THE IMPACT OF ANXIETY ON PERSPECTIVE-TAKING INVOLVED IN EMPATHY

by

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Volume One

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Thesis Overview

This thesis is comprised of two volumes of work completed as part of the author's doctorate in clinical psychology. The first volume comprises the research component and consists of three chapters; a meta-analysis of anxiety and depression in children and young people with callous-unemotional traits and conduct disorder, an empirical paper exploring the impact of anxiety on perspective-taking involved in empathy and a final chapter summarising chapters one and two for the purpose of public dissemination.

The second volume consists of five chapters of clinical practice reports (CPRs) completed over the course of doctoral training. The first chapter presents two psychological formulations of a case from an adult forensic placement. The second chapter is a service evaluation which explored service-user and staff views on the process of developing and utilising positive behaviour support plans within a secure hospital. The third chapter presents an integrated case study of a 92-year-old female with a long history of depression from the two perspectives of systemic and cognitive-behavioural therapy. The fifth chapter comprises an abstract summarising CPR 5, a clinical presentation of a 55-year-old man with mild learning disabilities and relapse prevention work.

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I. Anxiety and Depression in Children and Young People with Callous-Unemotional Traits and Conduct Disorder: A Meta-Analysis

1. Abstract

Introduction: Conduct disorders (CD) in children and adolescents are a common reason for referrals to mental health services and associated with great social and economic burden, as well as adult psychiatric disorders. Children and adolescents with CD and callous-unemotional (CU) traits appear to present a subgroup that is at higher risk of externalising behaviours and poorer outcomes. This review explored the experience of internalising symptoms (anxiety and depression) amongst children and adolescents with CD alone and with CD and CU traits, to provide further insight into whether the presence of CU traits increases the likelihood of symptoms of anxiety and depression.

Method: Thirteen studies reporting outcomes of anxiety, depression and mixed anxiety/depression were yielded through systematic searching. Ten studies reporting 15 outcomes in the form of standardised mean differences were meta-analysed, followed by a meta-analysis of correlational outcomes from three studies. Methods associated with estimates were rated for their quality using risk of bias tools.

Results: A random effects model was used to pool standardised mean differences and revealed that overall, CD & CU groups reported significantly higher levels of anxiety, depression and mixed anxiety and depression compared to the CD only groups. No significant difference between the separate outcomes of anxiety and depression, and combined anxiety and depression was observed. Correlational outcomes were meta-analysed using a fixed effects

model and did not evidence a significant relationship between CU traits, anxiety and mixed anxiety and depression in young people with CD.

Discussion: Despite a limited number of studies available, the findings of this review were shown to be robust: internalising symptoms of anxiety and depression were higher in children and adolescents with CD and CU than those with CD alone. This finding suggests that the presence of CU traits results in children and adolescents with CD being more vulnerable to experiencing internalising symptoms.

2. Introduction

Often emerging in childhood and adolescence, conduct disorders are prevalent in around 3% of school-aged children, a common reason for referral to mental health provisions and shown to lead to major adult psychiatric disorders in around half of cases (Bonin et al., 2011; Coghill, 2013; Kazdin, 2003; Kim-Cohen et al., 2003). Despite the great social and economic burden posed by conduct disorders (Erskine et al., 2013; Romeo et al., 2006), there is a lack of research and clarity regarding effective treatments (Hawes et al., 2014; Pisano et al., 2017). The utility of subtyping children and adolescents with conduct problems according to the presence and levels of callous-unemotional (CU) traits is supported; particularly as higher levels of CU traits are associated with more severe and chronic antisocial behaviour, and poorer responses to treatment (Frick et al., 2014a; Hawes et al., 2014). The importance of exploring and developing individual-focused interventions has been highlighted in a review of available treatments for children and adolescents with high CU traits (Wilkinson et al., 2016). Although a greater emphasis is placed upon externalising behaviours, a high degree of co-occurring internalising problems is highlighted amongst children with conduct problems in clinical and community

samples (Polier et al., 2012). Studies reporting the internal experiences of children and young people with conduct disorders and CU traits were therefore reviewed, with the aim of contributing to a greater understanding of this subgroup and inform more efficacious treatments.

Conduct Disorder (CD) is diagnosed on the basis of a pattern of repetitive and persistent behaviour which violates the basic rights of others (e.g. aggression to people or animals, destruction of property or theft) or major societal norms or rules (e.g. truancy and running away from home) (American Psychiatric Association, 2013). CD is highly associated with criminal behaviour and aggression, along with difficulties with social, emotional and occupational functioning (Frick et al., 2005). There is a wealth of research that aims to explore the aetiology of CD. Whilst a wide range of risk factors associated with the development of CD have been outlined, Frick (2016) highlights that there is much debate surrounding the integration of such factors to establish models of causation. Identified risk factors include environmental factors in utero (e.g. maternal substance misuse and stress), conditions at birth (e.g. complications, parental psychopathology), childhood (e.g. experience of parenting, poverty, and community violence) along with the interplay of genetic factors (e.g. neurocognition and temperament) (see Fairchild et al. (2019) for a comprehensive review).

The current conceptualisation and diagnostic criteria for CD are also topics of debate. One key criticism of the current CD diagnostic criteria is that they focus entirely on behavioural symptoms and lack consideration of any cognitive or emotional processes underlying symptoms (Nock et al., 2006). This is particularly surprising given the high rates of comorbidity of CD with anxiety and depression (Angold & Costello, 1994); more than 50% of clinically referred children with CD fulfilled criteria for major depression and greater than 40%

met criteria for multiple anxiety disorders (Greene et al., 2002). Further, Frick and Viding (2009) highlight that CD is characterised by clinical manifestations that are often greatly heterogenous in terms of clinical presentation, outcome, and treatment response. The conceptualisation of CD also varies in the literature, with regards to whether it is considered as a dimensional, or a categorical construct. Dimensional perspectives place CD amongst a wider spectrum of other externalising disorders, such as Oppositional Defiant Disorder (ODD) and Attention Deficit Hyperactivity Disorder (ADHD) (Krueger et al., 2009), leading to a greater focus on associated symptoms, such as disinhibition and impulsivity. Consisting of a more categorical approach, the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) outlines diagnostic criteria with additional sub-types according to the age of onset of symptoms and presence of Limited Prosocial Emotions (LPEs).

The LPE subtype of CD consists of symptoms, such as shallow or deficient affect, empathy, remorse or guilt, and lack of concern about performance (American Psychiatric Association, 2013). According to the current conceptualisation of psychopathy (Cleckley, 1976), the symptoms associated with the LPE subtype are often referred to as the affective dimension of psychopathy or CU traits (Frick & Ray, 2015). The LPE specifier was incorporated into the DSM-5 diagnostic criteria in response to the growing body of research suggesting that children with CD and CU traits form a subgroup that are at risk of more severe outcomes (Kahn et al., 2012). Children with CU traits and conduct problems display more severe, instrumental, and premeditated aggression (Frick et al., 2003), an earlier onset (Dandreaux & Frick, 2009) and more stable pattern (Frick et al., 2005) of conduct problems. The presence of CU traits during childhood has also been shown to be associated with more severe antisocial outcomes in adulthood, regardless of controlling for more severe and early-onset conduct problems (McMahon et al., 2010). Further, children in this subgroup have poorer prognosis and response

to treatment (Pardini et al., 2010; Rowe et al., 2010). As highlighted by Blair et al. (2014), it is important to develop further understanding of the interaction of symptoms of CD and CU traits, in order to support the development of more efficacious treatments and improve outcomes for this subgroup of children.

The presence of CU traits is widely argued to be a moderating factor for emotional characteristics in children with severe CD (Frick et al., 2014b). There has been a considerable amount of interest pertaining to the presence of anxiety symptoms and their role in informing subgroup differentiations. A negative association between CU traits and anxiety has been documented in numerous studies (Cleckley, 1976; Dolan & Rennie, 2007; Pardini & Fite, 2010). Further, research has shown that young people with lower levels of fearfulness, a construct similar to anxiety, are at a higher risk of developing CU traits (Waller et al., 2016). Contrasting results have been reported, however, with reports of no significant association (Neumann & Pardini, 2014) or a positive association between CU traits and anxiety traits (Fontaine et al., 2011). Such conflicting evidence may arise partly from study designs that do not account for the nuanced relationship between CU traits, conduct problems and anxiety. Specifically, there is some evidence that CU traits are negatively correlated with anxiety when controlling for conduct problems, and the inverse has also been identified; conduct problems are positively correlated with anxiety when controlling for CU traits (Frick & Dickens, 2006; Frick et al., 1999). Frick et al. (1999) suggested that trait anxiety may be higher in children and adolescents with conduct problems due to the consequences of their risk-taking behaviour.

The presence or absence of anxiety is also used in research as a way of distinguishing between variants of antisocial young people. The work of Karpman (1941) outlined two variants of psychopathy: a primary variant resulting from an inherent deficit, and a secondary variant, said

to be acquired as a result of early life traumatic or adverse experiences, consisting of people who are more greatly affected by negative stimuli and score higher on negative emotionality (Kimonis, Tatar II, et al., 2012). Further, reports of higher levels of CU traits, anxiety and earlier adverse experiences in clinic-referred young people are shown to be associated with higher scores on impulsivity, behavioural inhibition, aggression and externalising behaviour measures (Kahn et al., 2013). Kimonis et al. (2011) also reported higher levels of depression, psychosocial distress and reactive aggression in people identified as having the secondary variant. Influenced by the earlier work of Karpman (Karpman, 1941, 1948), the taxonomy of variants according to characteristics, such as anxiety and CU traits is still widely used in the literature. This is seen through the use of latent-profile or model-based cluster analysis across samples of young offenders (Kimonis et al., 2013; Kimonis, Frick, et al., 2012) and adolescents in the community (Fanti et al., 2013).

Euler et al. (2015) highlighted that despite many efforts within the literature, the complex interplay of CU traits, anxiety symptoms and severity of behavioural outcomes in young people with CD remain mostly unclear. As discussed earlier, young people with CU traits and severe CD are widely thought to present a subgroup of children with more stable and severe forms of externalising behaviour (Frick et al., 2003; McMahon et al., 2010), and more stable patterns of conduct problems (Frick et al., 2005). Young people with CD and CU traits are also shown to respond poorly to treatment and thus have worse prognosis than young people with CD alone (Cecil et al., 2018; Pardini et al., 2010; Rowe et al., 2010). The majority of studies conducted have focused on emotional problems (e.g. depression and phobias) in the broader sense and have shown a negative correlation between CU traits and emotional problems (Blonigen et al., 2005; Saunders et al., 2019). Further, endeavours to understand anxiety and depression symptoms in young people with CD in the current literature appear to be mostly within the

context of further understanding their role as covariates for externalising symptoms, such as aggression and antisocial behaviour. Adopting this perspective generates a focus on the mental health of vulnerable children within the context of the impact on wider society. Consequently, the internal experiences, well-being, and quality of life of the vulnerable children themselves are overlooked. It is likely that the development of a greater understanding of young people with CD and CU, in particular their internal experiences, may inform the development of more efficacious treatment programmes and improve outcomes for this subgroup.

The existing literature was reviewed to further explore the relationship between young people with CD and CU traits and experiences of internalising symptoms, namely anxiety and depression. Separate analyses were conducted to allow the inclusion of studies of differing methodologies. Firstly, studies providing means and standard deviations of anxiety and depression symptoms for young people with CD only and young people with CD and CU traits were reviewed. This provides a direct comparison of young people with CD only with those with CD and CU traits, enabling insight into whether the presence of CU traits increases the likelihood of symptoms of anxiety and depression. Subgroup analyses were conducted to test whether differences in anxiety and/or depression symptoms between CD only and CD and CU groups were influenced by various factors. Factors explored for subgroup analyses were gender, participant setting, methods used to devise the groups, CU trait reporter and anxiety and/or depression reporter. Studies reporting correlations between CU traits with anxiety and/or depression symptoms in young people with CD were reviewed, to determine whether there is a relationship between CU severity and internalising symptoms.

3. Method

Identifying primary studies

Search of electronic databases

A systematic search of the literature was initially carried out on 19th July 2020 using Embase, PsycINFO, PubMed and Web of Science. The aim of the search was to obtain a comprehensive overview of the literature on the relationship between CU traits and anxiety and depression in children with CD. The search terms used to identify these studies are outlined in Table 1.1 below and were informed by existing reviews in the field (Frick et al., 2014b; Waller et al., 2020). The meta-analysis by Waller et al. (2020) focused on the associations between CU traits and empathy, guilt and prosociality. Frick et al. (2014b) explored the importance of identifying subgroups of children and adolescents with CD and CU traits, with the aim of further developing understanding, diagnosis and treatment for this subgroup. The focus of this review was therefore novel, in terms of exploring the experience of anxiety and depression amongst children with CD and CU traits. Guidelines outlined by Moher et al. (2009) in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) were adopted and followed for the systematic search process.

Table 1.1

Search criteria

Group 1	Group 2	Group 3	Group 4
	‘AND’	‘AND’	‘AND’
“Conduct disorder” ‘OR’ Delinquency	Child* ‘OR’ Adolescen* ‘OR’ Juvenile ‘OR’ Youth ‘OR’ Girl*‘OR’ Boy* ‘OR’ Infan* ‘OR’ Teen* ‘OR’ Paediatric* OR Pediatric*	“Callous unemotional ‘OR’ “Callous-unemotional” ‘OR’ Callous ‘OR’ Unemotional ‘OR’ “CU trait*” ‘OR’ “Limited prosocial Emotions” ‘OR’ psychopath ‘OR’ psychopathy ‘OR’ psychopaths ‘OR’ psychopathic	“Mental health” ‘OR’ “mental illness” OR “mental disorder” OR “Emotional problems” ‘OR’ Psychopathology ‘OR’ Internalising ‘OR’ Internalizing ‘OR’ Depression ‘OR’ “Depressive disorder” ‘OR’ “Mood disorder” ‘OR’ Anxiety ‘OR’ Anxious ‘OR’ “Generalised anxiety disorder” ‘OR’ “Generalized anxiety disorder” ‘OR’ Dysthym*

Inclusion and exclusion criteria applied during the selection process are described in Table 1.2.

Table 1.2

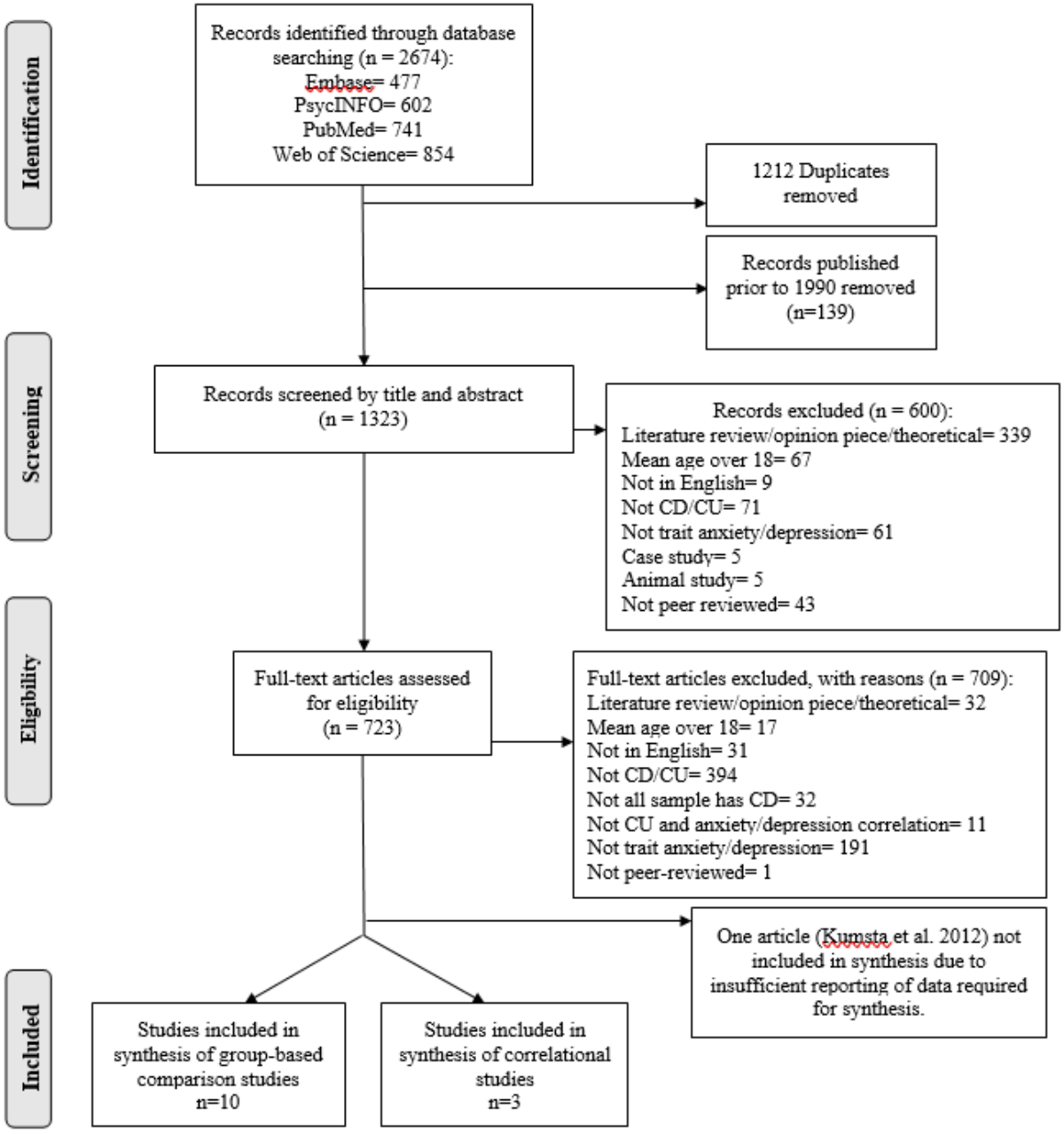
Inclusion and exclusion criteria

Inclusion Criteria	Justification
Participants	
Participant sample with a mean age of 18 or younger	To enable inclusion of data from studies with child and adolescent participants, in accordance with previous reviews in this area (Frick et al., 2014b; Waller et al., 2020)
All participants have symptoms of CD	Studies were only included if CD symptoms were reported. Where conduct problems were reported, studies were only included if results of a subgroup with CD symptoms were reported, or if CD symptoms were reported in all participants.
Studies include a measure of CU traits	To ensure internal validity of the meta-analysis, only studies with validated measures of CU traits, CU subscales from psychopathy measures or combinations of items from various questionnaires that measure the CU construct were included.
Type of article	
Studies published in English language	English is the first language of the author (MS) and facilities for the translation of other languages were not available.
Meta-analyses, reviews, commentaries, theoretical papers, opinion pieces, study protocols, clinical guidance, non-outcome focused studies, case studies and qualitative studies were excluded	Such articles do not provide outcome data required for the present meta-analysis, however, reference sections of reviews and meta-analyses were checked for unidentified studies.
Studies published from 1990 onwards.	Studies published prior to 1990 were not included as it was common practice at this time to base definitions of psychopathic and CU traits upon a mostly undersocialised construct of CD. This exclusion was also included in the review by Frick et al. (2014b).
Outcome measure	
Studies reporting depression or generalised anxiety disorder. Studies reporting anxiety as a combination of Generalised Anxiety Disorder (GAD), separation anxiety, phobias etc. were excluded.	This meta-analysis focused on depression and GAD only. The decision to exclude studies reporting anxiety disorders other than GAD was made to allow a focus on the general psychological experience of depression and anxiety, rather than symptoms that may be related to a specific difficulty or context. In addition, more specific anxiety disorders have a smaller evidence base and would therefore be unlikely to provide a robust estimate or allow for subgroup analysis.
Outcome data	
Studies must report either means and standard deviations or *F*-Test statistics, Cohen's *d*, or *r* effect sizes	To ensure that outcome data can be extracted and calculated into an effect size for the purpose of this meta-analysis.

