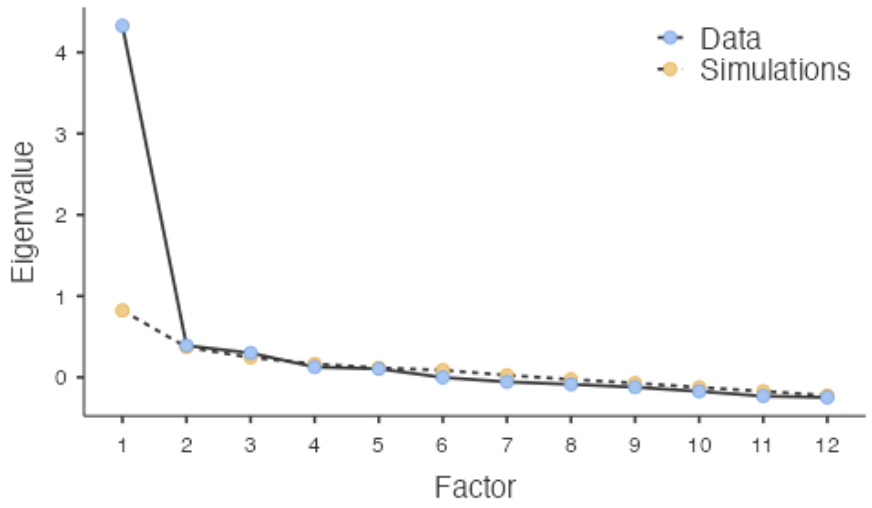
*Parallel Analysis (Final 12-Item Set, Imputed Sample)*

### Eigenvalues

Initial Eigenvalues

| Factor | Eigenvalue |
|---|---|
| 1 | 4.32631 |
| 2 | 0.39032 |
| 3 | 0.29905 |
| 4 | 0.12593 |
| 5 | 0.10450 |
| 6 | -0.00167 |
| 7 | -0.05631 |
| 8 | -0.08666 |
| 9 | -0.12184 |
| 10 | -0.17322 |
| 11 | -0.23203 |
| 12 | -0.24749 |

**Scree Plot**


Data
Simulations
Eigenvalue
Factor
0
1
2
3
4
1
2
3
4
5
6
7
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9
10
11
12

# Appendix F

## Complete Case EFA and CFA

### *EFA of CD-RISC-25 (Complete Case Analysis)*

The complete case sample ($n$ = 462) was randomly divided into two subsamples, each comprising 231 participants. Subsample 1 was used for EFA, and subsample 2 was used for CFA.

**Preliminary Analyses.** Despite the smaller sample size ($n$ = 231), Bartlett's test was significant ($p < .001$), indicating that the correlation matrix was not random. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was .89, indicating a "meritorious" sample size (Kaiser & Rice, 1974). The individual item KMO values were all above .5. The Cronbach's $\alpha$ value of the 25-item scale was .89. The polychoric correlation matrix was inspected for correlations below .3 or above .9; no correlations greater than .9 were found. Items 2, 3, 9, and 13 only had a correlation coefficient higher than .3 with one other item (Q2 with Q13 = .56, and Q3 with Q9 = .42). This indicated a poor fit with the rest of the items, therefore, these items were removed.

**Factor Extraction.** The parallel analysis and scree plot indicated that one factor should be extracted (Figure F1). Exploratory factor analysis (EFA) was conducted using the weighted least squares mean and variance adjusted (WLSMV) estimation method, extracting one factor. Table F1 illustrates the factor loadings for the extracted one-factor solution. Model fit was acceptable: $\chi^2$ (189, $N$ = 231) = 512, $p < .001$, RMSEA = .09, 90% CI [.08, .10], CFI = .91, TLI = .90, SRMR = .06), supporting the adequacy of the one-factor model for the data.

**Table F1**

*Factor Loadings of the One-Factor Solution of the Exploratory Factor Analysis Using WLSMV (Complete Case Analysis)*

| Item | Factor 1 loading ($\beta$) |
|---|---|
| Q24 I work to attain my goals no matter what roadblocks I encounter along the way | .74 |
| Q17 I think of myself as a strong person when dealing with life's challenges and difficulties | .73 |
| Q11 I believe I can achieve my goals, even if there are obstacles | .72 |
| Q14 Under pressure, I stay focused and think clearly | .70 |
| Q8 I tend to bounce back after illness, injury or other hardships | .68 |
| Q19 I am able to handle unpleasant or painful feelings like sadness, fear, and anger | .67 |
| Q12 Even when things look hopeless, I don't give up | .65 |
| Q23 I like challenges | .64 |
| Q4 I can deal with whatever comes my way | .64 |
| Q5 Past successes give me confidence in dealing with new challenges and difficulties | .64 |
| Q16 I am not easily discouraged by failure | .64 |
| Q15 I prefer to take the lead in solving problems rather than letting others make all the decisions | .63 |
| Q22 I feel in control of my life | .63 |
| Q18 I can make unpopular or difficult decisions that affect other people, if it is necessary | .62 |
| Q25 I take pride in my achievements | .61 |
| Q7 Having to cope with stress can make me stronger | .54 |
| Q1 I am able to adapt when changes occur | .54 |
| Q21 I have a strong sense of purpose in life | .52 |
| Q20 In dealing with life's problems, sometimes you have to act on a hunch without knowing why | .48 |
| Q6 I try to see the humorous side of things when I am faced with problems | .38 |

| Item | Factor 1 loading ($\beta$) |
|---|---|
| Q10 I give my best effort no matter what the outcome may be | .33 |

*Note.* $N = 231$. Adapted from "Connor, K. M., & Davidson, J. R. T. (2003). Development of a new resilience scale: The Connor-Davidson Resilience Scale (CD-RISC). *Depression and Anxiety, 18*(2), 76–82. https://doi.org/10.1002/da.10113."