The results of the systematic search are presented in Figure 1.1. The search yielded a total of 2674 records, from which duplicates (n = 1212) and articles published prior to 1990 (n = 139) were removed. The exclusion criteria were used to screen the remaining articles (n = 1323) by title and abstract. The most common reasons for exclusion were that articles did not provide outcome data required for the meta-analysis (n = 399), were not focused on CD and or CU traits (n = 71) and did not report trait anxiety or depression (n = 61). The remaining 723 articles were reviewed against the exclusion criteria in their full-text form. Through this process, 13 articles were identified to meet the full inclusion/exclusion criteria and therefore included in this meta-analysis, 10 studies reporting group-based comparisons and three studies reporting correlational data. One article (Kumsta et al., 2012) which met the inclusion criteria could not be included in the synthesis, as inferential or descriptive statistics of anxiety and/or depression were not reported.

Figure 1.1

Process of study selection: Adapted PRISMA flow diagram (Moher et al., 2009)



Data extraction

All data were extracted by the author (MS). Some studies reported outcomes of anxiety and depression separately. In instances where anxiety and depression outcomes were reported from

the same study, both outcomes were extracted and included into the meta-analysis and a suffix was added to the study label to indicate the outcome of interest (i.e., 'A' for anxiety, 'D' for depression and AD for anxious/depressed).

Studies reporting standardised mean differences between groups

The majority of studies (n = 10) reported outcome means, standard deviations and sample size of CD only and CD & CU groups for anxiety and/or depression outcomes. In some studies, data were presented as the percentage of young people in the group that fulfilled criteria for depression and/or anxiety (Pauli et al., 2020; Vanwoerden et al., 2016). In such cases, percentages were converted into log ratios and then into estimates of Cohen's *d* using sample sizes. In one study (Pardini et al., 2012), data were presented as means and standard error. In this case, the standard error was converted into standard deviations prior to calculating the standardised mean difference.

The data from the primary studies were not reported to be adjusted for any covariates within the studies themselves. The CD only and CD & CU group means for anxiety in Eisenbarth et al. (2016) were provided as the average across two time points. Pardini et al. (2012) reported group means for depression for two time points; Time Point 1 when participants were 6-8 years old and Time Point 7 at 12-14 years old. To maintain commonality of age amongst participants across studies included in the synthesis, the decision was made to extract data from Time Point 7 only from the Pardini et al. (2012) study. All other studies included in the synthesis reported outcome data collected from one time point only.

Studies reporting correlations between CU traits and anxiety and/or depression in young people with CD

Three studies reported correlations between CU traits and anxiety and depression in CD populations. Amongst these studies, two reported associations as a zero-order Pearson *r* correlation coefficient. Dolan and Rennie (2007) used Spearman's Rho, a nonparametric measure, to report the association between anxiety and CU traits. The data from this study were transformed into a Pearson's *r* equivalent, using the transformations reported by Rupinski and Dunlap (1996).

Defining problematic variance

As a meta-analysis involves the pooling together of effect sizes from numerous studies to generate a single overall effect, it is important that studies from which the pooled estimate is derived should not present substantially different estimates of the effect itself. If the primary studies show markedly diverse estimates, then it is possible, or indeed likely, that the estimate of the effects in the primary studies has been influenced by extraneous and confounding factors. Heterogeneity refers to the extent to which effect sizes vary amongst contributing studies included in a meta-analysis. As highlighted by Borenstein et al. (2011), high levels of heterogeneity may suggest that the outcomes of the primary studies are too dissimilar, alluding to a lack of true effect in the data. Heterogeneity may arise due to factors, such as methodological variation in the studies, differences in sample characteristics or measurement error (Rücker et al., 2008). Higgin's I^2 (Higgins & Thompson, 2002) is a commonly used measure that provides an indication of the percentage of variability in the effect sizes that is not attributable to sampling error. Given the variation in study methodologies, problematic heterogeneity was defined as a Higgin's I^2 value of greater than 75% in this meta-analysis (Higgins et al., 2003). In cases where unacceptable or problematic heterogeneity was identified,

subsequent analyses were conducted to explore the potential causes of difference in the primary studies.

Risk of Bias Assessment

Standardised mean difference studies

As this meta-analysis pulls data from studies presenting with markedly different methodologies, a study hierarchy (Table 1.3) was created to indicate the position of the study within a hierarchy based upon the quality of the evidence that could be expected from different types of methodology.

Table 1.3

Study design hierarchy

Study Design	Description	Quality Score
Prospective case cohort study	Cohort Study (prospective) is a study of a group of young people, some of whom are identified to have CU traits, in which participants are followed up over time to determine who develops anxiety and depression, and whether the outcome is associated with the exposure.	25
Retrospective case cohort study	Cohort Study (retrospective) is when data are gathered for a cohort that was identified based on anxiety and depression symptoms. Young people with CD are then identified some of whom have CU traits.	20
Case control study	Case Control Study is a study in which young people previously identified as presenting with CD with CU traits are compared with people with CD but who do not have such traits. Anxiety and depression symptoms are identified retrospectively.	15
Cross-sectional studies	Cross-Sectional Study is the observation of a defined population at a single point in time or during a specific time interval to examine associations between the anxiety and depression symptoms and diagnoses of CD and CU traits. The symptoms and diagnostic groups are therefore determined simultaneously.	10

Protogerou and Hagger (2020) highlight that there are numerous quality checklists available, however, they are often inappropriate for evaluating psychological research and thus may lack

validity. Quality criteria were therefore developed for the purpose of assessing risk of bias within this literature. The risk of bias criteria were developed by adapting existing frameworks including The Cochrane Collaboration Risk of Bias Tool (Higgins et al., 2011) and the Risk of Bias Assessment Tool for Nonrandomised Studies (RoBANS) (Kim et al., 2013). In the existing frameworks, performance bias is assessed according to the 'measurement of exposure' (Higgins et al., 2011) and the 'blinding of participants and research personnel' (Kim et al., 2013). To increase the applicability of the topic of this review, the criteria were adapted in order to assess the presence of systematic differences between the two groups of interest, which may lead to differences in outcomes. Additionally, attrition bias is assessed in the existing frameworks according to the presence of 'incomplete outcome data.' In this review, the domain of statistical bias was created to include attrition bias, as well as evaluation of the appropriateness of statistical methods and the methods used to devise groups. The framework assesses risk of bias in seven domains: selection bias, performance bias, treatment fidelity, detection bias, statistical bias, reporting bias and generalisation. Treatment fidelity bias was not assessed as it was not deemed applicable to this meta-analysis. Criteria developed to define low, unclear or high risk of bias in the remaining six domains are described in Table 1.4 and the application of these criteria are reported in Figure 1.2.

Figure 1.2

Ratings of risk of bias. Red indicates high risk of bias, amber marks an unclear risk of bias and green is a low risk of bias.

Study Name	Study Design	Selection Bias	Performance Bias	Treatment Bias	Detection Bias	Statistical Bias	Reporting Bias	Generalisability	Quality.Index
Eisenbarth et al. A	Cross-sectional studies	Low risk	Unclear risk	Not Applicable	Low risk	Unclear risk	Low risk	Low risk	54%
Eisenbarth et al. D	Prospective case cohort study	Low risk	Unclear risk	Not Applicable	Low risk	Unclear risk	Low risk	Low risk	95%
Euler et al. AD	Cross-sectional studies	Unclear risk	Unclear risk	Not Applicable	Low risk	Unclear risk	Unclear risk	Unclear risk	46%
Fanti et al. AD	Cross-sectional studies	Low risk	Unclear risk	Not Applicable	Low risk	Unclear risk	Unclear risk	Low risk	51%
Pardini et al. D	Prospective case cohort study	Unclear risk	Unclear risk	Not Applicable	Low risk	Low risk	Low risk	Unclear risk	92%
Pauli et al. A	Cross-sectional studies	Unclear risk	Unclear risk	Not Applicable	Low risk	High risk	Low risk	Low risk	49%
Pauli et al. D	Cross-sectional studies	Unclear risk	Unclear risk	Not Applicable	Low risk	High risk	Low risk	Low risk	49%
Schwenck AD	Case control study	Unclear risk	Unclear risk	Not Applicable	Unclear risk	Unclear risk	Low risk	Unclear risk	59%
Sebastian et al. A	Cross-sectional studies	High risk	Unclear risk	Not Applicable	Unclear risk	Unclear risk	Low risk	Unclear risk	43%
Sebastian et al. D	Cross-sectional studies	High risk	Unclear risk	Not Applicable	Unclear risk	Unclear risk	Low risk	Unclear risk	43%
Sethi et al. A	Cross-sectional studies	High risk	Low risk	Not Applicable	Unclear risk	Unclear risk	Low risk	Unclear risk	46%
Sethi et al. D	Cross-sectional studies	High risk	Low risk	Not Applicable	Unclear risk	Unclear risk	Low risk	Unclear risk	46%
Vanwoerden et al. D	Cross-sectional studies	Unclear risk	Low risk	Not Applicable	Low risk	Unclear risk	Low risk	Unclear risk	51%
Viding et al. A	Cross-sectional studies	High risk	Unclear risk	Not Applicable	Unclear risk	Unclear risk	Low risk	Unclear risk	43%
Viding et al. D	Cross-sectional studies	High risk	Unclear risk	Not Applicable	Unclear risk	High risk	Low risk	Unclear risk	41%

Note. A suffix is added to the study label to indicate the outcome of interest (i.e. ‘A’ for anxiety, ‘D’ for depression and ‘AD’ for anxious/depressed.

Table 1.4

Criteria for ratings of low, unclear or high risk across six domains

Domain	Details	Risk of Bias
Selection Bias	Were efforts made to minimise systematic difference between the characteristics of those selected for the study and those who are not?	High Risk -Studies providing a diagnosis as incentive for parents/ teachers of children. No description of the method by which participants were selected, or characteristics of participants are not described. Unclear Risk -Participants recruited through behavioural or educational support programmes, psychiatric services or inpatient settings as likely to be more complex or severe presentation. Financial incentives provided in return for participation. Instances where the nature of the study (e.g interviews in homes) may impact self-selection. Low Risk-Participant selection strategy is wide e.g. across large geographical area, many schools etc reducing the likelihood of systematic difference between participants selected vs those not selected.
Performance Bias	Systematic differences between/within groups in the participants that may lead to differences in motivation to complete the study	High Risk- Differences in the CD only and CD & CU groups that are likely to impact the outcome Unclear Risk- Differences in the CD only and CD & CU groups are reported (e.g. ADHD, alcohol misuse) which are not likely to impact the outcome Low Risk- There appears to be no evidence of systematic differences between/within the CD only and CD & CU groups that may impact their motivation to complete the study.
Detection Bias	Are measures used for detecting the outcome data (depression and anxiety) appropriate?	High Risk - Poor measure used. Rating of outcome provided by unfamiliar other (e.g. researcher) based on limited observational timeframe. Unclear Risk- Adult (parent/guardian/teacher) only report Low Risk- Good quality measures used to detect outcome data and use of combined adult (parent/teacher) and child report OR self-report only for older (adolescent) children.
Statistical Bias	How have groups CD and CD & CU groups been devised? Have appropriate statistical methods been used? Is there incomplete data due to attrition? Has completer analysis been performed only, or have the studies included an "intention to treat" analysis?	High Risk- Arbitrary method of dichotomising groups e.g. median split and 20-30% missing data OR over 30% missing data. Unclear Risk – Arbitrary method of dichotomising groups e.g. median split. 20-30% missing data. Low Risk – Groups devised based upon clinical or normative cut-offs to determine the presence of CU traits. Less than 10% missing data or 10-20% missing data but clear description of process employed to control for missing data.
Reporting Bias	Evidence of selective outcome reporting e.g. only significant results reported. Are there measures that have not been reported in the results that have been mentioned in the method section?	High Risk – Not reported full outcome measures stated in the method section/reported, only a subsample of results, only significant results etc. Unclear Risk – Not all descriptive and/or summary statistics are reported Low Risk – Reporting of non-significant results, exclusions, missing data and results of measures outlined in method.
Generalisation	Can the research findings be applied to settings other than that in which they were originally tested? Are there any differences between the study participants and those persons to whom the review is applicable?	High Risk- Very small sample of participants (n < 30) recruited from a population with little comorbidity e.g. CD only with no comorbidity with ADHD. Unclear Risk- Relatively small sample (n= 30-150), exact geographical location, or recruitment location unclear AND Studies whereby the selection strategy is likely to have influenced the generalisability of the results e.g. feedback offered in return for participation may lead to higher levels of help-seeking parents. Oversampling in low income neighbourhoods may also lead to an unclear risk of bias in addition to entire samples recruited from juvenile/welfare institutions. Low Risk- Large (n>150), diverse sample of participants e.g. from a large geographical area, variation in parent education and parental marital status etc.

The quality effects model was calculated using the total score from the risk of bias ratings (reported in Figure 1.2). The maximum total score (quality index expressed as a percentage) encompasses the study's overall design as assessed within the study design hierarchy (see Table 1.3) and the risk of bias ratings as reported in Table 1.4 (score of 2 for a low risk of bias, 1 for unclear risk and 0 for high risk). As multiple outcomes were extracted from some studies, quality ratings were assigned to the method associated with each estimate separately. Below, ratings associated with *"methods"* refer to the method associated with a particular estimate, which could be different for multiple estimates taken from a single study.

Selection bias

Selection bias was mixed within the studies. Three methods were rated as presenting with low risk due to reasons such as having an extensive recruitment strategy across wide geographical areas and many schools (Eisenbarth et al., 2016). Six methods were rated as posing an unclear risk of bias as authors reported that participants were receiving treatment or in educational provisions. The remaining methods (Sebastian et al., 2016; Sethi et al., 2018; Viding et al., 2012) were rated as high risk due to feedback regarding CD symptoms being offered in return for parents and teachers responding to advertisements. It is possible that parents and teachers in these studies have higher levels of help-seeking behaviours and thus this may result in differences in the final sample. The authors also reported that children and adolescents who were unable to tolerate MRI scanners were excluded from the sample. As hyperactivity is common in CD, it is possible that the final sample may consist of children and young people with less complex and/or severe behaviour due to exclusions made for excessive movement. It is therefore likely that participants in these studies may be systematically different from participants who were not included in the studies.

Performance bias

Three methods were identified as low risk (Sethi et al., 2018; Vanwoerden et al., 2016) due to the way in which participants in the two groups (CD and CD & CU) were reported to have undergone the same process and not differ on factors that may affect outcome variables. The remaining methods were rated as unclear risk of bias. Reasons included authors not reporting data regarding group differences or where differences, such as alcohol use (Sebastian et al., 2016), or symptoms of ADHD, ODD and CD, were higher in one group compared to the other (Pauli et al., 2020). Such differences were rated as unclear as they are either unlikely to impact the outcome or known to vary between the groups.

Detection bias

As highlighted by De Los Reyes et al. (2015), parent-child agreement on a child's experience of internalising symptoms can often be low when measured through psychometric assessments. Eight methods in the analysis were rated as posing a low risk of detection bias, as anxiety and depression were measured using a combination of adult (teacher/parent) and child report, or adolescent self-report alone (Eisenbarth et al., 2016). Seven methods were rated as unclear risk as they relied on adult-only report of the child's anxiety and depression symptoms.

Statistical bias

Three methods were rated as high risk due to the way that groups were devised based upon an arbitrary method such as median split, as well as having a large amount of missing data (e.g. 28% in Pauli et al. (2020)). Eleven methods were identified as presenting an unclear bias due to either the use of an arbitrary method of devising groups (e.g. median split or tertial split) or 20-30% data missing. The use of median splits in studies was considered to pose a risk of statistical bias as this method of devising groups is said to result in a loss of discriminant power

(McClelland et al., 2015). A loss in power may occur as young people with similar levels of CU traits (at the 49th and 5th percentiles) would be placed into different categories (i.e., high/low CU groups). In contrast, young people who are normatively dissimilar (e.g. at 48th and 49th percentiles) may be categorised as members of the same group through the use of this grouping method. One method was rated as low risk as groups were devised using clinical/diagnostic cut-offs and a low amount of missing data was reported (Pardini et al., 2012).

Reporting bias

The reporting of full outcomes across the methods included within this analysis was generally good, with thirteen identified as low risk. The method described by Fanti (2013) was classed as presenting an unclear level of risk, as summary and descriptive statistics were not explicitly reported. In addition, the method described by Euler et al. (2015) was also categorised as unclear risk as missing data was not reported.

Generalisability

Five methods were categorised as being at a low risk of generalisability bias. Factors that were deemed to increase the generalisability of a method included large recruitment strategies spanning wide geographical locations (e.g. in Eisenbarth et al. (2016), participants were recruited from 12 high schools across three provinces in Cyprus and with parents of varying educational and marital statuses). Ten methods included in the review were categorised as unclear risk. Reasons for categorising methods as unclear included the use of relatively small sample sizes or where exclusions of common comorbidities known in children and adolescents with CD (e.g. ADHD, ODD) were made. In addition, methods were deemed to present unclear risk if the sample was recruited from one psychiatric service (Schwenck et al., 2012) or from juvenile institutions (Euler et al., 2015). Such factors may limit the extent to which the findings

from these studies can be applied to other children and young people with CD due to the way the methods may include young people with complex needs or a rare subgroup without comorbidity. Due to the high proportion of methods rated as unclear, there is a need to interpret the results of this meta-analysis with caution.

Summary of risk of bias assessment

Overall, methods included in the current meta-analysis were rated as having a mixed level of bias. A relatively low number of methods were identified as having a high risk of bias in any of the quality criteria (Pauli et al., 2020; Sebastian et al., 2016; Sethi et al., 2018; Viding et al., 2012). All ratings of high risk amongst these methods were identified using quality criteria pertaining to either selection or statistical bias. A considerable amount of unclear bias was identified across the quality criteria in all methods. The decision was made to include all estimates associated with unclear and high risk of bias in the final meta-analysis, due to the low number of studies in this field. Whilst caution must be taken when interpreting the results of this meta-analysis, it can be argued that it is representative of the current literature available in this area of CD, CU traits and anxiety and depression.

Correlational studies

Risk of bias assessment in correlational studies

All studies were of cross-sectional design and therefore comparable in terms of their position within the study hierarchy, discussed earlier (Table 1.3). Quality criteria were developed for the purpose of assessing the risk of six types of bias within this literature (Table 1.5).

Table 1.5

Criteria for ratings of low, unclear, or high risk across six domains for correlational studies

Domain	Details	Risk of Bias
Selection Bias	Were efforts made to minimise systematic difference between the characteristics of those selected for the study and those who were not?	High Risk - Studies involving diagnosis as incentive for parents/teachers of children. No description of the method by which, participants were selected, or characteristics of participants are not described. Unclear Risk - Participants recruited through behavioural or educational support programmes, psychiatric services or inpatient settings as likely to be more complex or severe. Financial incentives provided in return for participation. Instances where the nature of the study (e.g. interviews in homes) may impact self-selection, particularly due to research highlighting neglect and other adverse experiences within familial environment to higher levels of psychopathy. Low Risk- Participant selection strategy wide- e.g. across large geographical location, many schools etc. Due to the large recruitment strategy, the likelihood of systematic difference between those selected vs those not selected is reduced.
Performance Bias	Systematic differences between participants that may lead to differences in motivation to complete the study	High Risk - Some different procedures within the study which will result in difference in motivation to complete the study. Unclear Risk- Some different procedures within the sample which may result in difference in motivation to complete the study e.g. some participants completed certain measures whilst others did not. Low Risk- No evidence to suggest that there may be differences within the participant sample that may cause differences in motivation to complete the study
Detection Bias	Are the measures used for detecting outcome data (depression and anxiety) appropriate?	High Risk- Poor measure used. Rating of outcome provided by unfamiliar other (e.g. researcher) based on limited observational timeframe. Unclear Risk - Adult (parent/guardian/teacher) only report Low Risk- Good quality measures used to detect outcome data and use of combined adult (parent/teacher) and child report OR self-report only for older (adolescent) children OR parent-only for pre-adolescent children.
Statistical Bias	Have appropriate statistical methods been used? Is there incomplete data due to attrition? Has completer analysis been performed only, or have the studies included an "intention to treat" analysis?	High Risk - Over 30% missing data. Unclear Risk - 20-30% missing data or . Low Risk- Less than 10% missing data or 10-20% missing data but clear description of process employed to control for missing data.
Reporting Bias	Evidence of selective outcome reporting e.g. only significant results reported. Are there measures that have not been reported in the results that have been mentioned in the method section?	High Risk - Not reported full outcome measures stated in the method section/reported, only a subsample of results, only significant results etc. Unclear Risk - Not all descriptive and/or summary statistics are reported. Low Risk- Reporting of non-significant results, exclusions, missing data and results of measures outlined in method.
Generalisation	Can the research findings be applied to settings other than that in which they were originally tested? Are there any differences between the study participants and those persons to whom the review is applicable?	High Risk- Very small sample of participants (n<30) recruited from a population with little comorbidity e.g. CD only with no comorbidity with ADHD. Unclear Risk - Relatively small sample (n= 30-100), exact geographical location, or recruitment location unclear AND Studies whereby the selection strategy is likely to have influenced the generalisability of the results e.g. feedback offered in return for participation may lead to higher levels of help-seeking parents. Oversampling in low-income neighbourhoods may also lead to an unclear risk of bias in addition to entire samples recruited from juvenile/welfare institutions. Low Risk- Large (n>100), diverse sample of participants e.g. from a large geographical area, variation in parent education and parental marital status etc.

The quality index score (expressed as a percentage) was calculated using the total score from the risk of bias ratings (reported in Figure 1.3), and the study's overall design as assessed within the study design hierarchy (see Table 1.3). As for group designs, multiple correlational outcomes were extracted from some studies, quality ratings were assigned to the method associated with each estimate separately.

Figure 1.3

Ratings of risk of bias for correlational studies. Red indicates high risk of bias, amber marks an unclear risk of bias and green is a low risk of bias.

Study Name	Study Design	Selection Bias	Performance Bias	Treatment Bias	Detection Bias	Statistical Bias	Reporting Bias	Generalisability	Quality.Index
Dolan and Rennie A	Cross-sectional studies	Unclear risk	Low risk	Not Applicable	Low risk	Low risk	Low risk	Unclear risk	45%
Polier A	Cross-sectional studies	Unclear risk	Unclear risk	Not Applicable	Low risk	Unclear risk	Unclear risk	High risk	38%
Polier AD	Cross-sectional studies	Unclear risk	Unclear risk	Not Applicable	Unclear risk	Unclear risk	Unclear risk	High risk	36%
Benesch AD	Cross-sectional studies	Low risk	Low risk	Not Applicable	Low risk	Low risk	Low risk	Low risk	52%

Note. A suffix is added to the study label to indicate the outcome of interest (i.e. 'A' for anxiety and 'AD' for anxious/depressed.

Selection bias

Three methods were categorised as presenting with unclear risk due to their recruitment strategies (e.g. the sample in Dolan and Rennie (2007) consisted of offenders in institutions and secure care establishments and in the Polier et al. (2010) method, participants were attending a psychiatry clinic and reported to fulfil criteria for early-onset CD and comorbid ADHD). One method (Benesch et al., 2014) was identified as low risk due to the selection strategy consisting of recruitment across a wide range of settings, such as across schools, newspapers advertisements and private psychiatric practices.

Performance bias

Two methods (Benesch et al., 2014; Dolan & Rennie, 2007) were identified as low risk as participants appear to have undergone the same procedure during testing. In particular, Dolan and Rennie (2007) reported that due to some participants having poor literacy skills, measures were read out to all to maintain the same testing conditions. Polier et al. (2010) reported that children above the age of 10 were asked to complete an additional measure, thus prolonged testing time may have resulted in differing motivation and performance amongst children above and below the age of 10 in the sample. The method in the Polier et al. (2010) study was therefore rated as posing an unclear risk of performance bias.

Detection bias

Dolan and Rennie (2007) and the anxiety outcome data for Polier et al. (2010) were rated as low risk of bias as the samples consisted of adolescents who completed self-report outcome measures. Benesch et al. (2014) was also rated as presenting a low risk of bias as the outcome was measured using parent report only, however, the sample consisted of children predominantly of pre-adolescent age. The Polier et al. (2010) study utilised parent-report

measures only for the outcome of mixed anxiety and depression. The method described by Polier et al. (2010) for mixed anxiety and depression was therefore rated as presenting an unclear risk of bias as the mean age of the sample was 11.2, indicating a predominantly adolescent sample.

Statistical bias

Benesch et al. (2014) was rated as a low risk of statistical bias as appropriate statistical tests were conducted and less than 10% of missing data were reported along with an explicit description of managing missing data. Dolan and Rennie (2007) also reported management of less than 10% of missing data. The methods described by Polier et al. (2010), however, were rated as presenting unclear risks of statistical bias as the presence and management of missing data were not reported.

Reporting bias

Two methods (Benesch et al., 2014; Dolan & Rennie, 2007) were rated as presenting a low risk of reporting bias. Whilst all planned statistical analyses and descriptive and summary statistics were reported by Polier et al. (2010), the methods from this study were rated as presenting unclear risks of bias due to the lack of explicit reporting of missing data.

Generalisability

Due to the relatively large sample (n = 120) and wide recruitment strategy, the method associated with the Benesch et al. (2014) study was rated as low risk of generalisability bias. As the entire sample was recruited from offender and secure care institutions, the Dolan and Rennie (2007) method was identified as presenting an unclear risk of bias. The method described by Polier et al. (2010) was rated as a high risk of bias as the relatively small sample

(*n* = 33) consisted of young people who all had early-onset CD and comorbid ADHD, as well as being open to the same psychiatric service. Such specific criteria are likely to limit the extent to which the findings of the study can be generalised to other CD populations.

Analysis of studies with varying designs

Data included in the review were extracted from two types of study designs: studies reporting group-based mean differences and correlations. Two separate meta-analyses were conducted to determine the overall effects of studies reporting standardised mean differences between groups and another analysis synthesising the studies reporting correlations.

4. Results

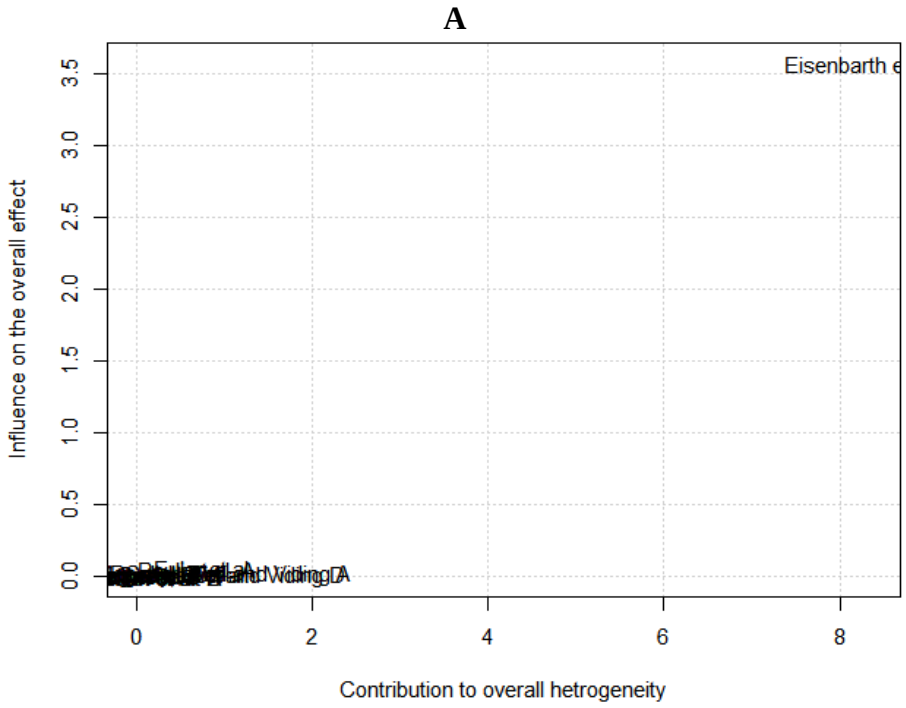
Standardised mean difference studies

The impact of influential primary studies

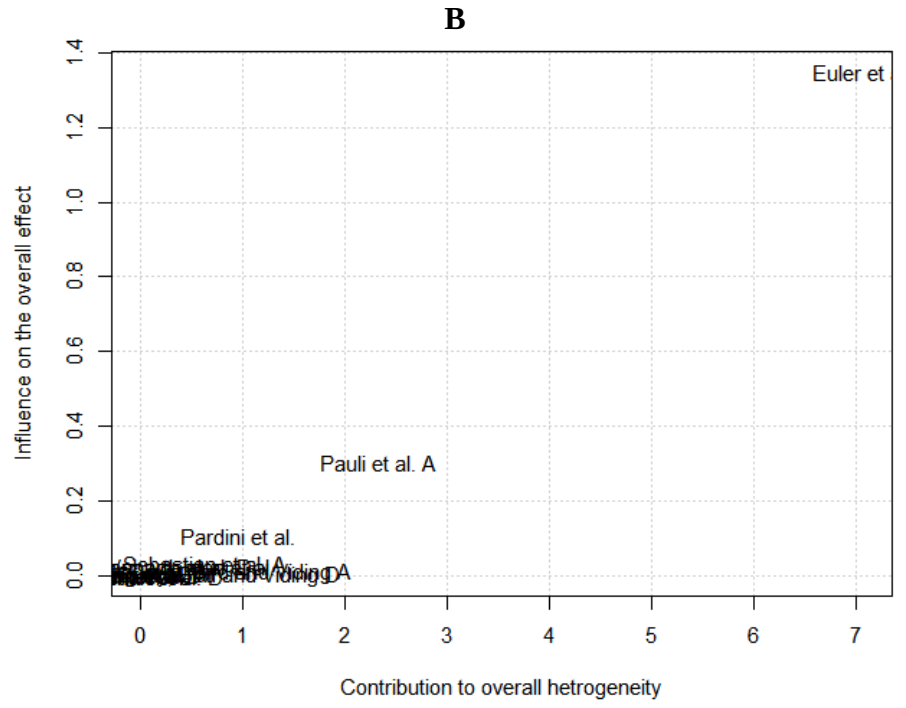
A Baujat Plot (Baujat et al., 2002) was developed to aid the process of the 'leave-one-out' analysis. The analysis aimed to detect estimates contributing disproportionate heterogeneity to the overall meta-analysis by calculating the random effects model with each of the primary estimates removed in turn. The resultant change in the weighted average effect size (i.e., influence) and the change in heterogeneity (i.e., discrepancy) are presented in Figure 1.4.

Figure 1.4

Baujat diagnostic plot of sources of heterogeneity.



Note. The vertical axis reports the influence of the study on the overall effect and the horizontal axis reports the discrepancy of the study with the rest of the literature. Panel A is the Baujat plot including the anxiety estimate from Eisenbarth et al. (2016).



Note. Panel B is a Baujat plot of the remaining studies following the removal of the anxiety estimate from Eisenbarth et al. (2016).

The Baujat diagnostic plot of sources of heterogeneity clearly identifies the anxiety estimate from Eisenbarth et al. (2016) as both influential and discrepant from the current literature (see Figure 1.4, Chart A). This estimate was re-reviewed for risk of bias with a view to assess the impact of its removal from the synthesis. It was found that Eisenbarth et al. (2016) reported the average standardised mean difference (SMD) for anxiety across two separate timepoints and noted that both CD symptoms and CU traits had also increased over time. It is therefore likely that the measure of SMD may have been confounded by the changes in these participant characteristics, thus the anxiety estimate from Eisenbarth et al. (2016) was removed from the synthesis.

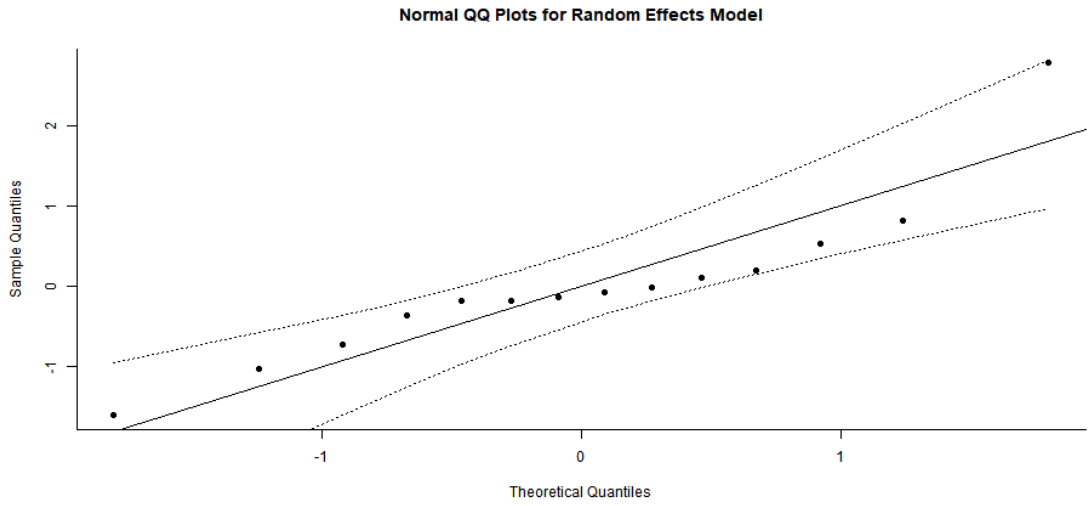
The Baujat diagnostic plot following the removal of the anxiety estimate from Eisenbarth et al. (2016) is presented in Chart B of Figure 1.4, and highlights Euler et al. (2015) as both influential and discrepant from the current literature. The Euler et al. (2015) estimate was re-reviewed for risk of bias in order to assess the appropriateness of its removal from the synthesis, however, no apparent reason for its removal was identified and it was therefore retained in the synthesis.

Selection of the meta-analytic model

The distribution of primary study effects is shown in Figure 1.5. The variance of the true effect (tau^2) was calculated using the DerSimonian and Laird estimator.

Figure 1.5

QQ plot of the distribution of standardised mean differences within the primary studies following the removal of Eisenbarth et al. (2016)



As can be seen from Figure 1.5, it appears that the underlying distribution of standardised mean differences approximates a normal distribution. The use of the DerSimonian and Laird estimator is therefore assumed to be an appropriate method for the calculation of the variation of the true effect.

The omnibus test

The standardised mean differences in anxiety and depression symptoms between children and adolescents with CD and without CU traits as described in the primary estimates, are presented in Figure 1.6. There were fourteen estimates reporting a total of 1375 participants, of which 663 were young people with CD & CU traits and 712 with CD only. Participants were recruited from a variety of settings including the community, specialist behavioural provision schools, young people offending, mental health and inpatient services. Participants were recruited over a variety of geographical locations including the UK, Cyprus, Germany, Switzerland, USA and one estimate by Pauli et al. (2020) was based upon a sample of children and young people recruited from 11 sites across Germany, Greece, Hungary, Netherlands, Spain, Switzerland and

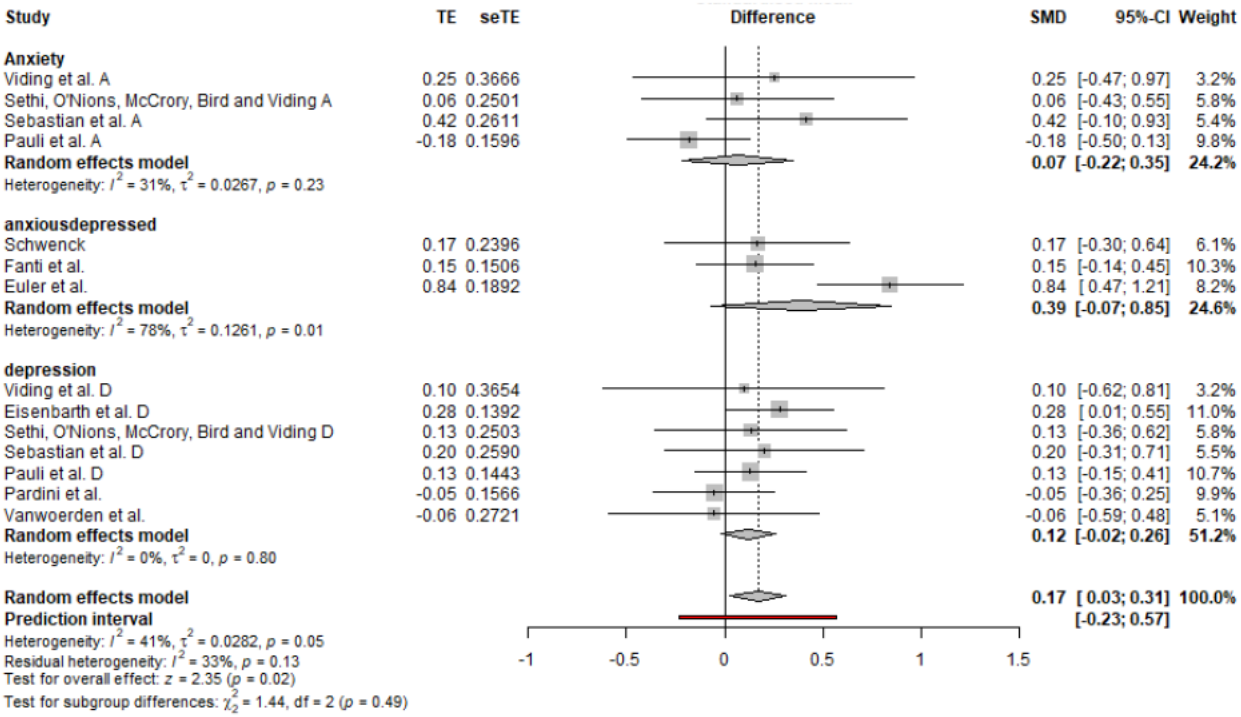
the United Kingdom. The majority of the samples in the estimates consisted of all-male or mixed-gender samples, with only one estimate (Pardini et al., 2012) consisting of an all-female sample. It should be noted that the majority of estimates reported a mixed-gender sample, consisting of a higher proportion of male participants. Participant ages in the estimates ranged from 9 to 18 years old.