**Item Removal.** As a unidimensional solution was determined, Cronbach's $\alpha$ was calculated for the whole scale (21 items), yielding a value of .90. Table F2 shows the item reliability statistics. In the analysis using imputed data, 12 items were highlighted with best properties in terms of factor loadings, item-rest correlations and impact on Cronbach's $\alpha$ if deleted. In the current complete case sample, the top 12 items were 4, 5, 8, 11, 12, 14, 15, 16, 17, 19, 23 and 24; these had factor loadings (> .62), and item-rest correlations (> .54). Additionally, their deletion would have lowered overall Cronbach's $\alpha$ more than the deletion of the rest of the items. Considering these metrics collectively, the decision was made to retain these 12 items as the final set. Items were removed one by one, and the impact of each item's deletion on Cronbach's $\alpha$ was monitored. EFA was rerun on the final 12-item set to inspect the impact of item deletion on the factor solution. Parallel analysis indicated a one-factor solution (Figure F2). The 12-item set demonstrated acceptable fit indices: $\chi^2$ (54, $N$ = 231) = 196, $p < .001$, RMSEA = .10, 90% CI [.09, 0.12], CFI = .94, TLI = .92, SRMR = .05), with factor loading between .61 and .73. The 12-item set identified in the current complete case analysis differed from the imputed analysis in that items 15 and 16 were identified here instead of items 7 and 22.

**Table F2**

*Item Reliability Statistics (Complete Case Analysis)*

| Item | Item-rest correlation | Cronbach's α if item deleted |
|---|---|---|
| Q17 I think of myself as a strong person when dealing with life's challenges and difficulties | .66 | .895 |
| Q11 I believe I can achieve my goals, even if there are obstacles | .63 | .896 |
| Q24 I work to attain my goals no matter what roadblocks I encounter along the way | .64 | .896 |
| Q8 I tend to bounce back after illness, injury or other hardships | .62 | .897 |
| Q14 Under pressure, I stay focused and think clearly | .63 | .897 |
| Q19 I am able to handle unpleasant or painful feelings like sadness, fear, and anger | .59 | .897 |
| Q4 I can deal with whatever comes my way | .57 | .898 |
| Q5 Past successes give me confidence in dealing with new challenges and difficulties | .56 | .898 |
| Q12 Even when things look hopeless, I don't give up | .57 | .898 |
| Q15 I prefer to take the lead in solving problems rather than letting others make all the decisions | .56 | .898 |
| Q23 I like challenges | .57 | .898 |
| Q16 I am not easily discouraged by failure | .54 | .899 |
| Q18 I can make unpopular or difficult decisions that affect other people, if it is necessary | .54 | .899 |
| Q22 I feel in control of my life | .53 | .899 |
| Q25 I take pride in my achievements | .53 | .899 |
| Q1 I am able to adapt when changes occur | .47 | .900 |
| Q7 Having to cope with stress can make me stronger | .48 | .900 |

| Item | Item-rest correlation | Cronbach's α if item deleted |
|---|---|---|
| Q20 In dealing with life's problems, sometimes you have to act on a hunch without knowing why | .42 | .901 |
| Q21 I have a strong sense of purpose in life | .42 | .902 |
| Q6 I try to see the humorous side of things when I am faced with problems | .32 | .905 |
| Q10 I give my best effort no matter what the outcome may be | .29 | .905 |

*Note.* $N = 231$. Adapted from "Connor, K. M., & Davidson, J. R. T. (2003). Development of a new resilience scale: The Connor-Davidson Resilience Scale (CD-RISC). *Depression and Anxiety, 18*(2), 76–82. https://doi.org/10.1002/da.10113."

***Confirmatory Factor Analysis (CFA) of the Reduced 12-Item Set (Complete Case Analysis)***

To evaluate the psychometric properties of the unidimensional 12-item set, a CFA using WLSMV estimation was conducted on the randomly selected second half of the complete case sample ($n = 231$). The 12-item set demonstrated good model fit: $\chi^2$ (54, $N = 231$) = 93.1, $p < .001$, CFI = .95, TLI = .94, RMSEA = .06, 90% CI [.04, .08], SRMR = .05. The results of the CFA thus support the model obtained via EFA. All 12 items loaded moderately to strongly (> .44) on a single factor (Table F3). The final 12-item set also demonstrated good internal consistency with a Cronbach's $\alpha$ of .88, which was marginally lower compared to the original 25-item scale ($\alpha = .89$) and well above the acceptable level of .7 (Kline, 1999). Therefore, the results suggested that the 12-item set demonstrated acceptable structural validity while providing a concise and efficient metric.

**Table F3**

*Standardised Loadings for the One-Factor 12-Item Set (Complete Case Analysis)*

| Item | Factor 1 loading ($\beta$) |
|---|---|
| Q11 I believe I can achieve my goals, even if there are obstacles | .66 |
| Q24 I work to attain my goals no matter what roadblocks I encounter along the way | .61 |
| Q4 I can deal with whatever comes my way | .64 |
| Q12 Even when things look hopeless, I don't give up | .67 |
| Q5 Past successes give me confidence in dealing with new challenges and difficulties | .67 |
| Q17 I think of myself as a strong person when dealing with life's challenges and difficulties | .72 |
| Q14 Under pressure, I stay focused and think clearly | .61 |
| Q23 I like challenges | .60 |
| Q15 I prefer to take the lead in solving problems rather than letting others make all the decisions | .58 |
| Q16 I am not easily discouraged by failure | .55 |
| Q8 I tend to bounce back after illness, injury or other hardships | .44 |
| Q19 I am able to handle unpleasant or painful feelings like sadness, fear, and anger | .55 |

*Note.* $N = 213$. Adapted from "Connor, K. M., & Davidson, J. R. T. (2003). Development of a new resilience scale: The Connor-Davidson Resilience Scale (CD-RISC). *Depression and Anxiety, 18*(2), 76–82. https://doi.org/10.1002/da.10113."

**Figure F1**

*Parallel Analysis (Items 2, 3, 9, and 13 Removed, Complete Case Analysis)*

## Eigenvalues

Initial Eigenvalues

| Factor | Eigenvalue |
|---|---|
| 1 | 6.7619 |
| 2 | 0.8855 |
| 3 | 0.5266 |
| 4 | 0.3548 |
| 5 | 0.3135 |
| 6 | 0.2071 |
| 7 | 0.1643 |
| 8 | 0.1008 |
| 9 | 0.0222 |
| 10 | -0.0190 |
| 11 | -0.0712 |
| 12 | -0.1262 |
| 13 | -0.1577 |
| 14 | -0.1695 |
| 15 | -0.2048 |
| 16 | -0.2244 |
| 17 | -0.2439 |
| 18 | -0.2878 |
| 19 | -0.3235 |
| 20 | -0.3646 |
| 21 | -0.3819 |