Estimates reporting a positive SMD indicate that the CD & CU groups reported higher average values compared to the CD only groups on the outcome measures for anxiety and depression. Negative SMD values indicate estimates where the CD only group reported higher values for anxiety and depression outcomes.

A random effects model was calculated using the DerSimonian and Laird method (see Figure 1.6). The effect of SMD was modelled using the generic inverse variance method. This weights studies according to the inverse of their variance from the estimate of the effect of SMD. Figure 1.6 provides separate estimates for each of the outcomes (anxiety, depression, and mixed depression/anxiety), as well as an overall effect across all of the outcomes.

Figure 1.6

Forest plot of the standardise mean difference anxiety and depression symptoms between children and adolescents with CD with and without CU traits.



There was no significant difference between the different outcomes of anxiety and depression (X^2 = 1.44, p = 0.49). The random effects model across all outcomes suggested a weighted average standardised mean difference of SMD = 0.17 (z = 2.35, p = 0.02) and a 95% confidence interval of between 0.03 to 0.31. An acceptable level of heterogeneity in the primary studies was observed I^2 = 41% (tau^2 = 0.028, p = 0.05). A standardised mean difference of this magnitude would be considered small, and it should also be noted that none of the separate domains of anxiety, depression and anxiety/depression were individually statistically significant (i.e., due to the reduction in the number of studies per outcome). The overall effect of studies included in the synthesis showed that the CD & CU groups reported significantly higher levels of anxiety, depression and mixed anxiety and depression compared to the CD only groups.

The effect of methodological risk of bias in the primary studies

The quality effects model was calculated using the total score from the risk of bias ratings reported in Figure 1.3. This score considers the position of a study's overall design within the study design hierarchy and the ratings of risk of bias as reported in Table 1.5 (with a score of 2 for low risk of bias, 1 for unclear risk of bias and 0 for high risk of bias).

The quality effects model can be interpreted as the meta-analytic synthesis that would have been obtained had all the studies been of the same methodological quality as the best study in the review. The quality effects model reported a synthesis of SMD = 0.1589 (95% CI 0.0097 to 0.308). The quality effects model evidences an approximately 7% decrease relative to the previous random effects estimate. Accordingly, when the synthesis includes information about the methodological quality of the studies, there is trivial change in the weighted average of these studies and the inclusion of information about methodological quality does not change the substantive conclusions of the meta-analysis.

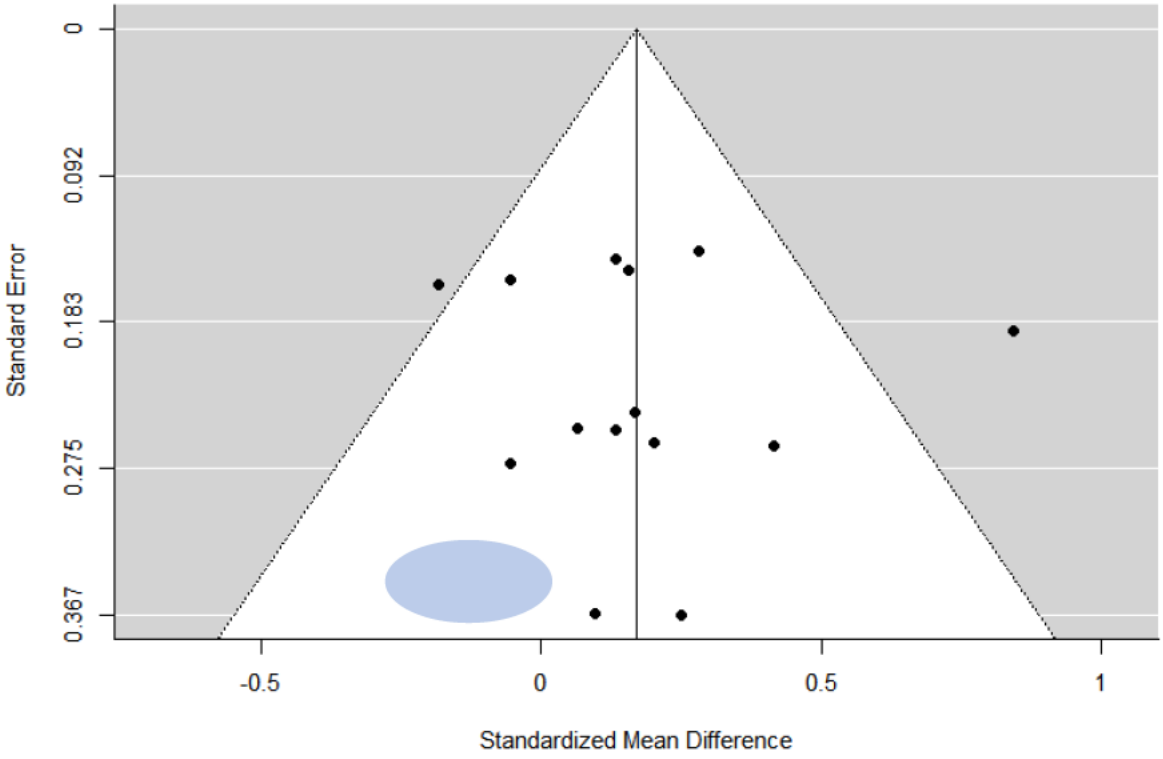
The impact of publication and small study biases

As discussed by Rothstein et al. (2005), publication bias refers to a phenomenon widely acknowledged to be present in research whereby studies with higher effects are more likely to be published than studies reporting lower effect sizes or non-significant results. Small study bias refers to the tendency for greater variability in measurements within studies with small sample sizes. It is therefore important to consider how the absence of studies with lower effects may cause the pooled effect estimated in the current meta-analysis to be higher than the true effect size. The presence of these biases can be identified through a process of plotting the magnitude of the study's standardised mean difference estimate against the square root of the study's sampling variances, otherwise known as a funnel plot. A symmetrical funnel shape is

created as effects from studies with small sample sizes will scatter more widely at the bottom of the plot due to greater variability, and studies with larger samples will lie closer to the top of the plot to the overall meta-analytic effect. The absence of studies in the area of the funnel plot associated with small sample sizes and non-significant results (see shaded area in Figure 1.7) is thought to indicate publication bias, suggesting an overestimation of the true effect. The funnel plot for all anxiety and depression outcomes is presented in Figure 1.7.

Figure 1.7

Funnel plot of the standardised mean difference for all anxiety and depression outcomes.



Note. The 95% confidence interval of the expected distribution of standardised mean difference for all outcomes is shown as an inverted "funnel". The range shaded in blue is the area associated with publication bias.

As can be seen from Figure 1.7, there is no clear evidence of publication bias in the distribution of the standardised mean differences for all anxiety and depression outcomes.

Rosenthal (1979) describes a method to calculate the 'fail-safe' number, which is the number of additional non-significant studies that would be required to be included in the meta-analysis to increase *p* to above 0.05 and thus for the overall effect to be non-significant. This calculation suggested that 36 studies would be required to reduce the observed standardised mean difference (SMD = 0.17) to non-significance, suggesting that the observed SMD is robust to studies missing due to publication bias.

Subgroup analysis

To test the impact of various factors upon the difference between CD and CD & CU participants for anxiety and depression outcomes, subgroup analyses were conducted (Table 1.6).

Table 1.6

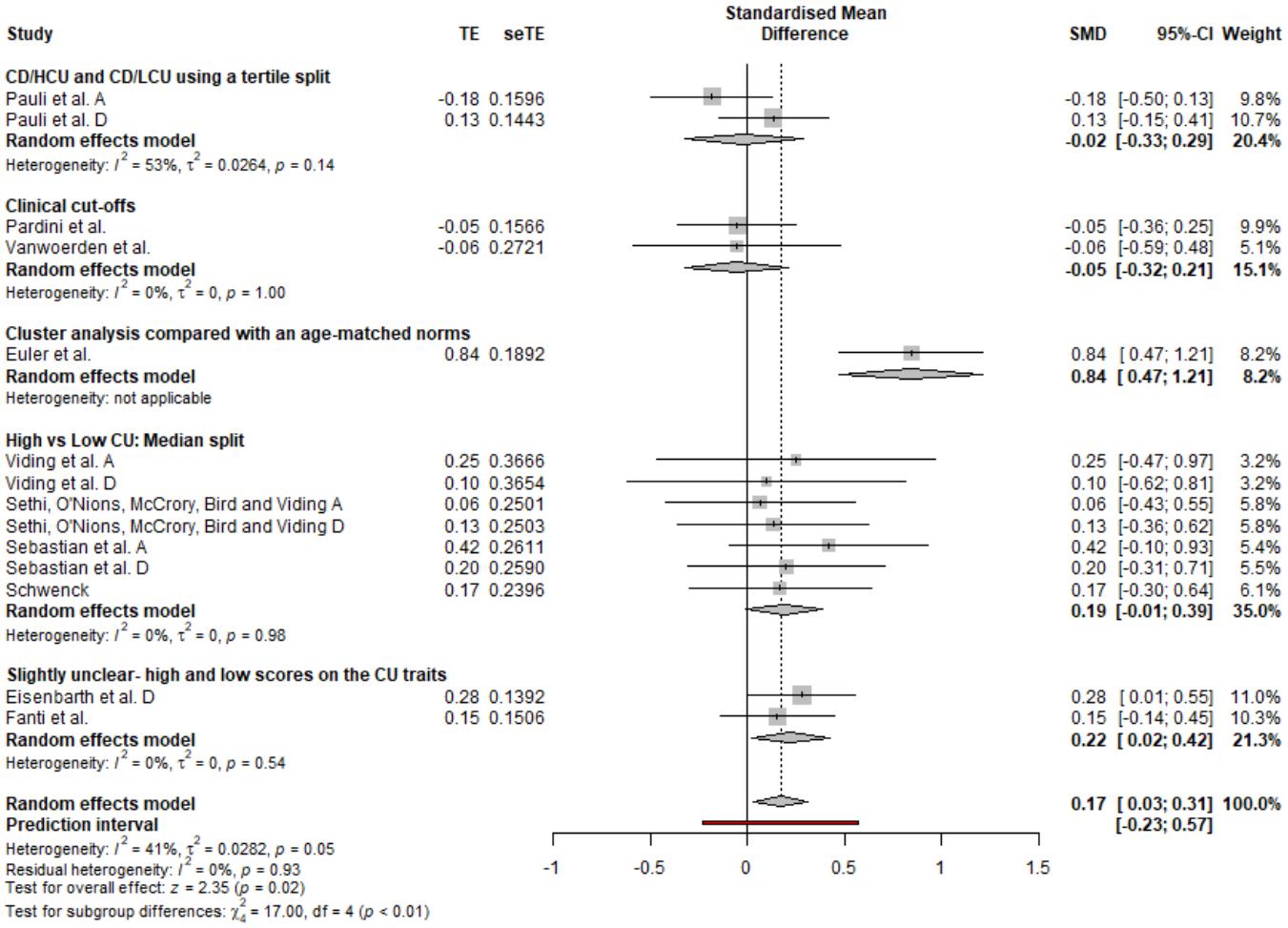
Subgroup analysis results

Moderators	Level	SMD	95% CI	Number of Studies	Participants	X^2	p
Gender	Female	-0.05	-0.36; 0.25	1	230		
	Male	0.19	-0.01; 0.39	4	314	1.68	0.20
Participant Setting	Community	0.17	0.02; 0.32	5	797		
	Community & specialist provision schools	0.10	-0.25; 0.45	1	64		
	Community & specialist provision schools & youth offending & mental health services	-0.02	-0.33; 0.29	1	656		
	Inpatient	0.42	-0.46; 1.29	2	238		
	Mental health services	0.17	-0.30; 0.64	1	70	1.62	0.81
Methods used to devise groups	CD/HCU and CD/LCU using tertial split	-0.02	-0.33; 0.29	1	656		
	Clinical cut-offs	-0.05	-0.32; 0.21	2	341		
	Cluster analysis compared with age-matched norms	0.84	0.47; 1.21	1	127		
	High vs Low CU: Median split	0.19	-0.01; 0.39	4	382		
	Slightly unclear- high and low scores on CU traits	0.22	0.02; 0.42	2	387	17.00	< 0.01
CU trait reporter	Combined parent and teacher	0.11	-0.07; 0.29	4	474		
	Parent	0.02	-0.20; 0.24	2	726		
	Self-report	0.32	-0.01; 0.66	4	625	2.16	0.34
Anxiety and/or depression reporter	Combined parent and child	-0.02	-0.21; 0.16	2	886		
	Parent	0.19	-0.01; 0.39	4	314		
	Self-report	0.32	-0.01; 0.66	4	625	4.25	0.12

The subgroup analysis indicated that varying methods used to devise groups appeared to significantly impact the magnitude of effect observed between the CD and CD & CU participants for anxiety and depression outcomes (see Figure 1.8).

Figure 1.8

Subgroup analysis of methods used to devise groups.



The difference between methods used to devise groups was statistically significant (X^2 = 17.00, p < 0.01). The weighted average difference for groups devised using a tertial split method was SMD = -0.02 (95% CI -0.33 to 0.29), clinical cut-offs SMD = -0.05 (95% CI -0.32 to 0.21), cluster analysis comparison with age-matched norms SMD = 0.84 (95% CI 0.47 to 1.21), median split method SMD = 0.19 (95% CI -0.01 to 0.39), and slightly unclear methods referring

to high/low CU traits SMD = 0.22 (95% CI 0.02 to 0.42). According to the subgroup analysis, it appears that the significant difference may be due to the use of cluster analysis compared with age-matched norms in the Euler et al. (2015) study. The subgroup analysis was therefore re-run without the Euler et al. (2015) study in order to explore whether it was mainly responsible for the significant difference between the methods used to devise groups. Subgroup analysis following the removal of the Euler et al. (2015) study revealed a non-significant effect ($X^2 = 3.86$, $p = 0.28$), suggesting that the significant effect in the original study may have been driven by the single study (Euler et al., 2015). As the removal of the Euler et al. (2015) study resulted in the narrowing of confidence intervals, the overall effect of the analysis remained significant. It is therefore difficult to conclude whether the significant difference observed is due to study-level effects or the method of cluster analysis.

Further subgroup analyses indicated that the impact of other variables upon the difference between CD and CD & CU participants for anxiety and depression outcomes was non-significant. As this meta-analysis consists of a relatively small number of studies, it is further limited when exploring subgroup differences. Exploring the impact of gender is an example of how the limited number of studies may have impacted subgroup analysis, as there was only one study consisting of an all-female sample (Pardini et al., 2012).

A meta-regression was conducted to examine the impact of mean age of participants on the magnitude of the effect observed between the CD and CD & CU participants (Table 1.7). The study by Pardini et al. (2012) was not included in the meta-regression as the mean age of the sample was not reported.

Table 1.7

Meta-regression

	Coefficient	SE	Z	p
Mean Age (years)	0.062	0.054	1.16	0.25

The association between mean age and anxiety and/or depression outcomes was non-significant ($p = 0.25$).

Correlational studies

The omnibus test

Correlations between the anxiety and depression outcomes and CU traits in children and adolescents with CD as described in the primary studies are reported in Table 1.8. There were four outcomes reporting a total of 296 young people with CD. Participants in the four outcomes were all males, recruited from a variety of settings, including the community, young offender institutions and secure care establishments in Germany and the United Kingdom. The ages of participants across the four outcomes ranged from 6 up to 16 years old.

Table 1.8

Correlations between CU traits and anxiety and or depression in children and adolescents with CD

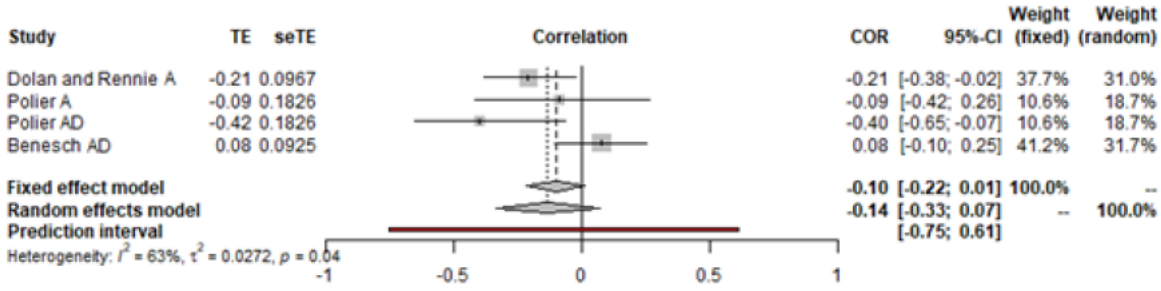
	COR	Lower 95% CI	Upper 95% CI	% Weight (fixed)
Dolan & Rennie	-0.21	-0.38	-0.02	37.7%
Polier et al. A	-0.09	-0.42	0.26	10.6%
Polier et al. AD	-0.40	-0.65	-0.07	10.6%
Benesch et al.	0.08	-0.10	0.25	41.2%

The total score from the risk of bias ratings is reported in Figure 1.2. This score considers the position of a study's overall design within the study design hierarchy and the ratings of risk of bias as reported in Table 1.5 (with a score of 2 for low risk of bias, 1 for unclear risk of bias and 0 for high risk of bias).

Due to the limited number of studies reporting correlation coefficients, analysis was conducted using the fixed effects model. The fixed effects model was favoured in this case as it is argued that the use of the random effects model to analyse a small number of studies may produce inaccurate estimates (Borenstein et al., 2007). The fixed effects model (Figure 1.9) reported a synthesis of r = -0.10 (95% CI -0.22 to 0.01). Due to restrictions imposed by the small number of studies, no further analysis was undertaken.

Figure 1.9

A forest plot of correlations between CU traits and anxiety and depression outcomes in children and adolescents with CD



The overall effect of the correlational studies was non-significant. Three of the outcomes reported in two studies (Dolan & Rennie, 2007; Polier et al., 2010) indicated a negative correlation between CU traits, anxiety and mixed anxiety and depression in young people with CD. The three outcomes reporting a negative correlation therefore suggest that as severity of CU traits increased in young people with CD, reported anxiety and mixed anxiety and depression decreased. Conversely, the study by Benesch et al. (2014) reported a positive correlation, whereby reports of anxiety and depression symptoms increased as the severity of CU traits increased in the sample of young people with CD symptoms.

5. Discussion

This review explored the relationship between CD and CU, and experiences of anxiety and depression symptoms in young people. Two separate meta-analyses were conducted, as studies reporting relevant data took two forms of design; a meta-analysis to determine the overall effects for studies reporting group-based mean differences and a second analysis for studies reporting correlations. The meta-analysis of studies reporting standardised mean differences between CD only and CD & CU groups consisted of 14 outcomes extracted from ten studies, reporting three types of internalising symptoms (anxiety, depression and combined anxiety and depression). The combined effect across all studies showed that the CD & CU group reported significantly higher levels of internalising symptoms across all outcomes of anxiety, depression and combined anxiety and depression, in comparison to the CD only group. Whilst the effect observed was small, it was shown to be robust, suggesting that this finding would hold with the addition of further research in the future.

This review suggests that the subgroup of young people with CD and CU traits are more likely to experience internalising difficulties compared to young people with CD alone. Despite the findings of the meta-analysis being based upon a small number of studies (10 studies reporting 14 outcomes), heterogeneity between studies was observed to be within an acceptable level, suggesting that the results are robust and would hold with the addition of further research. Young people with CD and CU traits are widely thought to be a more complex subgroup with a poorer prognosis, poorer response to treatment and present with greater levels of externalising behaviours (Dandreaux & Frick, 2009; Pardini et al., 2010; Rowe et al., 2010). As the evidence shows that this subgroup of young people experiences greater internalising symptoms, the findings highlight the need to focus on the internal experiences of these vulnerable young people, as well as their externalising behaviours and

wider impact on society. Frick et al. (1999) suggested that anxiety may be higher in children and adolescents with CD due to the consequences of their risk-taking behaviour. In line with this explanation, it is possible that higher levels of externalising behaviour in young people with CU traits may result in greater internalising symptoms due to increased severity in consequences. Examples of severe consequences resulting from externalising behaviours may include suspension and exclusion from school, and involvement with the criminal justice system. Attempts to disentangle whether internalising symptoms lead to an increased risk of externalising behaviours, or whether they occur in response to the consequences of antisocial behaviour would be beneficial. Karpman's (1941) notion of a secondary variant of psychopathy may provide an additional explanation for the increased risk of internalising symptoms in young people with CD and CU traits. According to this taxonomy, Karpman (1941) outlined that the secondary variant of psychopathy arises because of early life trauma and adverse life experiences. It is possible that such CU traits in young people may be associated with adverse life experiences, which may lead to an increased vulnerability to internalising symptoms.

The second meta-analysis combined four correlational outcomes extracted from three studies. An overall non-significant negative effect was observed in the correlational studies, suggesting that as CU traits increased in young people with CD, internalising symptoms of anxiety and mixed anxiety and depression may have decreased. Whilst contrary to the finding of the first meta-analysis, although non-significant, this is consistent with the limited existing evidence that has reported a negative association between CU traits and emotional problems (Blonigen et al., 2005). It should be noted, however, that this negative association reported in the Blonigen et al. (2005) study was amongst children without symptoms of CD. Due to the limited number of studies (n = 4) and considerably

heterogenous samples, the overall effect of the meta-analysis of correlational studies is less reliable than that of studies reporting group-based differences. Heterogeneity may have been caused by the differing comorbidity (e.g. ADHD, ODD) in each of the samples. The incongruent results of the correlational studies may be indicative of a non-linear relationship between CU traits and anxiety and depression symptoms. The use of a correlational design may be unable to detect differences that exist between groups, such as those with high and low CU traits, or where significant differences exist between low versus medium to high CU traits. Use of more subtle measures or non-linear modelling in future research aiming to explore differences in anxiety and depression between young people with CD, with and without CU traits may be advantageous. The use of emotional problems as a construct to encompass a broad range of difficulties (e.g. depression and phobias) in previous studies may also contribute to discrepancy in findings. Avoiding the use of such broad measures that include several concepts in future research is likely to allow greater insight into more nuanced relationships between CU traits and different types of internalising symptoms. As CU traits have been shown to be associated with lower levels of fearfulness (Waller et al., 2016), it is possible that this results in a general sense that this subgroup of young people is immune from experiencing internalising symptoms. The findings of this review, however, highlight that the opposite is true and young people with CD and CU traits are in fact more vulnerable to negative affect and experiences.

A meta-analysis involves combining results from numerous studies to provide a summary of existing evidence (Sutton & Higgins, 2008). A meta-analysis was deemed advantageous, given the limited number of studies on the topic, and the way in which existing studies often report anxiety and depression symptoms as covariates or part of a secondary analysis. Here, though we found an overall effect, it was not significant for separate estimates for

anxiety, depression, and anxiety/depression. It is likely that the lack of significance across each individual outcome may be due to the limited number of studies per outcome (i.e., the outcome of depression was the largest and consisted of seven estimates), leading to broader confidence intervals. An example includes the outcome of mixed anxiety and depression which was reported to be higher in the CD & CU groups compared to the CD only groups for all three studies (Euler et al., 2015; Fanti et al., 2013; Schwenck et al., 2012). The estimate reported by Euler et al. (2015) appeared to be discrepantly higher than other estimates included in the analysis of mixed anxiety and depression outcomes. It is possible that this difference may be explained by differences in recruitment; participants in the Euler et al. (2015) study were recruited from an inpatient setting, compared to the other two studies whereby participants were residing in the community and may therefore include a less complex group of young people.

Gender may provide a possible explanation for further discrepant estimates within the analysis. Interestingly, all three estimates reporting a negative effect were based upon samples consisting of either mixed gender (Pauli et al., 2020; Vanwoerden et al., 2016) or females only (Pardini et al., 2012). As discussed earlier, the seemingly discrepant estimate provided by Euler et al. (2015) was also based upon a mixed-gender sample. Given that other estimates based upon mixed-gender samples were not identified as discrepant (Eisenbarth et al., 2016; Fanti, 2013), this notion must be held tentatively, and consideration of gender in future research exploring internalising symptoms in young people with CD and CU traits will be useful. Gender differences have been identified in previous research concerning children with CD only: symptoms of anxiety and depression are reported to be more prevalent in females with CD than in males with CD (Keenan et al., 1999). The existence of a gender paradox is referred to within the CD literature, whereby CD is said to

be less prevalent amongst females, however, females are also said to be at a higher risk of developing comorbid symptoms, resulting in more severe psychopathology (Pajer et al., 2008; Stadler et al., 2013). The findings of this review suggest that higher symptoms of anxiety and depression in the CD & CU groups compared to CD only groups may be the case for males but may be to a lesser extent or even the reverse for females.

This review is likely impacted by the limitations within the field of CD and CU traits. The finding that young people with CD & CU traits experienced higher levels of overall internalising symptoms was shown to be robust; the limited literature available is, however, likely to have impacted the ability to observe significant difference within the individual categories of symptoms. Two separate analyses were conducted according to study design as correlational studies provide insight into linear relationships, whereas studies reporting standardised mean differences provide data regarding group differences. Conducting separate analyses in this way, however, further limited the number of studies in each analysis. In particular, the second analysis consisted of four correlational studies, impacting the ability to know whether the non-significant result is indicative of the true effect or due to a lack of power. The addition of more research studies providing data regarding the relationship between CD, CU traits and anxiety and depression is required to provide further certainty and insight. Further, the majority of the sample in the meta-analysis was male, which is unsurprising given that CD is more likely to be diagnosed in males than females (Euler et al., 2015). The underrepresentation of females in the literature available and thus included in the review limits the extent to which the findings can be applied to females, but also the ability to draw conclusions about the impact of gender on the interaction of CD, CU traits and internalising symptoms. Discussions about the quality criteria took place with the supervisory team, however, an independent check did not take

place. The use of an independent check of the criteria to calculate the inter-rater reliability would have increased the internal reliability of this review.

Despite the availability of other literature using broader definitions of conduct problems, such as delinquency, a rigorous process was used in this review to only select papers reporting outcomes in young people with either a level of CD symptoms or a CD diagnosis. Whilst employing a more stringent process limited the number of studies included, it maintained a high level of specificity, increasing the clinical applicability of this review. The high degree of specificity in this review allows novel insight into the differences amongst children and young people within the subgroups of CD and CU traits. The finding that children and young people with CD and the additional specifier of CU traits are more likely to experience anxiety and depression symptoms, highlights the need for a greater focus on the internal experiences of this subgroup. A focus to further understand the internal experiences is likely to inform the development of more efficacious treatments, the wider narrative and improve the prognosis for this subgroup of children and young people who are often deemed 'hard to treat.' As the conceptualisation of CD continues to be a topic of debate, it is hoped that addressing such issues within the literature will enable more clarity in future reviews.

The mixed anxiety and depression outcome provided by the Euler et al. (2015) study was identified as discrepant due to showing a much larger effect in comparison to the other studies. Euler et al. (2015) was the only study included in the group- based mean difference analysis to make use of cluster-analysis as a method to devise CD only and CD & CU groups. Further research is required to distinguish whether cluster analysis is a key method

of categorising young people to identify the link between CU traits and internalising symptoms, or whether the study presents a spurious effect.

Conclusion

A high prevalence of comorbid anxiety and depression symptoms amongst children and young people with CD is reported (Angold & Costello, 1994; Greene et al., 2002). Young people with CD and CU traits appear to present a more complex subgroup compared to those with CD alone due to several factors, including an earlier onset and more stable pattern of conduct problems (Dandreaux & Frick, 2009; Frick et al., 2005), and poorer prognosis and treatment response (Pardini et al., 2010; Rowe et al., 2010). There is a tendency to focus on the interaction of CD, CU traits and anxiety with respect to externalising behaviours, such as aggression, however there is limited consideration of the internal experience of young people with CD and CU within the existing literature. This meta-analysis therefore reviewed the existing literature to further explore the experience of anxiety and depression symptoms in young people with CD, with and without CU traits. As internalising symptoms of anxiety and depression were higher in children and adolescents with CD compared to those with CD alone, the finding of the review suggests that the additional specifier of CU traits results in children with CD being more susceptible to experiencing internalising symptoms. Although the results of this review are based upon a relatively small number of studies, the findings were shown to be robust. Research has highlighted the influence that contextual information has upon clinician judgement and the way in which future risk of criminality is rated amongst young people with CD symptoms (De Los Reyes & Marsh, 2011; Rockett et al., 2007). A shift from focusing solely upon on externalising behaviours to also considering the internal experiences of these children is

therefore likely to be beneficial. Developing further understanding of internal experiences is also likely to inform more effective treatment and improve the prognosis of this subgroup of young people with CD and CU traits.

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II. The Impact of Anxiety on Perspective-Taking Involved in Empathy

1. Abstract

Introduction: Understanding the impact of anxiety on empathy underpins how we understand social functioning in pressured environments. The existing evidence about the way anxiety impacts empathy is mixed and highlights the complexity of empathy as a construct. It is generally accepted that empathy consists of separate components, such as cognitive and affective empathy, and is influenced by gender and trait levels of empathy. This study explored the impact of state anxiety on affective and cognitive empathy in a sample of women. Relationships between trait levels of anxiety, affective and cognitive empathy were measured, and the extent to which they moderated the relationship between trait anxiety and empathy.

Method: Seventy-five females between the ages of 18 and 30 completed measures of affective and cognitive empathy, and trait anxiety. Participants then either underwent an anxiety or relaxation induction, prior to completing measures of affective and cognitive empathy performance.

Results: Robust positive correlations were found between trait cognitive and trait affective empathy, and trait and performance affective empathy. ANCOVA analysis revealed that the experience of state anxiety impaired affective empathy performance when controlling for trait empathy, however, was not observed to have an impact on cognitive empathy performance. Regression analysis revealed that trait anxiety and empathy did not moderate the influence of state anxiety on affective empathy performance.

Discussion: The findings suggest that irrespective of trait levels of anxiety and empathy, women became less affectively empathic when anxious.

2. Introduction

Empathy is the capacity to share and understand the thoughts and feelings of others (Preston & De Waal, 2002; Zaki, 2014), and is a crucial element of social interaction, prosocial behaviour and moral development (Decety et al., 2015). The process of empathy enables people to make sense of and predict others' feelings and behaviours, in order to then connect and respond accordingly (Allison et al., 2011). Empathy does not occur in isolation from other abilities. Some individuals are more empathic than others, and this relates to their other traits (Davis, 1980, 1983). Within individuals, empathy for others can be affected by other internal states, such as anxiety (Gambin & Sharp, 2018; Pittelkow et al., 2021). It is crucial to understand these relationships because it is often when we are anxious that understanding others is most important, such as when Emergency Room doctors try to understand the wishes of a person's family during urgent procedures, or Clinical Psychologists look to understand someone's feelings and intentions when they report thoughts of suicide.

The complex and multidimensional nature of empathy is widely discussed and debated in the literature (Davis, 1983; Reniers et al., 2009; Zoll & Enz, 2010). Amongst the numerous conceptualisations of empathy, the notion of two separable components of affective and cognitive empathy is the most accepted (Cuff et al., 2016). The components of affective and cognitive empathy are thought to co-occur and are thus difficult to disentangle (Baron-Cohen & Wheelwright, 2004). Considerations of affective empathy typically refer to the co-experience of the same emotional state as the other, that is experiencing personal distress as a

result of another person's unpleasant situation (Lishner et al., 2015). Affective empathy is thought to involve emotional, visceral and sensorimotor responses to the affective state of others (Yu & Chou, 2018), and results in shared experiences of phenomena, such as facial expressions and moods (Dimberg & Thunberg, 1998; Neumann & Strack, 2000). Affective empathy is characterised by a conscious self-other distinction (Bernhardt & Singer, 2012), which sets it apart from other processes. Emotion contagion (the convergence of emotions amongst people within close proximity of each other) and mimicry (implicit mirroring of others' emotional facial expressions) are examples of other processes without self-other distinction, as they feature an automatic response to the emotional state of the other. Other related processes include sympathy or empathic concern, which do not necessarily feature a sharing of the other's emotions, but a desire to support their welfare (Eres et al., 2015). Cognitive empathy refers to the process of recognising and identifying the emotional states of others (Cuff et al., 2016) and therefore incorporates a range of mechanisms, including some aspects of perspective-taking and Theory of Mind (Decety, 2011). Theory of Mind, sometimes referred to as 'mentalising' or 'mindreading', involves the ability to attribute mental states such as thoughts, beliefs and intentions of the self and others (Leslie et al., 2004). As Theory of Mind and cognitive empathy both involve inferring the mental states of others, they are often considered to be overlapping or the same construct (Lawrence et al., 2004). Cognitive and affective empathy are postulated as dissociable constructs, associated with differing neurocognitive processes and with deficits in cognitive and affective empathy resulting in differential outcomes (Lindeman et al., 2018).

Early conceptualisations focused on empathy as being a measurable, static or trait-like ability, that could not be taught (Cohen & Strayer, 1996; Otterbacher et al., 2017). Interestingly, Ze et al. (2014) reported the absence of any evidence of age-related changes in self-reported

empathy. Trait empathy refers to the extent to which individuals vary in their ability to respond empathically across situations (Cohen & Strayer, 1996; Konrath et al., 2018). Brain structures thought to be associated with empathy are susceptible to inter-individual differences of trait empathy (Banissy et al., 2012). Having a higher level of trait empathy is often viewed as a favourable personal trait, due to its association with prosocial behaviour (Stiff et al., 1988), altruistic behaviour (De Waal, 2008), greater perceptions of justice (Patient & Skarlicki, 2010) and communication skills (Redmond, 1985). Increasing evidence, however, highlights that higher levels of empathy may also have detrimental effects such as bias, fatigue, burnout and exhaustion (Rabines, 2017). Empathic abilities also relate to other individual traits, with higher levels of anxiety being reported to be associated with a reduction in empathy (Decety & Meyer, 2008; Negd et al., 2011).

Later conceptualisations of empathy have also outlined the presence of a dynamic variability within individuals, namely state empathy (Van der Graaff et al., 2016). Fluctuations in mood and psychological states have been shown to cause within-person variability in empathy (Nezlek, 2001, 2005). Individuals' state empathy can be increased by manipulating their motivation to empathise, further supporting the notion that empathy can be developed or trained (Nook et al., 2016; Schumann et al., 2014). An example of fluctuations in empathic ability include how it is shown to increase for ingroup members compared to outgroup members (Cikara et al., 2011; Gutsell & Inzlicht, 2010). Charitable organisations often use emotionally moving advertisements to evoke empathy and thus action in viewers. Bloom (2017) highlights that empathy is often exploited to motivate harmful action; one example is by evoking empathy towards ingroup members or 'victims', to generate animus towards outgroup members, such as immigrants or minority races, or to gain public support for war. Literature reporting the relation between trait and state empathy is relatively scarce and appears

to be further hindered by the ongoing debated definition of empathy as a construct. As a result, the existing literature explores the relationship between trait and state empathy, whereby empathy is often studied as different facets. Amongst the existing evidence, positive correlations between trait and state empathic concern and the experience of personal distress are reported (Davis, 1983). Trait perspective-taking and state empathic concern were not found to be related (Davis, 1983), suggesting that there may be differing processes underlying the various aspects of empathy.

The majority of empathy research uses measures of dispositional or trait empathy which often consist of self-report questionnaires. The Questionnaire of Cognitive and Affective Empathy (QCAE) (Reniers et al., 2011) was developed to overcome the limitations of existing trait-based measures of empathy with poor psychometric properties that were based upon underdeveloped definitions of empathy. Situational tasks are often used to measure state or performance empathy by asking participants about their experience immediately following their exposure to stimuli (Zhou et al., 2003). The Reading the Mind in the Eyes Test (RMET) (Baron-Cohen et al., 2001) is a test of Theory of Mind or 'mentalising', which refers to an individual's ability to attribute the mental states of oneself or others (Premack & Woodruff, 1978), and overlaps with the term 'empathy' (Baron-Cohen et al., 2001). As Theory of Mind and cognitive empathy are often considered to be similar or overlapping concepts, the RMET is often used as a measure of cognitive empathy (Lawrence et al., 2004). The Pictorial Empathy Test (PET) (Lindeman et al., 2018) was developed as a measure of affective empathy to overcome shortcomings in the literature. The PET consists of photographs depicting individuals in vulnerable states. Facial expressions are central to empathic responses (Balconi et al., 2011); therefore, the PET provides an ecologically valid measure of affective empathy.

There is increasing interest in the impact that anxiety has on empathy. Anxiety is a multi-dimensional construct and said to have a trait-like component, which refers to an individual's tendency to experience anxiety, and is related to apprehension and worry (Moran, 2016). State anxiety is an unpleasant reaction accompanied with high physiological arousal, in response to a potential threat (Russell, 1980). Increased social sensitivity and awareness of others' distressing situation may be related to the experience of anxiety (Knight et al., 2019). Others posit that anxiety may result in increased worry for others in the form of compassion, and greater consideration of how one may impact the other and thus increase empathic ability (Knight et al., 2019). Uncertainty remains regarding whether affective responses such as anxiety are characteristic or obstacles of the empathy process (Stellar et al., 2020). The existing literature, however, largely focuses on the experience of social anxiety (for a review see: Pittelkow et al., 2021) or anxiety within therapists and impact on therapeutic relationships (Negd et al., 2011).