**Scree Plot**

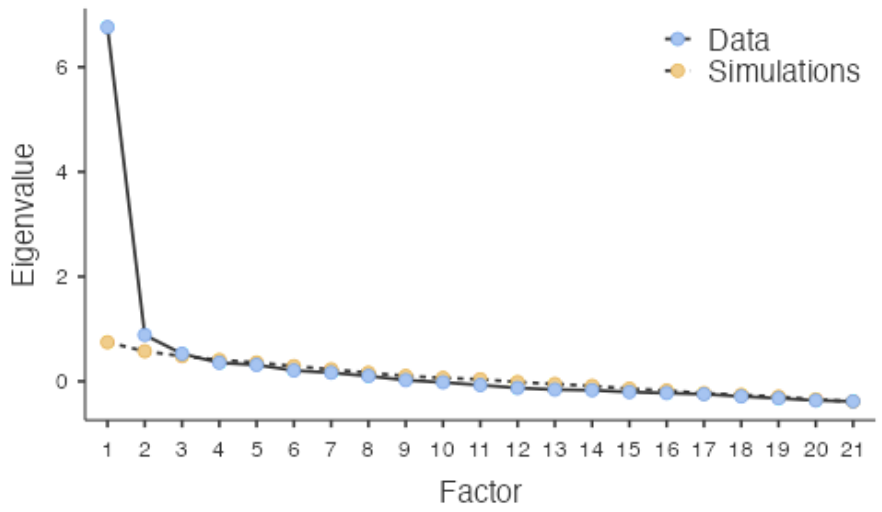


**Figure F2**

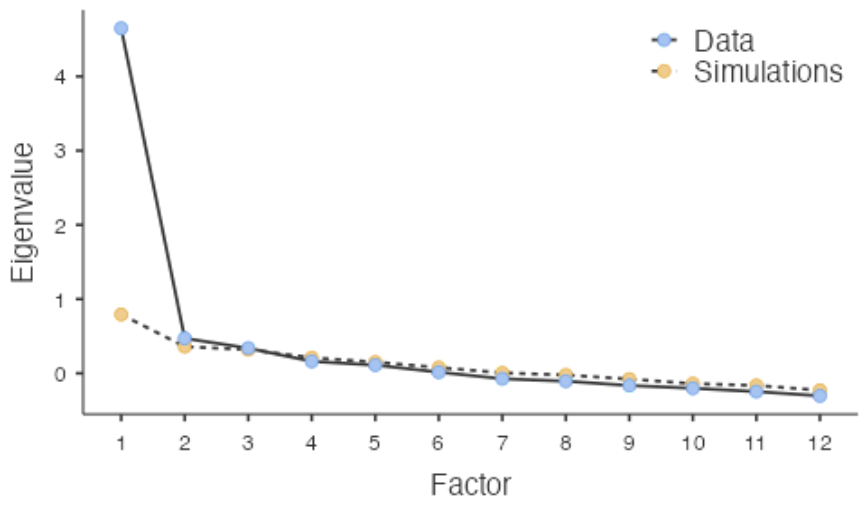
*Parallel Analysis (Final 12-Item Set, Complete Case Analysis)*

## Eigenvalues

Initial Eigenvalues

| Factor | Eigenvalue |
|---|---|
| 1 | 4.6482 |
| 2 | 0.4711 |
| 3 | 0.3389 |
| 4 | 0.1605 |
| 5 | 0.1107 |
| 6 | 0.0151 |
| 7 | -0.0736 |
| 8 | -0.1061 |
| 9 | -0.1643 |
| 10 | -0.2018 |
| 11 | -0.2465 |
| 12 | -0.3036 |

**Scree Plot**



# Appendix G

## Complete Case Correlational Analyses

**Table G1**

*Complete Case Correlations Between Baseline Resilience and Depression at 6- and 12-Months Post-Randomisation*

| Variable | 6 Month ITT PHQ-9 ($n$ = 360) | 6 Month PP PHQ-9 ($n$ = 260) | 12 Month ITT PHQ-9 ($n$ = 290) | 12 Month PP PHQ-9 ($n$ = 216) |
|---|---|---|---|---|
| CD-RISC-25 | -.17** ($p$ = .002) | -.07 ($p$ = .23) | -.14* ($p$ = .02) | -.15* ($p$ = .03) |

*Note.* * $p < .05$. ** $p < .01$. PHQ-9 = Patient Health Questionnaire. CD-RISC-25 = 25-item Connor-Davidson Resilience Scale

**Table G2**

*Complete Case Correlations Between Baseline Resilience and Baseline Depression Severity*

| Variable | ITT Baseline PHQ-9 ($n$ = 462) | PP Baseline PHQ-9 ($n$ = 278) |
|---|---|---|
| CD-RISC-25 | –.36*** ($p < .001$) | –.36*** ($p < .001$) |

*Note.* *** $p < .001$. PHQ-9 = Patient Health Questionnaire. CD-RISC-25 = 25-item Connor-Davidson Resilience Scale

# Appendix H

## Appendix H1

## Statistical Assumptions of the Imputed ITT Multiple Regression Analysis of 6-Month Outcomes

Visual inspection of the scatter plot of residuals indicated that the assumptions of linearity and homoscedasticity were met. Visual inspection of the histogram and normal probability plot indicated that the assumption of normality was met. The assumption of no multicollinearity was met, as the correlation coefficient between baseline resilience and baseline PHQ-9 was below 0.9 ($r = –.36$), the variance inflation factor was less than 10 (VIF = 1.15) and the tolerance value was greater than .2 (tolerance = .87). Inspection of casewise diagnostics revealed that no cases had a standardised residual greater than 3, indicating no concerning outliers in the data. Furthermore, no more than 1% of the cases had standardised residuals with a value greater than 2.58, indicating an acceptable level of error in the model. Cases with values greater than 2 did not exceed 5%, indicating that the model provided a good representation of the data. Mahalanobis distances were inspected using a cut-off point based on the critical value of chi-square for $p = .05$ and two predictors (5.99). Twenty-two cases exceeding this value were found, representing multivariate outliers. This finding was cross-referenced with indicators of the influence of these cases on the regression model. Inspection of Cook's distances revealed no cases with a value greater than 1, indicating that no cases had an undue influence on the model (Cook & Weisberg, 1995). Inspection of standardised DFBeta values revealed no cases above 1, indicating that no cases exerted a large influence. These additional investigations suggested that the multivariate outliers identified by Mahalanobis distances did not exert a large influence on regression parameters and, therefore, were kept in the analysis.

## Appendix H2

## Complete Case ITT Multiple Regression Analysis of 6-Month Outcomes

The power analysis indicated that with a sample of 360, it would be possible to detect a minimum effect size of $f^2 = 0.02$, with alpha set at .05, at 66% power. Therefore, the complete case ITT regression analysis was underpowered (Cohen, 1992). A multiple regression analysis was performed with depression outcomes at 6-months post-randomisation as the dependent variable and resilience and baseline depression severity as the independent variables. Table H2 describes the results of the regression analysis. The multiple regression model significantly explained 12% of the variance in depression outcomes at 6 months ($F(2, 357) = 24.37$, $p < .001$, *adjusted* $R^2 = .12$). Inspection of the beta weights revealed that resilience did not make a significant contribution to the prediction of depression outcomes when controlled for baseline depression severity. All statistical assumptions were met.

**Table H2**

*Summary of Complete Case ITT Regression Analysis for 6-Month Outcomes (n = 360)*

| Variable | *B* [95% CI] | Std. Error *B* | Std. Coefficient *β* | *t* | *p* |
|---|---|---|---|---|---|
| Baseline PHQ-9 | 0.50 [0.34, 0.66] | 0.08 | 0.33*** | 6.13 | < .001 |
| Baseline CD-RISC-25 | –0.02 [-0.07, 0.03] | 0.03 | –0.05 | –0.86 | .39 |

*Note. Adj.* $R^2 = .12$. *** $p < .001$. PHQ-9 = Patient Health Questionnaire. CD-RISC-25 = 25-item Connor-Davidson Resilience Scale

## Appendix H3

## Complete Case PP Multiple Regression Analysis of 6-Month Outcomes

The power analysis indicated that with a sample of 260, it would be possible to detect a minimum effect size of $f^2 = 0.02$, with alpha set at .05, at 52% power. Therefore, the complete case ITT regression analysis was underpowered (Cohen, 1992). A multiple regression analysis was performed with depression outcomes at 6-months post-randomisation as the dependent variable and resilience and baseline depression severity as the independent variables. Table H3 describes the results of the regression analysis. The multiple regression model significantly explained 11% of the variance in depression outcomes at 6 months ($F(2, 257) = 16.36$, $p < .001$, *adjusted* $R^2 = .11$). Inspection of the beta weights revealed that resilience did not make a significant contribution to the prediction of depression outcomes when controlled for baseline depression severity. All statistical assumptions were met.

**Table H3**

*Summary of Complete Case PP Regression Analysis for 6-Month Outcomes (n = 260)*

| Variable | *B* [95% CI] | Std. Error *B* | Std. Coefficient *β* | *t* | *p* |
|---|---|---|---|---|---|
| Baseline PHQ-9 | 0.52 [0.34, 0.70] | 0.09 | 0.35*** | 5.58 | < .001 |
| Baseline CD-RISC-25 | 0.03 [-0.03, 0.09] | 0.03 | 0.06 | 0.96 | .34 |

*Note. Adj.* $R^2 = .11$. *** $p < .001$. PHQ-9 = Patient Health Questionnaire. CD-RISC-25 = 25-item Connor-Davidson Resilience Scale

## Appendix H4

## Statistical Assumptions of the Imputed ITT Multiple Regression Analysis of 12-Month Outcomes

Visual inspection of the scatter plot of residuals indicated that the assumptions of linearity and homoscedasticity were met. Visual inspection of the histogram and normal probability plot indicated that the assumption of normality was met. The assumption of no multicollinearity was met, as the correlation coefficient between baseline resilience and baseline PHQ-9 was below .9 ($r = –.36$), the variance inflation factor was less than 10 (VIF = 1.51) and the tolerance value was greater than .2 (tolerance = .87). Inspection of casewise diagnostics revealed that no cases had a standardised residual greater than 3, indicating no concerning outliers in the data. Furthermore, no more than 1% of the cases had standardised residuals with a value greater than 2.58, indicating an acceptable level of error in the model. Cases with values greater than 2 did not exceed 5%, indicating that the model provided a good representation of the data. Mahalanobis distances were inspected using a cut-off point based on the critical value of chi-square for $p = .05$ and two predictors (5.99). Twenty-three cases exceeding this value were found, representing multivariate outliers. This finding was cross-referenced with indicators of the influence of these cases on the regression model. Inspection of Cook's distances revealed no cases with a value greater than 1, indicating that no cases had an undue influence on the model (Cook & Weisberg, 1995). Inspection of standardised DFBeta values revealed no cases above 1, indicating that no cases exerted a large influence. These additional investigations suggested that the multivariate outliers identified by Mahalanobis distances did not exert a large influence on regression parameters and, therefore, were kept in the analysis.

## Appendix H5

### Complete Case ITT Multiple Regression Analysis of 12-Month Outcomes

The power analysis indicated that with a sample of 290, it would be possible to detect a minimum effect size of $f^2 = 0.02$, with alpha set at .05, at 56% power. Therefore, the complete case ITT regression analysis was underpowered (Cohen, 1992). A multiple regression analysis was performed with depression outcomes at 12-months post-randomisation as the dependent variable and baseline resilience and depression severity as the independent variables. Table H5 describes the results of the regression analysis. The multiple regression model significantly explained 10% of the variance in depression outcomes at 12 months ($F(2, 287) = 17.22$, $p < .001$, *adjusted* $R^2 = .10$). Inspection of the beta weights revealed that resilience did not make a significant contribution to the prediction of depression outcomes when controlled for baseline depression severity. All statistical assumptions were met.

**Table H5**

*Summary of Complete Case ITT Regression Analysis of 12-Month Outcomes (n = 290)*

| Variable | *B* [95% CI] | Std. Error *B* | Std. Coefficient *β* | *t* | *p* |
|---|---|---|---|---|---|
| Baseline PHQ-9 | 0.55 [0.35, 0.76] | 0.10 | 0.32*** | 5.29 | < .001 |
| Baseline CD-RISC-25 | –0.01 [-0.07, 0.05] | 0.03 | –0.03 | –0.46 | .65 |

*Note. Adj.* $R^2 = .10$. ***$p < .001$. PHQ-9 = Patient Health Questionnaire. CD-RISC-25 = 25-item Connor-Davidson Resilience Scale

## Appendix H6

## Complete Case PP Multiple Regression Analysis of 12-Month Outcomes

The power analysis indicated that with a sample of 216, it would be possible to detect a minimum effect size of $f^2 = 0.02$, with alpha set at .05, at 44% power. Therefore, the complete case ITT regression analysis was underpowered (Cohen, 1992). A multiple regression analysis was performed with depression outcomes at 12-months post-randomisation as the dependent variable and resilience and baseline depression severity as the independent variables. Table H6 describes the results of the regression analysis. The multiple regression model significantly explained 14% of the variance in depression outcomes at 12 months ($F(2, 213) = 17.82$, $p < .001$, *adjusted* $R^2 = .14$). Inspection of the beta weights revealed that resilience did not make a significant contribution to the prediction of depression outcomes when controlled for baseline depression severity. All statistical assumptions were met.