It is not necessarily the case that anxiety will have the same impact on empathy for everyone. The notion of gender differences with regards to women having greater trait empathy is generally accepted (Davis, 1980; Hoffman, 1977; Schulte-Rüther et al., 2008). The mediating influence of gender during state-like empathy processes is also widely discussed. Tomova et al. (2014) reported that when subjected to acute levels of stress, females experienced increased self-other distinctions and reduced emotional egocentricity bias which led to faster, more affiliative responses towards the other that were less likely to be influenced by their own emotional states. The authors highlighted that when stressed, women were able to respond flexibly from self or other perspectives depending on the task demands. On the other hand, when under stress, males expressed egocentric responses. The 'tend-and-befriend' hypothesis is often provided as one possible explanation for the increased ability of empathy in females

during periods of heightened stress (Taylor et al., 2000). The ‘tend and befriend’ theory posits that when exposed to threat, females will tend to offspring to promote their survival and seek affiliation with others for joint comfort and protection (Taylor, 2011). Whilst studies have reported that women are able to recognise emotional expressions faster and more accurately than men (e.g.Hall & Matsumoto, 2004), it is argued that trait empathy is often not taken into consideration (Martínez-Velázquez et al., 2020). Martínez-Velázquez et al. (2020) reported that higher trait empathy was associated with greater affective and cognitive empathic responses in both males and females but did not appear to influence emotional recognition ability.

Understanding the impact of anxiety on empathy is crucial to understanding how we interact with one another in the most pressured environments. Existing evidence presents a confused and potentially complex picture, through which anxiety may be associated with either less or more empathy for others. One reason for this confusion may be potentially different relationships with cognitive versus affective empathy. Another reason may be a lack of appreciation of trait-like empathy differences between individuals. Given the known effect of gender differences in anxiety (Lewinsohn et al., 1998), perspective-taking processes in social anxiety (Tomova et al., 2014) and self-reported empathy (Martínez-Velázquez et al., 2020), this study consisted of an-all female sample. The study used trait measures of cognitive and affective empathy and anxiety. A between-subjects design was implemented, where participants either engaged in an anxiety induction condition or a relaxation exercise. The aims of this study were to explore: i) The relationship between trait measures of anxiety, cognitive empathy and affective empathy, ii) The impact of state anxiety on cognitive and affective empathy performance, iii) How the impact of state anxiety was moderated by trait anxiety and empathy.

3. Method

Study Design

A between-subjects design was implemented as participants were assigned to either the anxiety or the relaxation condition.

Participants

Participants (*n* = 75) were individuals who self-identified their gender and sex as female and were between the ages of 18 and 30 (mean age = 21.4 years). Participants were required to state that they did not meet any of the exclusion criteria, which included diagnoses of a mental health condition or neurodevelopmental disorder (e.g. learning disability or Autism Spectrum Disorder). Participants were either students (*n* = 26, mean age = 19.3) recruited through the University of Birmingham or members of the public, (*n* = 49, mean age = 25.5) recruited through social media. Participants were offered study credits or £5 Amazon vouchers in return for their participation. There were 38 participants in the anxiety condition (23 students and 15 members of the public, mean age = 21.7) and 37 participants in the relaxation condition (26 students and 11 members of the public, mean age = 21.2).

Procedure

Ethical approval was obtained through the University of Birmingham Ethics Committee (see Appendix A) and the study was pre-registered with the Open Science Framework (see: https://osf.io/pndyw). All stages of participation took place via remote methods in the interest of social distancing. Students at the University of Birmingham were recruited through the Research Participation Scheme and members of the public were recruited

through social media sites, such as Facebook. Participants who expressed an interest to partake were signposted to the online study information sheet (see Appendix B), consent forms (see Appendix C) and online questionnaires on Qualtrics. Links to the study information and forms were made available to student participants on the Research Participation Scheme platform. A study poster was advertised on social media to recruit members of the public (see Appendix D). Participants were then required to book onto testing slots which took place over the videoconferencing platform Zoom and provided a link for their allocated time. Written consent was obtained from participants by asking them to type their name on the online forms, and verbal consent was obtained at the beginning of the testing videocall.

Interactive testing slots were facilitated by the researcher, whereby measures of cognitive and affective empathy were completed under one of two mood induction conditions (anxious or relaxed). The researcher presented all study instructions and materials to the participants by screensharing slides to ensure a consistent procedure. Participants were required to type all their responses to measures into the chat function of Zoom. A thorough debrief was provided to all participants to ensure the management of any distress caused through the experimental tasks, including the mild anxiety condition. The debrief included a check to ensure that participants felt able to manage any distress present at the end of the session and providing signposting information for further support, if required.

There were no incomplete or missing data in questionnaires completed online, as participants were prompted to complete any missing items prior to submitting their responses.

Questionnaires

The first stage of participation involved online completion of the study questionnaires, including demographic questions of age, gender and sex, the Penn State Worry Questionnaire (PSWQ) (Meyer et al., 1990) and the Questionnaire of Cognitive and Affective Empathy (QCAE) (Reniers et al., 2009).

Penn State Worry Questionnaire (PSWQ; Meyer et al., 1990). The PSWQ is widely used as a measure of worry and generalised anxiety disorder (GAD). As worry is considered a central aspect of anxiety disorder (Barlow, 1988), the PSWQ is often used as an outcome measure in studies exploring treatment of GAD (Borkovec & Costello, 1993; Ladouceur et al., 2000). The PSWQ is a 16-item measure consisting of 11 items pertaining to the experience of pathological worry and five reverse-scored items relating to worry not being a problem. Responses are made using a five-point Likert scale from 1 ('not at all typical of me') to 5 ('very typical of me') and scores from all items are summed to derive a total score. Higher total scores reflect higher levels of pathological worry. The PSWQ has been shown to have good psychometric properties as a screening tool for GAD (Molina & Borkovec, 1994), as well as when administered online (Zlomke, 2009).

Questionnaire of Cognitive and Affective Empathy (QCAE; Reniers et al., 2009). The 31-item questionnaire was developed by amalgamating items rated to have the highest face-validity from existing validated self-report measures, such as the Empathy Quotient (Baron-Cohen & Wheelwright, 2004) and the Interpersonal Reactivity Index (IRI; Davis, 1983). The development process of the QCAE included rigorous psychometric analyses in a large sample of undergraduate students and employees, which revealed high reliability and strong convergent and construct validity (Reniers et al., 2009). Cognitive empathy is

measured through two subscales of Perspective Taking and Online Stimulation and the Affective Empathy scale consists of three subscales: Emotion Contagion, Proximal Responsivity and Peripheral Responsivity. The five subscales were identified through exploratory factor analysis during the development of the measure, and indicated high internal validity (Reniers et al., 2009).

Mood induction

Participants were alternatively assigned to one of two conditions (anxiety or relaxation). Checks were conducted after every 20 participants to ensure that there were no significant differences between the groups on self-reported trait empathy or anxiety scores. On occasions, where significant differences were identified, parity was restored through assigning participants based on a median split of the relevant measure, before pseudo-random assignment was resumed.

Participants engaged in mood induction (anxiety or relaxation) three times during their testing slot; at the beginning, halfway through the cognitive empathy paradigm and before completing the emotional empathy paradigm. Mood induction in the experimental condition was based on instructions adapted from Cataldo and Cohen (2015) and involved participants recalling and writing about a time they felt very anxious for five minutes. Participants were explicitly asked not to choose a memory of a social anxiety nature and were asked to share their screen to allow the experimenter to see their writing and check that they had followed instructions at the end of the study. The use of autobiographical memory tasks and writing about emotionally evocative experiences from participants' own lives is shown to be an effective way of experimentally inducing target emotions (Gino et al., 2012; Todd et al., 2015). To determine the effectiveness of the anxiety induction,

participants were asked to rate the extent to which the writing task caused them to experience various emotions (including anxiety) using a 9-point Likert scale (0=not at all and 9=as much as possible). Mood induction in the relaxation condition involved participants listening and engaging in a Progressive Muscle Relaxation (PMR) exercise for five minutes. Mood induction 'top-ups' were provided to ensure that the effect of the target emotion was sustained throughout the study. Following each mood induction, participants were asked to rate their current experience of seven emotions (including anxiety and relaxation) using the 9-point Likert scale described above.

Empathy performance measures

All participants completed measures of Cognitive Empathy (the Reading the Mind in the Eyes Task- RMET) and Affective Empathy (the Pictorial Empathy Test- PET). The order of the completion of study tasks (i.e., the RMET and the PET) was counterbalanced, therefore some participants completed the RMET first whilst others completed the PET and then the RMET.

Reading the Mind in the Eyes Test (RMET; Baron-Cohen et al., 2001). The RMET is considered a valid and reliable measure of social cognition and emotional and social processing, which is widely used in various clinical groups and has been translated into many languages (Vellante et al., 2013). The revised RMET was used as a measure of cognitive empathy during the experimental phase of the study. During the RMET, participants were presented with a series of 36 photographs depicting the eyes of various actors and actresses along with four words from which participants were asked to choose one that best matched what they felt the person in the photograph was thinking or feeling. Participants' responses were compared to the correct answers provided by the authors and

reported to have been derived from a consensus in a sufficient sample size (Baron-Cohen et al., 2001). Two versions of the RMET were administered, therefore participants were either presented the items in the original or reverse order. Due to the length of the measure, it was administered in two halves with a mood induction top-up in the middle.

Pictorial Empathy Test (PET; Lindeman et al., 2018). The PET aims to provide a brief measure of momentary reactions of affective empathy and whilst research is limited, it has been shown to have sufficient psychometric properties; the PET is reported to have high reliability and validity (Lindeman et al., 2018). Administration of the PET entails presenting seven pictures depicting individuals in distress sequentially and asking participants to rate the extent to which they experience the photograph as 'emotionally moving'. Participants provided their rating using a Likert scale (1= not at all- 5=very much). The total score of the PET is obtained by calculating the mean score of seven responses.

4. Results

Descriptive Data

Mean scores of self-reported trait anxiety and trait and state (performance-based) affective empathy and cognitive empathy are provided in Table 2.1:

Table 2.1

Mean scores of trait anxiety and trait and state affective empathy and cognitive empathy

		Anxiety Condition (n=38) Mean (SD)	Relaxation Condition (n=37) Mean (SD)
Self-reported in questionnaires (Trait measures)	Anxiety	56.50 (10.41)	55.78 (11.11)
	Affective Empathy	36.92 (6.20)	36.19 (4.32)
	Cognitive Empathy	59.37 (8.66)	59.57 (5.79)
Task measures (State measures)	Affective Empathy	3.60 (0.75)	3.89 (0.58)
	Cognitive Empathy	26.58 (4.41)	27.27 (4.00)

Counterbalancing check

Independent *t*-tests were conducted on the final samples to test for differences in trait levels of anxiety and empathy between the two experimental groups (anxiety and relaxation conditions). The results indicated that there were no significant differences in self-reported trait anxiety ($t(73) = .288$, $p = .774$), affective empathy ($t(73) = .592$, $p = .556$), and cognitive empathy ($t(73) = -.117$, $p = .907$), between participants in the anxiety and relaxation conditions. In addition, there was no significant difference ($t(73) = .495$, $p = .622$), between the mean ages of participants in the anxiety ($M = 21.66$) and relaxation groups ($M = 21.22$). These findings reveal that participants in the two experimental groups were appropriately counterbalanced, as there were no significant differences in the mean ages and trait levels of anxiety and empathy between the groups.

Manipulation check

The mean rating was calculated for each participant's scores of self-reported experience of anxiety and relaxation collected across the three mood manipulation checks. *T*-tests were conducted to examine the difference between groups and revealed that participants in the anxiety condition reported a significantly higher experience of anxiety ($t(73) = 6.890$, $p < .005$)

and participants in the relaxation condition reported a significantly higher experience of relaxation ($t(64) = -7.851$, $p < .005$). The mean anxiety scores were 4.78 ($SD = 1.60$) and 2.51 ($SD = 1.21$) and mean relaxation scores were 4.46 ($SD = 1.67$) and 7.04 ($SD = 1.12$) in the respective groups. These findings therefore suggest that methods of mood induction were effective at achieving the target emotions within the experimental groups.

The relationship between trait measures of anxiety, cognitive empathy and affective empathy

As data for some measures were not normally distributed (see Appendix E), Spearman's Rank correlations were conducted to test whether self-reported trait empathy measures were correlated to state empathy performance. For correlations between empathy measures, 1-tailed tests were undertaken (as an inverse correlation between two theoretically overlapping constructs would be hard to interpret as meaningful). For correlations between empathy measures and anxiety, 2-tailed tests were undertaken. The correlation matrix in Table 2.2 shows that there were several significant correlations, which were upheld when applying a Bonferroni correction of ($p < 0.005$) to control for multiple comparisons. Self-reported trait affective and trait cognitive empathy were positively correlated. Additionally, performance affective empathy was significantly positively correlated with self-reported affective empathy.

There was some evidence for marginal correlations between other variables, which are not upheld when applying stringent Bonferroni correction, however, were significant at the $p < 0.05$ level. The results suggest a positive correlation between self-reported trait anxiety and self-reported trait affective empathy. There is also some evidence that self-reported trait anxiety and performance cognitive empathy are negatively correlated, and self-reported cognitive empathy and performance affective empathy are positively correlated.

Table 2.2

Correlations (Spearman's Rho (p value)) between trait anxiety, trait empathy measures and state empathy measures

	PSWQ	QCAE (Cognitive)	QCAE (Affective)	RMET	PET
PSWQ (Trait Anxiety)	-				
	-				
QCAE (Trait Cognitive Empathy)	.213	-			
	(.067)	-			
QCAE (Trait Affective Empathy)	.302††	.360**	-		
	(.008)	(.001)	-		
RMET (State Cognitive Empathy)	-.260†	.121	-.115	-	
	(.025)	(.151)	(.163)	-	
PET (State Affective Empathy)	.220	.225*	.333**	-.144	-
	(.058)	(.026)	(.002)	(.109)	-

***** *Correlation is significant at the 0.05 level (1-tailed).*
*** Correlation is significant at the 0.01 level (1-tailed).*
† *Correlation is significant at the 0.05 level (2-tailed)*
†† *Correlation is significant at the 0.01 level (2-tailed)*

The impact of state anxiety on affective and cognitive empathy performance

It was hypothesised that state anxiety would impact performance on measures of cognitive and affective empathy. Further, it was hypothesised that trait anxiety would moderate the impact that state anxiety had on affective and cognitive empathy processes. The initial analysis plan that was pre-registered (see: https://osf.io/pndyw) included statistical analysis using ANCOVA as a method of determining the impact of state anxiety on state empathy whilst controlling for trait anxiety and empathy. As requirements of parametric ANVOCA were not met by the data (see Appendix F), all ANCOVA were calculated using bootstrap estimates for means, standard errors, and confidence intervals. As the statistical reliability was calculated using bootstrap resampling, with 1000 resamples, these analyses are robust to violation of parametric assumptions.

No significant difference was observed in state cognitive empathy scores (as measured by RMET) between anxiety and relaxation groups when controlling for trait anxiety and self-reported trait cognitive empathy ($F(1, 71) = 0.386$, $p = 0.536$), $\eta_p^2 = .005$. Trait anxiety contributed significantly as a covariate in the final model, $F(1, 71) = 8.578$, $p = .005$, $\eta_p^2 = .108$, but trait cognitive empathy did not, $F(1, 71) = 2.693$, $p = .105$, $\eta_p^2 = .037$.

A one-way ANCOVA showed a significant difference in state affective empathy scores (as measured by the PET) between anxiety and relaxation groups when controlling for trait anxiety and self-reported trait affective empathy, $F(1, 71) = 5.502$, $p = 0.022$, $\eta_p^2 = .072$. This Partial Eta Squared value suggests that 7.2% of the variance in state affective empathy is explained by the experimental manipulation (i.e., anxiety induction). Trait affective empathy was observed to explain 18% of the variance between anxiety and relaxation groups. Trait affective empathy contributed significantly as a covariate in the final model, $F(1, 71) = 15.539$, $p < .001$, $\eta_p^2 = .18$, but trait anxiety did not, $F(1, 71) = .221$, $p = 0.64$, $\eta_p^2 = .003$.

The moderating role of trait anxiety and empathy on the impact that state anxiety has on affective empathy performance

The ANCOVA revealed that state anxiety significantly impacted affective empathy performance. A regression was conducted to explore the interactions between group (state anxiety or relaxation), trait empathy and anxiety. These interaction terms demonstrate the degree to which the impact of group was modelled consistently across different levels of the trait variable. Parametric assumptions for regression analysis were met (see Appendix G). The overall regression analysis was significant, $F(6, 74) = 3.897$, $p = .002$, and accounted for 19% variance (Adjusted $R^2 = .190$). The only significant contributor to the model was group (anxiety or relaxation). Trait affective empathy only evidenced a marginal contribution, which may be

partly due to overlap with interaction terms. That the interaction terms did not significantly contribute suggests that the impact of group was consistent across different levels of trait empathy and trait anxiety. The model therefore predicts that irrespective of trait levels of anxiety and empathy, state anxiety impaired affective empathy ability equally in all women.

Table 2.3

Regression model with interaction terms

Variable	***B***	***SE B***	***β***	***Sig.***
Group (Anxiety/Relaxation)	.330	.146	.242	.027
Trait Anxiety	.009	.010	.147	.346
Trait Affective Empathy	.048	.025	.376	.062
Group x Trait affective empathy	.012	.031	.075	.710
Group x Trait Anxiety	-.013	.014	-.136	.380
Group x Trait Anxiety x Affective Empathy	.000056	.001	.005	.967

5. Discussion

In this study, I investigated the relationship between state and trait anxiety and empathy across cognitive and affective domains. Robust positive correlations were found between trait cognitive and trait affective empathy, and trait and performance affective empathy. Applying stringent control for multiple comparisons revealed marginal positive correlations between self-reported trait anxiety and trait affective empathy, and trait cognitive empathy and performance affective empathy. A marginal negative correlation was also identified between trait anxiety and performance cognitive empathy. The experience of state anxiety impaired affective empathy performance, when controlling for trait empathy, but was not observed to

have an impact on cognitive empathy performance. Trait anxiety and empathy were not seen to have a moderating impact on the influence of state anxiety on affective empathy performance, suggesting that all women in the sample were affected by anxiety in the same way, regardless of their trait anxiety and empathy.

Relationships between trait anxiety and empathy measures and performance empathy

Correlations were observed between trait and state empathy measures, apart from state cognitive empathy performance, which did not correlate with any other measure of empathy. Within these significant correlations, the strongest were observed between trait and state affective empathy, and trait affective and trait cognitive empathy. The results of this study appear to provide further insight into the nuanced relationship between trait and state empathy. The findings of this study are in line with those reported in a meta-analysis by Pittelkow et al. (2021), who also reported the differential impact of social anxiety on empathy; social anxiety was associated with increased affective empathy but did not appear to have an impact on cognitive empathy. Self-reported trait cognitive and trait affective empathy were positively associated, which suggests that individuals who rated themselves as highly empathic considered this to be in the case of both domains of empathy. This is consistent with the findings in the original paper of the QCAE (Reniers et al., 2011), whereby cognitive and affective scales were reported to be moderately correlated. Stronger relationships were reported between the subscales within the cognitive and affective scales (Reniers et al., 2011), providing support for the notion that whilst affective and cognitive empathy are related, they remain two distinct constructs. One aspect of the findings failed to replicate previous findings (Martínez-Velázquez et al., 2020) in showing a relationship between trait and performance cognitive empathy. Martínez-Velázquez et al. (2020) reported that higher trait empathy was associated with greater affective and cognitive empathic responses in a mixed gender sample. As this

study is based upon an all-female sample, it is possible that discrepancies in findings may be due to the documented role of gender in empathy (Davis, 1980; Hoffman, 1977; Schulte-Rüther et al., 2008). It is also important to note that trait empathy in the Martínez-Velázquez et al. (2020) study encompassed both affective and cognitive empathy, rather than exploring them as separate domains.