**Table H6**

*Summary of Complete Case PP Regression Analysis of 12-Month Outcomes (n = 216)*

| Variable | *B* [95% CI] | Std. Error *B* | Std. Coefficient *β* | *t* | *p* |
|---|---|---|---|---|---|
| Baseline PHQ-9 | 0.61 [0.39, 0.83] | 0.11 | 0.37*** | 5.46 | < .001 |
| Baseline CD-RISC-25 | –0.01 [-0.08, 0.06] | 0.04 | –0.02 | –0.36 | .72 |

*Note. Adj.* $R^2 = .14$. ***$p < .001$. PHQ-9 = Patient Health Questionnaire. CD-RISC-25 = 25-item Connor-Davidson Resilience Scale

# Appendix I

## Imputed Moderation Analysis Results

### *Imputed Moderation Power Analysis*

The moderation power analysis indicated that with the ITT sample of 510 and three predictor variables, it would be possible to detect a minimum effect size of $f^2 = 0.02$, with alpha set at .05, at 77% power. For the PP sample of 306 and three predictor variables, the same minimum effect size would be detectable at 52% power. Therefore, the moderation analyses were underpowered (Cohen, 1992).

### *Moderation Analysis*

In the ITT analysis of 6-month outcomes, the overall model was significant, $F(4, 505) = 19.93$, $p < .001$, $R^2 = .14$, indicating that the predictors collectively accounted for a significant proportion (14%) of variance in depression severity. Table I1 illustrates that the only significant predictor was baseline depression severity. Treatment type did not significantly moderate the effect of baseline resilience on depression outcomes at 6 months.

**Table I1**

*Imputed ITT Moderation Analysis of Predictors of 6-Month Outcomes (n = 510)*

| Varaiable | *B* | *SE B* | *t* | *p* |
|---|---|---|---|---|
| Constant | 5.79 | 2.84 | 2.04 | .04 |
| CD-RISC-25 | –0.04 | 0.06 | –0.64 | .52 |
| Treatment Type | –0.24 | 1.51 | –0.16 | .87 |
| CD-RISC-25 x Treatment Type | 0.002 | 0.04 | 0.06 | .95 |
| Baseline PHQ9 | 0.48*** | 0.06 | 7.52 | < .001 |

*Note. Adj.* $R^2$ = .14. ***$p$ < .001. PHQ-9 = Patient Health Questionnaire. CD-RISC-25 = 25-item Connor-Davidson Resilience Scale

In the PP analysis of 6-month outcomes, the overall model was significant, F(4, 301) = 11.18, $p$ < .001, $R^2$ = .13, indicating that the predictors collectively accounted for a significant proportion (13%) of variance in depression severity. Table I2 illustrates that the only significant predictor was baseline depression severity. Treatment type did not significantly moderate the effect of baseline resilience on depression outcomes at 6 months.

**Table I2**

*Imputed PP Moderation Analysis of Predictors of 6-Month Outcomes (n = 306)*

| Variable | *B* | *SE B* | *t* | *p* |
|---|---|---|---|---|
| Constant | 1.93 | 1.96 | 0.98 | .33 |
| CD-RISC-25 | –0.02 | 0.09 | –0.20 | .84 |
| Treatment Type | 0.31 | 0.67 | 0.46 | .65 |
| CD-RISC-25 x Treatment Type | 0.02 | 0.05 | 0.43 | .67 |
| Baseline PHQ9 | 0.55*** | 0.09 | 6.42 | < .001 |

*Note. Adj.* $R^2$ = .13. ***$p$ < .001. PHQ-9 = Patient Health Questionnaire. CD-RISC-25 = 25-item Connor-Davidson Resilience Scale

In the ITT analysis of 12-month outcomes, the overall model was significant, F(4, 505) = 21.76, $p$ < .001, $R^2$ = .15, indicating that the predictors collectively accounted for a significant proportion (15%) of variance in depression severity. Table I3 illustrates that

treatment type and baseline depression severity significantly predicted treatment outcomes. However, treatment type did not significantly moderate the effect of baseline resilience on depression outcomes at 12 months.

**Table I3**

*Imputed ITT Moderation Analysis of Predictors of 12-Month Outcomes (n = 510)*

| Variable | *B* | *SE B* | *t* | *p* |
|---|---|---|---|---|
| Constant | 0.98 | 1.49 | 0.66 | .51 |
| CD-RISC-25 | –0.02 | 0.06 | –0.31 | .75 |
| Treatment Type | 1.37** | 0.51 | 2.67 | .008 |
| CD-RISC-25 x Treatment Type | –0.009 | 0.04 | –0.23 | .82 |
| Baseline PHQ9 | 0.50*** | 0.07 | 7.54 | < .001 |

*Note. Adj.* $R^2$ = .15. **$p$ < .01 ***$p$ < .001. PHQ-9 = Patient Health Questionnaire. CD-RISC-25 = 25-item Connor-Davidson Resilience Scale

For the PP analysis of 12-month outcomes, the overall model was significant, $F(4, 301) = 15.3$, $p < .001$, $R^2 = .17$, indicating that the predictors collectively accounted for a significant proportion of variance (17%) in depression severity. Table I4 illustrates that treatment type and baseline depression severity significantly predicted treatment outcomes. However, treatment type did not significantly moderate the effect of baseline resilience on depression outcomes at 12 months.