There was some evidence that self-reported trait anxiety was positively associated with trait affective empathy – though the correlational fell marginally short of significance via a conservative Bonferroni correction. The possible positive association between trait anxiety and self-reported trait affective empathy may be indicative of a desire to associate and affiliate amongst women when anxious, as described in the 'tend-and-befriend' hypothesis (Taylor et al., 2000). Interestingly, however, a negative correlation was observed between trait anxiety and performance cognitive empathy, suggesting that trait anxiety in fact negatively impaired cognitive empathy performance. It is important to note that this study employed more stringent criteria to control for multiple comparisons. The use of a more stringent Bonferroni correction of ($p < 0.005$) led to the identification of trait anxiety being broadly related to trait affective empathy and performance cognitive empathy. Future research aiming to explore these hypotheses more directly would be advantageous, to observe how trait anxiety is related to both trait and performance empathy.

State anxiety, affective and cognitive empathy performance

Individuals in the relaxation condition provided significantly higher ratings of affective empathy compared to those in the anxiety condition, when controlling for self-reported trait anxiety and empathy scores. State anxiety was not observed to have an impact on cognitive empathy. This finding suggests that when accounting for trait levels of anxiety and affective

empathy, the experience of state anxiety impaired affective empathy, but did not significantly impact cognitive empathy in the sample of women. The impact of state anxiety on affective empathy performance was not moderated by levels of self-reported trait anxiety and empathy. This finding suggests that all women in the sample were affected by state anxiety in the same way, and differing levels of trait anxiety and empathy did not influence the relationship between anxiety and affective empathy.

Anxiety resulted in women being less affectively empathic but was not seen to impact their cognitive empathy. Whilst the size of this effect was relatively small, the differential impact of anxiety on the separate components of empathy may provide support for the notion of the two distinct empathic reactions of compassion and empathic distress (Singer & Klimecki, 2014). Anxiety may cause reduced affective empathy due to the experience of empathic distress; the experience of anxiety may lead to a reduced capacity to feel the emotions of others, and a desire to withdraw to protect oneself from the negative emotions (Batson, 2009; Decety, 2010). Contrarily, cognitive empathy performance appeared to be unaffected by the experience of state anxiety. A possible explanation for the differential impact of state anxiety on performance affective and cognitive empathy is that due to the use of complex cognitive skills, cognitive empathy may be easier to control than affective empathy which is a more automatic process (De Waal, 2008; Trauernicht et al., 2021). Interestingly, whilst the experience of state anxiety did not appear to affect cognitive empathy performance, self-reported trait anxiety was associated with poorer cognitive empathy performance. Whilst the anxiety induction produced a measurable effect, it is likely to result in a relatively mild level of anxiety which provides a partial analogue to the real-world experience of anxiety, such as that experienced by Emergency Room doctors. It is therefore possible that cognitive empathy performance is only impacted in the event of more pronounced anxiety, hence why it was not observed in this study.

Limitations and future directions

As empathy remains a complex, poorly defined and understood construct, the findings of this study are restricted by the limits of the literature and measurement tools available for experimental use. In particular, the findings are dependent on the ability of measures to provide a direct measure of the construct. The PET, like many of the other available brief measures of affective empathy performance, relies on self-reported experience of affective empathy and may therefore be susceptible to response bias, whereas the RMET may provide a measure of empathy performance which is less effected by participant bias. Coll et al. (2017) outline that affective empathy requires the participant to experience a matching state to that of the other. Scores of affective empathy performance using self-reported measures, such as the PET, are often derived from the extent to which the participant rates stimuli as emotionally moving. Participants are not required to share the emotion that they experience when viewing the stimuli of the PET. It is possible that participants experiencing a high level of mis-matched emotions may receive a score that indicates high affective empathy, when in fact this is not the case according to the current definition of empathy (Coll et al., 2017). The consideration of a third form of empathy, motor empathy (Blair, 2005), in future research would be advantageous and provide further insight into the role of anxiety on empathy.

The study results also rely on the assumption that the RMET provides a direct measure of cognitive empathy performance. Whilst the RMET is used widely in research as a measure of cognitive empathy, its scores are shown to be influenced by intelligence (Baker et al., 2014), which was not assessed in this study. In addition, Coll et al. (2017) outline that the current empathy literature mostly relies on an oversimplified definition of the empathic process, which does not often account for related processes such as Theory of Mind and interoception. Additionally, measures of empathy employed in experimental research are often poorly

associated with prosocial behavioural outcomes, suggesting that the presence of empathy does not necessarily result in greater behavioural outcomes or prosocial action (Stellar et al., 2020). Whilst autobiographical memory tasks are widely used and shown to be effective methods of experimentally inducing target emotions in the literature (Gino et al., 2012; Todd et al., 2015) and in the current study, it is important to acknowledge that the anxiety induced in this study may be a mild analogue to real-world experiences. Further research exploring how the level of anxiety moderates the relationship between anxiety and empathy is required to develop a greater understanding of the practical implications of such findings. This study consisted of an all-female sample and as gender differences are reported in the relationship between distress and empathy (Taylor et al., 2000; Tomova et al., 2014), this suggests that the applicability of the findings of this study are limited to females only. The study sample consisted of community and undergraduate student populations. The use of participant characteristics as a random effect in the analysis to explore any potential difference between these populations and the study effects observed, may have therefore been advantageous. Given the employment of a between subjects design and controlling for individual differences in trait anxiety and empathy, any impact of including community and undergraduate samples would likely favour the null hypothesis.

This finding suggests a potentially useful response when considering scenarios whereby clinicians are required to accurately identify and understand the feelings and intentions of others whilst working in high-pressured environments, such as when a client reports suicidal ideation. In the event of becoming anxious, experiencing less affective empathy may prove protective for the clinician, as co-experiencing the client's distress is likely to reduce their ability to manage and support the client. The unaffected cognitive empathy is likely to be useful for the clinician in terms of identifying and recognising the distress of the client, to conduct an

accurate assessment and manage their risk. Conversely, it is possible that if an individual is anxious when their friend shares bad news, a reduction in their affective empathy may result in them being experienced as less containing and empathic by the other. This is because affective empathy involves responses that communicate the co-experience of affect, such as facial expressions and mood (Dimberg & Thunberg, 1998; Neumann & Strack, 2000). Whilst the anxious friend may be able to identify and recognise the distress in the other due to unaffected cognitive empathy, the reduced affective empathy may impair their ability to express that they are co-experiencing and therefore *with* their friend and their experience.

Conclusion

The current study builds upon previous research and provides a novel insight into how the experience of negative valence, in this case anxiety, may impact various components of empathy differentially amongst women. This study showed that women who were anxious rated themselves as experiencing less affective empathy than women who were relaxed. The findings therefore suggest the existence of a simple relationship between state anxiety and empathy performance in women; women regardless of their trait levels of anxiety and empathy became less affectively empathic when anxious. Recalling past experiences of feeling anxious successfully induced a measurable level of anxiety in women in the sample. A negative correlation was observed between trait anxiety and cognitive empathy performance; however, state anxiety did not appear to influence cognitive empathy performance and was not moderated by trait anxiety and empathy levels. The results of this study are likely impacted by the ongoing debate regarding the construct of empathy and limitations of available experimental measures of empathy. The findings of this study also rely on experimentally induced anxiety which is likely to be relatively mild in comparison to most real-world experiences of anxiety. As the current study focused on an all-female sample, replicating the

study in a male sample would enable further insight into gender differences in the relationship between state anxiety and performance empathy. This finding provides insight into an interesting and underexplored phenomenon; suggesting that whilst females may experience a decreased sharing of affect, their ability to understand the emotions of others when they are anxious remains unaffected.

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III. Public Dissemination Document

Meta-Analysis: Anxiety and Depression in Children and Young People with Callous-Unemotional Traits and Conduct Disorder

Introduction

Conduct Disorders (CD) often emerge in childhood and adolescence and are prevalent in around 3% of school-aged children and identified as a common cause for referral to mental health provisions and major adult psychiatric disorders (Bonin et al., 2011; Kazdin, 2003; Kim-Cohen et al., 2003). The additional specifier of Limited Prosocial Emotions (LPEs) was incorporated into the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) to describe a subgroup of children with CD who also show symptoms including shallow or deficient affect, empathy, remorse and lack of concern about performance (American Psychiatric Association, 2013). The symptoms associated with the LPE subtype of CD are often referred to as the affective dimension of psychopathy or callous-unemotional (CU traits) (Frick & Ray, 2015). Compared to those with CD alone, young people with CD and CU traits are shown to be a subgroup that are at risk of more severe outcomes (Kahn et al., 2012), have an earlier onset and more stable pattern of conduct problems (Dandreaux & Frick, 2009; Frick et al., 2005), and display more severe aggression (Frick et al., 2003). Children with CD are shown to experience a high degree of co-occurring internalising problems (e.g. anxiety and depression) (Polier et al., 2012). There tends to be a greater focus on the externalising behaviours (e.g. aggression) of children with CD and CU traits, and consideration of their internal experience is often within the context of understanding and predicting their externalising behaviour. This review explored the experience of internalising symptoms (anxiety and depression) amongst children and adolescents with CD alone and with CD and

CU traits, to provide further insight into whether the presence of CU traits increases the likelihood of symptoms of anxiety and depression.

Method

Thirteen studies reporting outcomes of anxiety, depression and mixed anxiety/depression were yielded through systematic searching. Two separate meta-analyses were conducted; the first analysis consisted of ten studies reporting 15 outcomes of standardised mean differences for CD and CD & CU groups and the second consisted of four correlational outcomes of internalising symptoms (anxiety and depression) and CU traits in a sample of children with CD symptoms. Methods associated with estimates for each outcome were rated for their quality using risk of bias tools.

Results

A random effects model was used to pool standardised mean differences and revealed that overall, CD & CU groups reported significantly higher levels of anxiety, depression and mixed anxiety and depression compared to the CD only groups. No significant difference between the separate outcomes of anxiety and depression and combined anxiety and depression was observed. Correlational outcomes were meta-analysed using a fixed effects model and did not evidence a significant relationship between CU traits, anxiety and mixed anxiety and depression in young people with CD.

Discussion

Despite a limited number of studies available, the findings of this review were shown to be robust: internalising symptoms of anxiety and depression were higher in children and adolescents with CD and CU than those with CD alone. This finding highlights that young

people with CD and CU symptoms are more vulnerable to experiencing internalising symptoms such as anxiety and depression.

The Impact of Anxiety on Perspective-taking Involved in Empathy

Introduction: Empathy is the capacity to share and understand the thoughts and feelings of others (Preston & De Waal, 2002; Zaki, 2014), and is considered to be a crucial factor of social interaction, prosocial behaviour and moral development (Decety et al., 2015). The existing evidence about the way anxiety impacts empathy is mixed and highlights the complexity of empathy as a construct. It is generally accepted that anxiety consists of two separate components- affective and cognitive empathy. Conceptualisations of affective empathy generally refer to it as the process of experiencing the same emotional state as others (Lishner et al., 2015). Cognitive empathy refers to the process of recognising and identifying the emotional state of others (Cuff et al., 2016). Individuals are said to have a static, trait empathy and also a dynamic state empathy ability, which fluctuates with changes in mood and psychological states (Nezlek, 2001; Van der Graaff et al., 2016). Trait levels of anxiety and gender are thought to impact state empathic ability.

Understanding the impact of anxiety on empathy underpins how we understand social functioning in high-pressured environments. It is important to understand the relationship between anxiety and empathy because it is often when we are anxious that understanding others is most important, such as when Clinical Psychologists aim to understand someone's feelings and intentions when they report suicidal thoughts. This study therefore explored the impact of state empathy on affective and cognitive empathy in a sample of women. The relationships

between trait levels of anxiety, affective and cognitive empathy were measured and the extent to which they influence the relationship between trait anxiety and empathy were explored.

Method: Seventy-five females between 18 and 30 years old completed questionnaires measuring their trait levels of affective and cognitive empathy, and trait anxiety. Participants in the study then either underwent anxiety or relaxation induction prior to completing measures of affective and cognitive empathy performance.

Results: Trait cognitive and trait affective empathy were positively associated. Trait and performance affective empathy were also positively correlated. The results showed that when controlling for trait empathy, state anxiety impaired affective empathy performance. This relationship was not observed for cognitive empathy performance, as it was not affected by the experience of state anxiety.

Discussion: The findings suggest that irrespective of trait levels of anxiety and empathy, when anxious, women in the study experienced a reduction in their affective empathy performance. State anxiety was not observed to have an impact on cognitive empathy. This finding suggests the presence of a potentially useful mechanism: Whilst the experience of anxiety will reduce a female Psychologists' ability to experience the same emotion as their distressed client (affective empathy), it does not impact their ability to recognise and identify the client's emotion (cognitive empathy). Given the high level of distressing workload a Psychologist is likely to carry out, this may be a protective and useful mechanism.

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Appendices for Volume One

Appendix A: Letter from ethics committee providing permission to proceed with the research

Re: "The impact of anxiety on perspective-taking involved in empathy"
Application for amendment ERN_19-1226A

Thank you for the above application for amendment, which was reviewed by the Science, Technology, Engineering and Mathematics Ethical Review Committee.

On behalf of the Committee, I can confirm that this amendment now has full ethical approval.

I would like to remind you that any substantive changes to the nature of the study as now amended, and/or any adverse events occurring during the study should be promptly brought to the Committee's attention by the Principal Investigator and may necessitate further ethical review. A revised amendment application form is now available at https://intranet.birmingham.ac.uk/finance/accounting/Research-Support-Group/Research-Ethics/Ethical-Review-Forms.aspx . Please ensure this form is submitted for any further amendments.

Please also ensure that the relevant requirements within the University's Code of Practice for Research and the information and guidance provided on the University's ethics webpages (available at https://intranet.birmingham.ac.uk/finance/accounting/Research-Support-Group/Research-Ethics/Links-and-Resources.aspx) are adhered to and referred to in any future applications for ethical review. It is now a requirement on the revised application form (https://intranet.birmingham.ac.uk/finance/accounting/Research-Support-Group/Research-Ethics/Ethical-Review-Forms.aspx) to confirm that this guidance has been consulted and is understood, and that it has been taken into account when completing your application for ethical review.

Please be aware that whilst Health and Safety (H&S) issues may be considered during the ethical review process, you are still required to follow the University's guidance on H&S and to ensure that H&S risk assessments have been carried out as appropriate. For further information about this, please contact your School H&S representative or the University's H&S Unit at healthandsafety@contacts.bham.ac.uk.

If you require a hard copy of this correspondence, please let me know.

Kind regards,

Ms Sam Waldron
Research Ethics Officer
Research Support Group
C Block Dome (room 137)
Aston Webb Building
University of Birmingham
Edgbaston B15 2TT
Tel:
Email:

Appendix B: Study Information Sheet

PARTICIPANT INFORMATION SHEET

Study Title: **The impact of recalling past experiences on the way individuals think about their own and others' feelings**

Researchers: **Manjeet Susch and Dr Andrew Surtees**

You are being invited to take part in an online research study. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and contact us if you have any questions using contact details provided below. Reading this information sheet will take up to 10 minutes.

What is the purpose of this research?

The project is being run by Manjeet Susch as part of her clinical psychology doctorate degree at the University of Birmingham. This online study is aimed at helping us to understand factors that can impact a person's ability to think about their feelings, as well as the feelings of others. In particular, the study will look into the impact that recalling difficult past experiences has on an individual's ability to think about their own and others' feelings. This study aims to contribute to the current understanding of factors that contribute to effective social functioning.

Who can take part?

Anybody over the age of 16 can take part in the research unless you have one or more of the following:

- A diagnosed mental health condition
- Participants with a diagnosed neurodevelopmental disorder (e.g. learning disability or autism spectrum disorder).

What will happen to me if I agree to take part?

Participation in the study will be entirely online. You will be asked to complete a short pack of questions which should take around 10 minutes. This will comprise questions about your personal characteristics such as gender and age. It will also include questions about your typical daily experience of emotions and those of others. You will then be asked to attend an online session lasting around 25 minutes. During the session you will be asked to recall a time where you have felt anxious and at another you will take part in a relaxation exercise before completing some tasks. The tasks will involve looking at pictures and thinking about the feelings of those depicted as well as those that are elicited within you. Some of the pictures elicit strong feelings in some people. Video sessions will not be recorded.

What will happen to the information I give?

Your answers to the questionnaires and responses in the tasks will be stored electronically in a database, along with the answers of other people who took part in the study. Your information will be identified by an anonymous code, in a file protected with a password, and will be kept separately from your name and any other personally identifiable data about you. Personally identifiable consent forms will be stored separately as password protected files on University of Birmingham servers. Only members of the research team will have access to your information. Confidentiality may be broken by the researchers if there is disclosure of any information that suggests potential risk of harm to yourself or others.

Personably identifiable information will be kept until two weeks after your participation and will then be destroyed in a confidential manner. Anonymised data will be stored for up to 10 years as per the University of Birmingham policy, after which it will also be destroyed in a confidential manner. Anonymised data may be shared with other researchers or made available through the Open Science Framework.

What will happen if I do not want to carry on with the study?
You do not have to take part in the research and can withdraw at any point during a session. If you start answering the questionnaires or take part in the task and change your mind, you do not have to continue. You do not have to give a reason why you do not wish to participate, but it would be helpful if you could let the study team know so that they do not contact you again. If you wish to withdraw your data from the study, this will be possible for up to two weeks after participation. It will not be possible to withdraw after this point as data will be anonymised and therefore not identifiably linked to you.

Payments and research participation scheme credits
You will receive compensation of 0.7 research participation scheme credits or £5 worth of Amazon vouchers for taking part in the study. You will receive either form of compensation at the end of your participation.

What will happen to the results of the research study?
The findings will be written up as part of a clinical psychology doctorate degree. In addition, we will publish any interesting findings in scientific journals. We will also send you copies of the results, if you would like. This would be in the spring/summer of 2021.

What happens if I have any further concerns or am unhappy with the project?
If you have any concerns about taking part, we encourage you to talk to other people you are close to about it or contact the research team. The research team consists of Dr Andrew Surtees, Manjeet Susch and as of yet, unidentified research assistants. Remember, you do not have to take part.

If you are unhappy with how the project is run, you can contact the University of Birmingham Research Ethics Committee (researchgovernance@contacts.bham.ac.uk).

What happens if the study causes me to experience or identify some difficult feelings?
As the study will require you to recall a past experience, the study will not introduce you to any novel unpleasant feeling that you will not have already experienced. However, if you feel that taking part in the study causes you to experience some difficult feelings that you would like support with please speak to the researcher about signposting. If you experience any difficult feelings during the session, the researchers will be available to support you to manage this.