**Table I4**

*Imputed PP Moderation Analysis of Predictors of 12-Month Outcomes (n = 306)*

| Variable | *B* | *SE B* | *t* | *p* |
|---|---|---|---|---|
| Constant | –1.98 | 1.95 | –1.02 | .31 |
| CD-RISC-25 | 0.05 | 0.09 | 0.53 | .60 |
| Treatment Type | 1.83** | 0.67 | 2.72 | .007 |
| CD-RISC-25 x Treatment Type | –0.04 | 0.05 | –0.71 | .48 |
| Baseline PHQ9 | 0.57*** | 0.09 | 6.74 | < .001 |

*Note. Adj.* $R^2$ = .17. **$p$ < .01 ***$p$ < .001. PHQ-9 = Patient Health Questionnaire.

CD-RISC-25 = 25-item Connor-Davidson Resilience Scale

# Appendix J

## Complete Case Moderation Analysis Results

### *Complete Case Moderation Power Analysis*

The complete case moderation power analysis indicated that with the 6-month ITT sample of 360 and three predictor variables, it would be possible to detect a minimum effect size of $f^2 = 0.02$, with alpha set at .05, at 60% power. For the 6-month PP sample of 260 and three predictor variables, the same minimum effect size would be detectable at 45% power. For the 12-month ITT sample of 290 and three predictor variables, it would be possible to detect a minimum effect size of $f^2 = 0.02$, with alpha set at .05, at 50% power. For the 12-month PP sample of 216 and three predictor variables, the same minimum effect size would be detectable at 38% power. Therefore, the complete case moderation analyses were underpowered (Cohen, 1992).

### *Complete Case Moderation Analysis*

In the complete case ITT analysis of 6-month outcomes, the overall model was significant, $F(4, 355) = 12.21$, $p < .001$, $R^2 = .12$, indicating that the predictors collectively accounted for a significant proportion (12%) of variance in depression severity. Table J1 illustrates that the only significant predictor was baseline depression severity. Treatment type did not significantly moderate the effect of baseline resilience on depression outcomes at 6 months.

**Table J1**

*Complete Case ITT Moderation Analysis of Predictors of 6-Month Outcomes (n = 360)*

| Variable | *B* | *SE B* | *t* | *p* |
|---|---|---|---|---|
| Constant | 3.99 | 1.89 | 2.11 | .04 |
| CD-RISC-25 | –0.02 | 0.08 | –0.28 | .78 |

| Variable | *B* | *SE B* | *t* | *p* |
|---|---|---|---|---|
| Treatment Type | –0.38 | 0.64 | –0.59 | .55 |
| CD-RISC-25 x Treatment Type | –0.0004 | 0.05 | –0.009 | .99 |
| Baseline PHQ9 | 0.50*** | 0.08 | 6.08 | < .001 |

*Note. Adj.* $R^2$ = .12. ***$p$ < .001. PHQ-9 = Patient Health Questionnaire. CD-RISC-25 = 25-item Connor-Davidson Resilience Scale

In the complete case PP analysis of 6-month outcomes, the overall model was significant, F(4, 255) = 8.18, $p$ < .001, $R^2$ = .11, indicating that the predictors collectively accounted for a significant proportion (11%) of variance in depression severity. Table J2 illustrates that the only significant predictor was baseline depression severity. Treatment type did not significantly moderate the effect of baseline resilience on depression outcomes at 6 months.

**Table J2**

*Complete Case PP Moderation Analysis of Predictors of 6-Month Outcomes (n = 260)*

| Variable | *B* | *SE B* | *t* | *p* |
|---|---|---|---|---|
| Constant | 2.40 | 2.22 | 1.08 | .28 |
| CD-RISC-25 | –0.002 | 0.10 | –0.02 | .98 |
| Treatment Type | 0.23 | 0.75 | 0.31 | .75 |
| CD-RISC-25 x Treatment Type | 0.02 | 0.06 | 0.36 | .72 |
| Baseline PHQ9 | 0.52*** | 0.09 | 5.55 | < .001 |

*Note. Adj.* $R^2$ = .11. ***$p$ < .001. PHQ-9 = Patient Health Questionnaire. CD-RISC-25 = 25-item Connor-Davidson Resilience Scale

In the complete case ITT analysis of 12-month outcomes, the overall model was significant, F(4, 285) = 10.34, $p$ < .001, $R^2$ = .13, indicating that the predictors collectively accounted for a significant proportion (13%) of variance in depression severity. Table J3 illustrates that treatment type and baseline depression severity significantly predicted treatment outcomes. However, treatment type did not significantly moderate the effect of baseline resilience on depression outcomes at 12 months.

**Table J3**

*Complete Case ITT Moderation Analysis of Predictors of 12-Month Outcomes (n = 290)*

| Variable | *B* | *SE B* | *t* | *p* |
|---|---|---|---|---|
| Constant | –1.95 | 2.38 | –0.82 | .41 |
| CD-RISC-25 | –0.014 | 0.09 | –0.15 | .88 |
| Treatment Type | 1.99* | 0.79 | 2.53 | .01 |
| CD-RISC-25 x Treatment Type | 0.002 | 0.06 | 0.03 | .98 |
| Baseline PHQ9 | 0.56*** | 0.10 | 5.43 | < .001 |

*Note. Adj.* $R^2$ = .13. *$p$ < .05 ***$p$ < .001. PHQ-9 = Patient Health Questionnaire. CD-RISC-25 = 25-item Connor-Davidson Resilience Scale

In the complete case PP analysis of 12-month outcomes, the overall model was significant, F(4, 211) = 11.74, $p$ < .001, $R^2$ = .18, indicating that the predictors collectively

accounted for a significant proportion of variance (18%) in depression severity. Table J4 illustrates that treatment type and baseline depression severity significantly predicted treatment outcomes. However, treatment type did not significantly moderate the effect of baseline resilience on depression outcomes at 12 months.