For further support you can also contact your GP or Samaritans on 116 123.

Ethical approval
This study has been reviewed by the University of Birmingham Research Ethics Committee.

If you would like to discuss any aspect of this research, please contact:

Alternatively, you can contact Dr Andrew Surtees (supervisor):

Thank you for taking the time to read this sheet

Appendix C: Study Consent Form

CONSENT FORM

Study Title: **The impact of recalling past experiences on the way individuals think about their own and others' feelings**

Researchers: **Manjeet Susch and Dr Andrew Surtees**

Please initial each box if you agree:

1. I confirm that I have understood the information sheet dated September 2020 (version 3) for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐
2. I understand that my participation is voluntary and that I can stop at any time, without giving any reason. ☐
3. I agree that I do not meet any of the exclusion criteria:
    - Under the age of 16
    - Diagnosed mental health condition
    - Participants with a diagnosed neurodevelopmental disorder (e.g. learning disability or autism spectrum disorder)

    ☐
6.
4. I understand that once I have submitted my responses, I have two weeks to withdraw from the study, however, following this it will not be possible to withdraw from the study. ☐
5. I understand that I will receive either 0.7 research participation scheme course credits or £5 worth of Amazon vouchers in return for my participation at the end of the study. ☐
6. I understand that the data collected during this study will be looked at by the research team and supervisors at the University of Birmingham to ensure that the analysis is a fair and reasonable representation of the data. ☐
7. I understand that the study will involve recalling past experiences which may cause me to experience some difficult feelings. I also understand that it is possible to speak to the researcher regarding further signposting if this is the case. ☐
8. I understand that the information collected about me will be used to support other research in the future, and may be shared anonymously with other researchers. ☐
9. I consent to being contacted by the researchers in order to receive a text message reminder about attending the session. Please provide your phone number _____ ☐
10. I agree to take part in the above study. ☐

..…….. …… ……

Name of participant Date Signature

…….. …… ……

Name of person taking consent Date Signature

Appendix D: Study Poster

UNIVERSITY OF BIRMINGHAM

How does recalling past experiences impact the way you think about your own and others' feelings?



We're looking for people to take part in a study that aims to understand factors that can impact a person's ability to think about their own and others' feelings

You can participate if:

- You do not have a diagnosed mental health condition
- You do not have a diagnosis of a neurodevelopmental disorder (e.g. learning disability or autism spectrum disorder).

If you participate you will:

- Complete a short questionnaire online
- Attend an online Zoom session to complete tasks which involve thinking about your own and others' feelings (around 25 minutes)
- Have the right to withdraw at any stage

You will receive 0.7 RPS credits of Amazon vouchers worth £5 for full participation

Participation will be **online** only and **flexible** Zoom sessions can be arranged (evenings and weekends)

To participate, or for more information contact Manjeet Susch
(Supervised by Dr Andrew Surtees-

Appendix E: Violation in parametric assumptions for correlational data

Assumption: Normal distribution

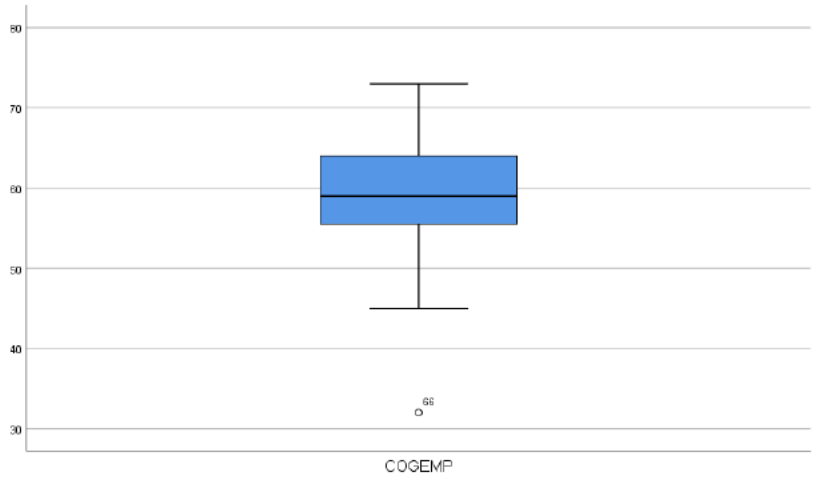
Tests of Normality

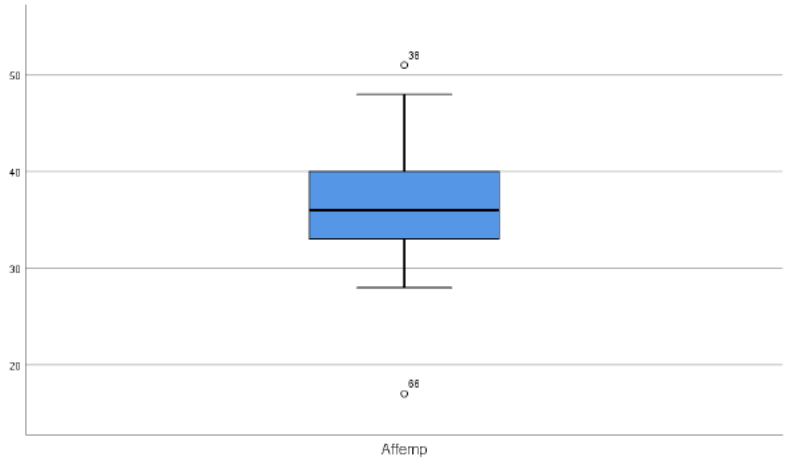
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
PSWQ	.054	75	.200*	.988	75	.688
COGEMP	.071	75	.200*	.964	75	.031
Affemp	.102	75	.052	.967	75	.048
RMETscore	.122	75	.008	.954	75	.008
PETscore	.134	75	.002	.936	75	.001

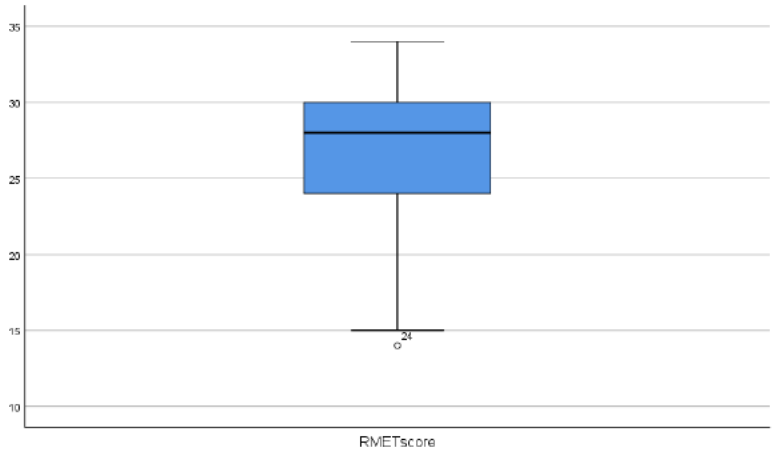
*. This is a lower bound of the true significance.

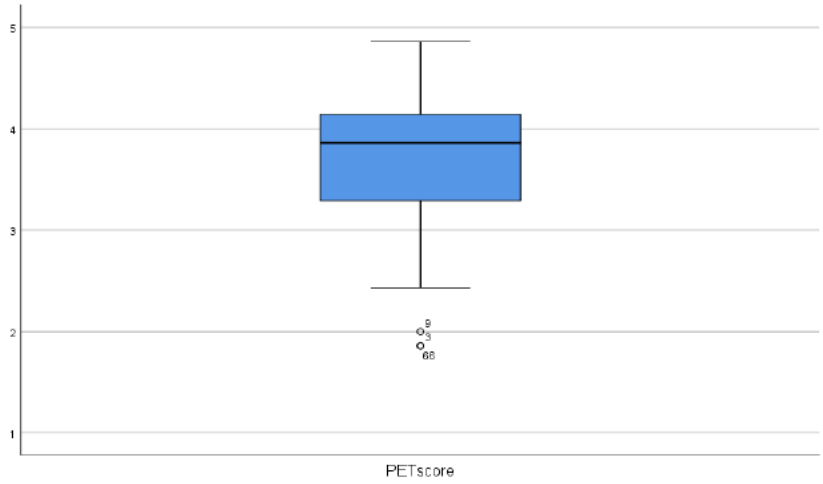
a. Lilliefors Significance Correction

Assumption: Outliers









Appendix F: Violation in parametric assumption for ANCOVA

Assumption 1: Normal distribution

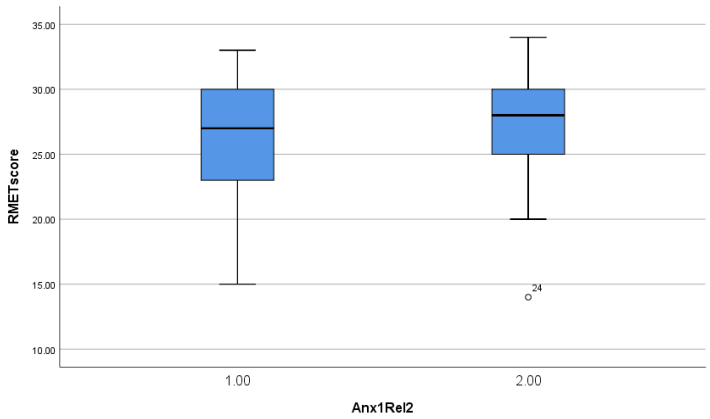
Tests of Normality

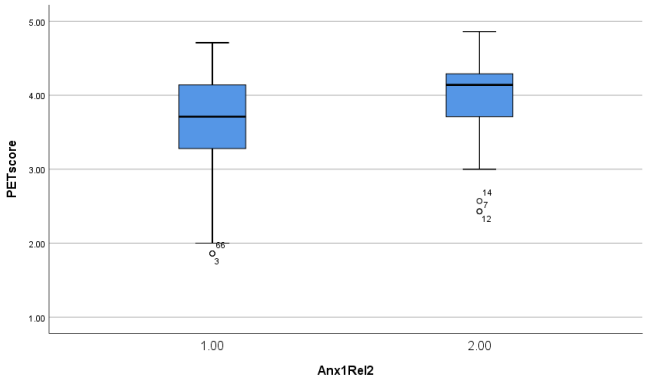
	Anx1Rel2	Kolmogorov-Smirnov[a] Statistic	df	Sig.	Shapiro-Wilk Statistic	df	Sig.
RMETscore	1.00	.123	38	.154	.954	38	.124
	2.00	.140	37	.065	.942	37	.052
PETscore	1.00	.113	38	.200*	.941	38	.047
	2.00	.208	37	.000	.881	37	.001

*. This is a lower bound of the true significance.

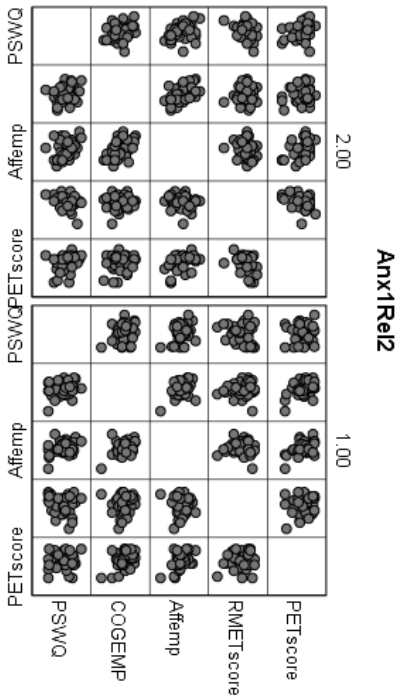
a. Lilliefors Significance Correction

Assumption 2: Outliers





Assumption 3: linear relationship between the covariate and the dependent variable for each level of the independent variable



Assumption 4: homogeneity of regression slopes

Tests of Between-Subjects Effects

Dependent Variable: RMETscore

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	18.873[a]	2	9.437	.529	.592	.014
Intercept	5948.815	1	5948.815	333.410	.000	.822
Anx1Rel2 * PSWQ * Affemp * COGEMP	18.873	2	9.437	.529	.592	.014
Error	1284.647	72	17.842			
Total	55655.000	75				
Corrected Total	1303.520	74				

a. R Squared = .014 (Adjusted R Squared = -.013)

Tests of Between-Subjects Effects

Dependent Variable: PETscore

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	5.969[a]	2	2.985	7.459	.001	.172
Intercept	65.340	1	65.340	163.291	.000	.694
Anx1Rel2 * PSWQ * Affemp * COGEMP	5.969	2	2.985	7.459	.001	.172
Error	28.810	72	.400			
Total	1085.271	75				
Corrected Total	34.779	74				

a. R Squared = .172 (Adjusted R Squared = .149)

Assumption 5: Homogeneity of variance

Levene's Test of Equality of Error Variances[a]

Dependent Variable: RMETscore

F	df1	df2	Sig.
1.921	1	73	.170

Tests the null hypothesis that he error variance of the dependent variable is equal across groups.

a. Design: Intercept + PSWQ + Affemp + COGEMP + Anx1Rel2

Levene's Test of Equality of Error Variances[a]

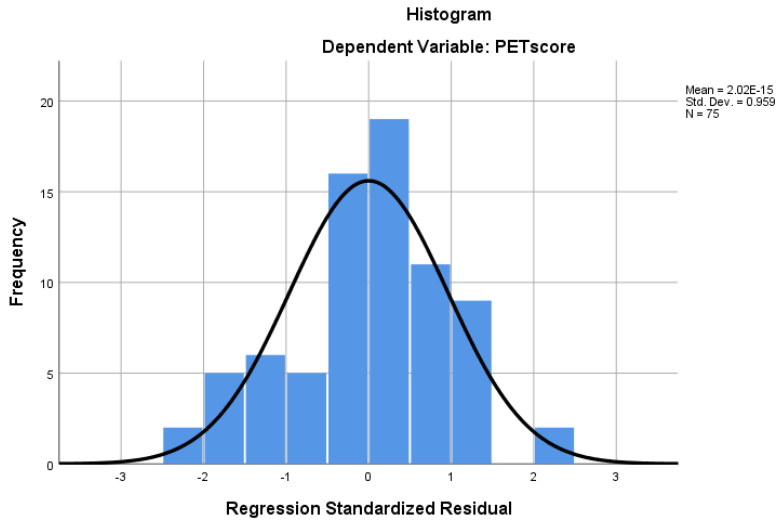
Dependent Variable: PETscore

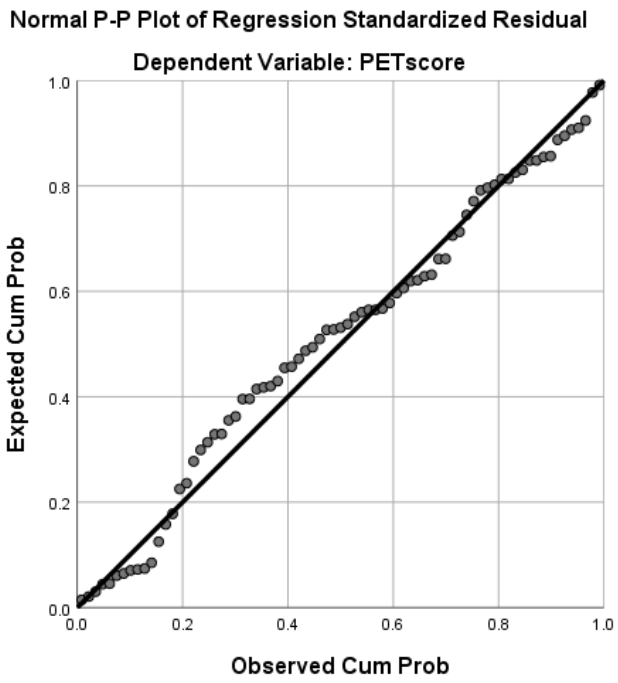
F	df1	df2	Sig.
1.132	1	73	.291

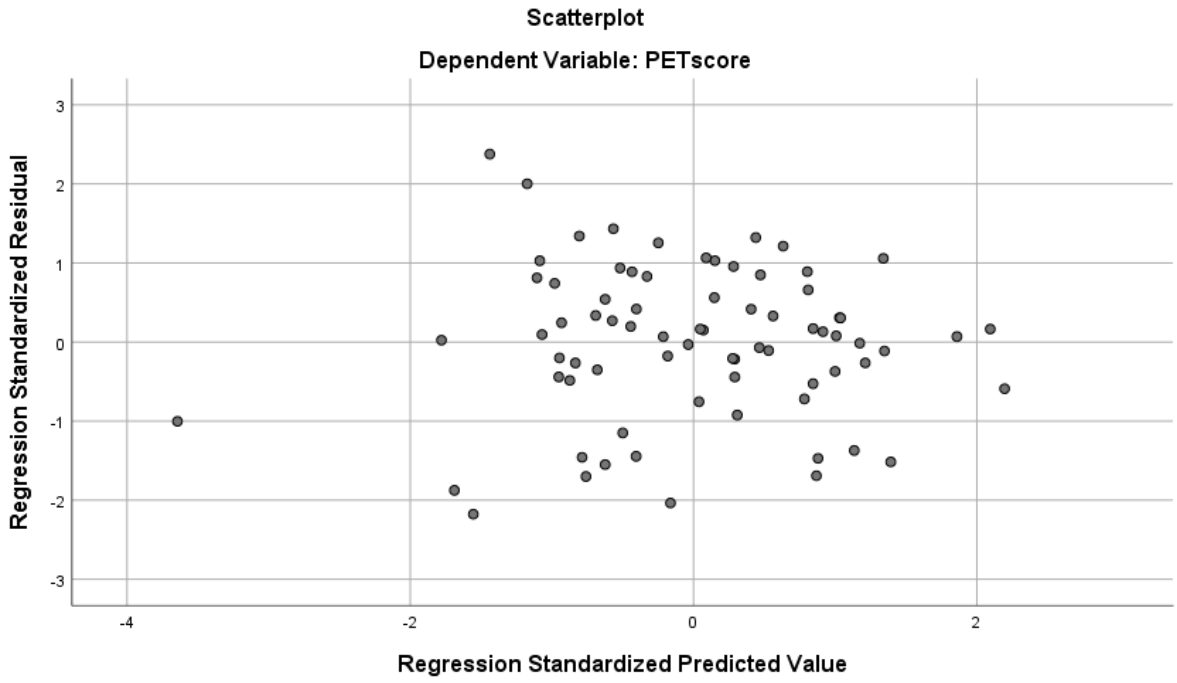
Tests the null hypothesis that he error variance of the dependent variable is equal across groups.

a. Design: Intercept + PSWQ + Affemp + COGEMP + Anx1Rel2

Appendix G: Assumptions for regression analysis




Normal P-P Plot of Regression Standardized Residual
Dependent Variable: PETscore
Expected Cum Prob
Observed Cum Prob
0.0
0.2
0.4
0.6
0.8
1.0


Scatterplot
Dependent Variable: PETscore
Regression Standardized Residual
Regression Standardized Predicted Value
3
2
1
0
-1
-2
-3
-4
-2
0
2