**Table J4**

*Complete Case PP Moderation Analysis of Predictors of 12-Month Outcomes (n = 216)*

| Variable | *B* | *SE B* | *t* | *p* |
|---|---|---|---|---|
| Constant | –4.90 | 2.59 | –1.89 | .06 |
| CD-RISC-25 | 0.09 | 0.11 | 0.87 | .38 |
| Treatment Type | 2.60** | 0.86 | 3.03 | .003 |
| CD-RISC-25 x Treatment Type | –0.06 | 0.06 | –0.94 | .35 |
| Baseline PHQ9 | 0.64*** | 0.11 | 5.81 | < .001 |

*Note. Adj.* $R^2$ = .18. **$p$ < .01 ***$p$ < .001. PHQ-9 = Patient Health Questionnaire. CD-RISC-25 = 25-item Connor-Davidson Resilience Scale

# Appendix K

## Imputed and Complete Case Correlational Analyses of Baseline Resilience Using the 12-Item Set of CD-RISC and Depression Outcomes

**Table K1**

*Pearson's Correlations Between Baseline Resilience Using Reduced CD-RISC 12-Item Set and Depression Outcomes at 6- and 12-Months Post-Randomisation*

| Variable | 6-Month ITT PHQ-9 Imputed ($n$ = 510) | 6-Month ITT PHQ-9 Complete Cases ($n$ = 379) | 6-Month PP PHQ-9 Imputed ($n$ = 306) | 6-Month PP PHQ-9 Complete Cases ($n$ = 270) |
|---|---|---|---|---|
| CD-RISC Reduced 12-Item Set | –.23*** ($p$ < .001) | –.16** ($p$ = .001) | –.12* ($p$ = .04) | –.09 ($p$ = .13) |

| Variable | 12-Month ITT PHQ-9 Imputed ($n$ = 510) | 12-Month ITT PHQ-9 Complete Cases ($n$ = 301) | 12-Month PP PHQ-9 Imputed ($n$ = 306) | 12-Month PP PHQ-9 Complete Cases ($n$ = 222) |
|---|---|---|---|---|
| CD-RISC Reduced 12-Item Set | –.20*** ($p$ < .001) | –.12* ($p$ = .04) | –.16** ($p$ = .005) | –.14* ($p$ = .04) |

*Note.* * $p$ < .05. ** $p$ < .01. *** $p$ < .001. PHQ-9 = Patient Health Questionnaire. CD-RISC = Connor-Davidson Resilience Scale

**Table K2**

*Pearson's Correlations Between Baseline Resilience Using Reduced CD-RISC 12-Item Set and Baseline Depression Severity*

| Variable | ITT Baseline PHQ-9 Imputed ($n$ = 510) | ITT Baseline PHQ-9 Complete Cases ($n$ = 483) | PP Baseline PHQ-9 Imputed ($n$ = 306) | PP Baseline PHQ-9 Complete Cases ($n$ = 288) |
|---|---|---|---|---|
| CD-RISC Reduced 12-Item Set | –.39*** ($p$ < .001) | –.37*** ($p$ < .001) | –.38*** ($p$ < .001) | –.37*** ($p$ < .001) |

*Note.* *** $p$ < .001. PHQ-9 = Patient Health Questionnaire. CD-RISC-25 = 25-item Connor-Davidson Resilience Scale

# Appendix L

## Assessing the Association Between Resilience and Treatment Outcomes Using the Reduced CD-RISC 12-Item Set (Imputed Data)

### *Imputed PP Multiple Regression Analysis of 6-Month Outcomes*

Table L1 describes the results of PP ($n$ = 306) multiple regression analysis with depression outcomes at 6 months as the dependent variable and resilience (reduced CD-RISC 12-item set) and baseline depression severity as independent variables. The multiple regression model significantly explained 12% of the variance in depression outcomes at 6 months ($F(2, 303) = 22.14$, $p < .001$, *adjusted* $R^2 = .12$). Inspection of the beta weights revealed that resilience did not make a significant contribution to the prediction of depression outcomes when controlled for baseline depression severity. All statistical assumptions were met.

**Table L1**

*Summary of Imputed PP Regression Analysis of 6-Month Outcomes (n = 306)*

| Variable | *B* [95% CI] | Std. Error *B* | Std. Coefficient *β* | *t* | *p* |
|---|---|---|---|---|---|
| Baseline PHQ-9 | 0.54 [0.37, 0.71] | 0.09 | 0.37*** | 6.29 | < .001 |
| CD-RISC Reduced 12-Item Set | 0.02 [–0.08, 0.12] | 0.05 | 0.02 | 0.37 | .71 |

*Note. Adj.* $R^2 = .12$. ***$p < .001$. PHQ-9 = Patient Health Questionnaire. CD-RISC = Connor-Davidson Resilience Scale

***Imputed ITT Multiple Regression Analysis of 12-Month Outcomes***

Table L2 describes the results of ITT ($n$ = 510) multiple regression analysis, where baseline resilience using the reduced CD-RISC 12-item set was the predictor, 12-month depression severity the dependent variable, and baseline depression was controlled. The multiple regression model significantly explained 13% of the variance in depression outcomes at 6 months ($F(2, 507) = 39.5$, $p < .001$, *adjusted* $R^2 = .13$). Inspection of the beta weights revealed that resilience did not make a significant contribution to the prediction of depression outcomes when controlled for baseline depression severity. All statistical assumptions were met.

**Table L2**

*Summary of Imputed ITT Regression Analysis of 12-Month Outcomes (n = 510)*

| Variable | *B* [95% CI] | Std. Error *B* | Std. Coefficient *β* | *t* | *p* |
|---|---|---|---|---|---|
| Baseline PHQ-9 | 0.50 [0.37, 0.64] | 0.07 | 0.33*** | 7.43 | < .001 |
| CD-RISC Reduced 12-Item Set | –0.06 [–0.14, 0.01] | 0.04 | –0.07 | –1.65 | .10 |

*Note. Adj.* $R^2 = .13$. ***$p < .001$. PHQ-9 = Patient Health Questionnaire. CD-RISC = Connor-Davidson Resilience Scale

***Imputed PP Multiple Regression Analysis of 12-Month Outcomes***

Table L3 describes the results of PP ($n$ = 306) multiple regression analysis with depression outcomes at 12 months as the dependent variable and resilience (reduced

CD-RISC 12-item set) and baseline depression severity as independent variables. The multiple regression model significantly explained 14% of the variance in depression outcomes at 12 months ($F(2, 303) = 26.05$, $p < .001$, *adjusted* $R^2 = .14$). Inspection of the beta weights revealed that resilience did not make a significant contribution to the prediction of depression outcomes when controlled for baseline depression severity. All statistical assumptions were met.

**Table L3**

*Summary of Imputed PP Regression Analysis of 12-Month Outcomes (n = 306)*

| Variable | *B* [95% CI] | Std. Error *B* | Std. Coefficient *β* | *t* | *p* |
|---|---|---|---|---|---|
| Baseline PHQ-9 | 0.57 [0.40, 0.74] | 0.09 | 0.38*** | 6.56 | < .001 |
| CD-RISC Reduced 12-Item Set | –0.02 [–0.12, 0.09] | 0.05 | –0.02 | –0.32 | .75 |

*Note. Adj.* $R^2 = .14$. ***$p < .001$. PHQ-9 = Patient Health Questionnaire. CD-RISC = Connor-Davidson Resilience Scale

# Appendix M

## Assessing the Association Between Resilience and Treatment Outcomes Using the Reduced CD-RISC 12-Item Set (Complete Case Analysis)

### *Power Analysis for the Complete Case Regression Using Reduced CD-RISC 12-Item Set*

The regression power analysis indicated that with the 6-month complete case ITT sample of 379 and two predictor variables, it would be possible to detect a minimum effect size of $f^2 = 0.02$, with alpha set at .05, at 69% power. For the 6-month PP sample of 270 and two predictor variables, the same minimum effect size would be detectable at 53% power. For the 12-month complete case ITT sample of 301 and two predictor variables, it would be possible to detect a minimum effect size of $f^2 = 0.02$, with alpha set at .05, at 58% power. For the 12-month PP sample of 222 and two predictor variables, the same minimum effect size would be detectable at 45% power. Therefore, the complete case regression analyses using the reduced CD-RISC 12-item set were underpowered (Cohen, 1992).

### *Complete Case ITT Multiple Regression Analysis of 6-Month Outcomes*

Table M1 describes the results of complete case ($n = 379$) multiple regression analysis using the reduced CD-RISC 12-item set as the predictor. The multiple regression model significantly explained 12% of the variance in depression outcomes at 6 months ($F(2, 376) = 25.92$, $p < .001$, *adjusted* $R^2 = .12$). Inspection of the beta weights revealed that resilience did not make a significant contribution to the prediction of depression outcomes when controlled for baseline depression severity. All statistical assumptions were met.

**Table M1**

*Summary of Complete Case ITT Regression Analysis of 6-Month Outcomes (n = 379)*

| Variable | *B* [95% CI] | Std. Error *B* | Std. Coefficient *β* | *t* | *p* |
|---|---|---|---|---|---|
| Baseline PHQ-9 | 0.52 [0.36, 0.67] | 0.08 | 0.33*** | 6.36 | < .001 |
| CD-RISC Reduced 12-Item Set | –0.04 [–0.12, 0.05] | 0.05 | –0.04 | –0.78 | .43 |

*Note. Adj.* $R^2$ = .12. ***$p$ < .001. PHQ-9 = Patient Health Questionnaire. CD-RISC = Connor-Davidson Resilience Scale

***Complete Case PP Multiple Regression Analysis of 6-Month Outcomes***

Table M2 describes the results of complete case ($n$ = 270) PP multiple regression analysis with depression outcomes at 6 months as the dependent variable and resilience (reduced CD-RISC 12-item set) and baseline depression severity as independent variables. The multiple regression model significantly explained 12% of the variance in depression outcomes at 6 months ($F(2, 267) = 19.48$, $p < .001$, *adjusted* $R^2$ = .12). Inspection of the beta weights revealed that resilience did not make a significant contribution to the prediction of depression outcomes when controlled for baseline depression severity. All statistical assumptions were met.

**Table M2**

*Summary of Complete Case PP Regression Analysis of 6-Month Outcomes (n = 270)*

| Variable | *B* [95% CI] | Std. Error *B* | Std. Coefficient *β* | *t* | *p* |
|---|---|---|---|---|---|
| Baseline PHQ-9 | 0.56 [0.38, 0.74] | 0.09 | 0.38*** | 6.03 | < .001 |
| CD-RISC Reduced 12-Item Set | 0.05 [–0.06, 0.16] | 0.06 | 0.06 | 0.89 | .38 |

*Note. Adj.* $R^2$ = .12. ***$p$ < .001. PHQ-9 = Patient Health Questionnaire. CD-RISC = Connor-Davidson Resilience Scale

***Complete Case ITT Multiple Regression Analysis of 12-Month Outcomes***

Table M3 describes the results of complete case ($n$ = 301) ITT multiple regression analysis where baseline resilience using the reduced CD-RISC 12-item set was the predictor, and 12-month depression severity was the dependent variable, with baseline depression controlled. The multiple regression model significantly explained 10% of the variance in depression outcomes at 6 months ($F(2, 298) = 18.21$, $p < .001$, *adjusted* $R^2 = .10$). Inspection of the beta weights revealed that resilience did not make a significant contribution to the prediction of depression outcomes when controlled for baseline depression severity. All statistical assumptions were met.

**Table M3**

*Summary of Complete Case ITT Regression Analysis of 12-Month Outcomes (n = 301)*

| Variable | *B* [95% CI] | Std. Error *B* | Std. Coefficient *β* | *t* | *p* |
|---|---|---|---|---|---|
| Baseline PHQ-9 | 0.58 [0.38, 0.78] | 0.10 | 0.33*** | 5.61 | < .001 |
| CD-RISC Reduced 12-Item Set | –0.003 [–0.11, 0.10] | 0.05 | –0.003 | –0.05 | .96 |

*Note. Adj.* $R^2$ = .10. ***$p$ < .001. PHQ-9 = Patient Health Questionnaire. CD-RISC = Connor-Davidson Resilience Scale

***Complete Case PP Multiple Regression Analysis of 12-Month Outcomes***

Table M4 describes the results of complete case ($n$ = 222) PP multiple regression analysis with depression outcomes at 12 months as the dependent variable and resilience (reduced CD-RISC item set) and baseline depression severity as independent variables. The multiple regression model significantly explained 14% of the variance in depression outcomes at 12 months ($F(2, 219) = 19.46$, $p < .001$, *adjusted* $R^2 = .14$). Inspection of the beta weights revealed that resilience did not make a significant contribution to the prediction of depression outcomes when controlled for baseline depression severity. All statistical assumptions were met.

**Table M4**

*Summary of Complete Case PP Regression Analysis of 12-Month Outcomes (n = 222)*

| Variable | *B* [95% CI] | Std. Error *B* | Std. Coefficient *β* | *t* | *p* |
|---|---|---|---|---|---|
| Baseline PHQ-9 | 0.64 [0.42, 0.86] | 0.11 | 0.39*** | 5.81 | < .001 |
| CD-RISC Reduced 12-Item Set | –0.001 [–0.12, 0.12] | 0.06 | –0.001 | –0.004 | .99 |

*Note. Adj.* $R^2$ = .14. ***$p$ < .001. PHQ-9 = Patient Health Questionnaire. CD-RISC = Connor-Davidson Resilience Scale