# HOW IS RESILIENCE ASSOCIATED WITH DEPRESSION, ANXIETY, POST-TRAUMATIC STRESS DISORDER (PTSD) AND WELLBEING FOR INDIVIDUALS WHO HAVE EXPERIENCED CHILDHOOD TRAUMA?

by

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A THESIS SUBMITTED TO THE UNIVERSITY OF BIRMINGHAM FOR THE DEGREE OF DOCTOR OF CLINICAL PSYCHOLOGY

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# Thesis Overview

This thesis is comprised of two volumes. Volume One consists of a literature review and empirical research paper. Volume Two consists of five Clinical Practice Reports (CPRs) completed during clinical training.

Within Volume One is a systematic meta-analysis, an empirical research paper and a press release document. The meta-analysis reviewed and analysed literature regarding the effectiveness of resilience interventions for University students in increasing resilience and reducing symptomatology. A significant negligible effect size was found for the effectiveness of interventions in increasing resilience and a significant small effect size for the effectiveness of interventions in decreasing symptomatology. The empirical research paper investigated the associations between resilience and depression, anxiety, post-traumatic stress disorder (PTSD) and wellbeing for individuals who have experienced childhood trauma. A significant positive association was found between childhood trauma and PTSD but not depression, anxiety, or wellbeing. Resilience was not found to be a mediator or a moderator of the relationship between childhood trauma and PTSD.

Volume Two comprises five Clinical Practice Reports (CPRs). CPR 1 presents the assessment and formulation of a client from a Cognitive Behavioural Therapy (CBT) and psychodynamic perspective. CPR2 is a single case experimental design assessing the effectiveness of Cognitive Therapy for Command Hallucinations for a client presenting with psychosis. CPR3 is a service evaluation exploring whether consumers of a Looked After Children CAMHS service experienced it as collaborative. CPR4 is an integrated case study using CBT and Systemic perspectives with a client with a Learning Disability. CPR5

is presented as an abstract of an oral presentation where leadership competencies were demonstrated through a description of supervision provided to an Honorary Assistant Psychologist.

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VOLUME ONE

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### Empirical Research Paper

# Effectiveness of resilience interventions in increasing resilience and decreasing symptomatology for University students: a meta-analysis

## Abstract

*Introduction:* This meta-analysis reviews the literature on the effectiveness of resilience interventions for University students in both increasing resilience levels and reducing mental ill-health symptomatology. Resilience has been defined as the ability to bounce back from adversity and interventions based on resilience have been found to be effective with various populations. This review explores the population of University students due to the high prevalence of mental health problems and relatively low level of help-seeking within this group; thus, indicating the need for effective interventions.

*Method:* Systematic searches across 4 databases resulted in 16 primary studies to be meta-analysed. All studies were prospective in design. The studies encompassed 1578 participants in total with a mean age of 21.38 years. Information was extracted from the studies for standardised mean differences (SMD) to be calculated. To assess methodological quality a quality appraisal tool was used; included studies varied but the majority were rated as high quality.

*Results:* The generic inverse random effects model was calculated from the SMD. A significant negligible effect size (SMD = 0.19, $p$ = .01) was found for the effectiveness of resilience interventions in increasing resilience levels. A significant small effect size (SMD

= 0.49, $p < .001$) was found for the effectiveness of resilience interventions in decreasing symptomatology (aggression, anxiety, depression, psychological distress, stress). When the quality effects model was used which controls for methodological quality of included studies, this resulted in negligible changes in the resilience and symptomatology analyses. This meant the effect sizes were still significant, but the change was very small.

*Conclusion:* The findings show that although significant effect sizes were found, these were negligible and small, indicating that resilience interventions as explored in this review, are not the most effective interventions to use with University students.

*Clinical implications:* The way in which resilience interventions have been offered to University students currently could be improved by a holistic approach which is evaluated longitudinally using outcome measures based on quality of life as opposed to resilience levels and symptomatology.

*Future research:* To explore how interventions to improve resilience and wellbeing can move from an individualised to a holistic approach which is incorporated into educational and organisational systems.

# Introduction

This meta-analysis focuses on resilience, drawing on previous literature which highlights this construct as important in enabling individuals to cope with adversity. There is a growing body of literature investigating the use of resilience interventions for a wide range of populations, including those with and without mental health problems. Many studies have focused on conducting these interventions with populations perceived to experience high levels of stress and burnout (Fox et al., 2018; Venegas et al., 2019; Wild et al., 2020). This meta-analysis is, to the author's knowledge, the first to explore the effectiveness of resilience interventions for University students who are a group shown to have higher prevalence rates of mental health problems than the general population.

## *University students and mental health problems*

Research has highlighted the high prevalence of mental health problems for University students. Studies vary in the reported prevalence, some finding rates at least as high as the general population (Macaskill, 2013), but many have found rates higher than the general population (Eisenberg et al., 2007; MHFA England, 2020; Pereira et al., 2020; Stallman, 2010; Stallman & Shochet, 2009). The World Health Organisation (WHO) reported that Universities across the world are seeing increasing rates of mental health problems for students. The WHO conducted a survey across 8 countries and found that 35% of students experienced at least one mental health problem during their lifetime and 31% experienced at least one mental health problem in the last 12 months (Auerbach et al., 2018). Zivin et al. (2009) commented that although many studies have found a high prevalence rate for mental health problems within the University student population, there have been fewer longitudinal studies investigating the longer-term impact. The authors found that at

baseline over 50% of students reported a mental health problem and that after two years 60% of these participants reported at least one mental health problem. Studies have also investigated the prevalence of mental health problems in students compared to their age-matched peers with some studies reporting similar rates (Blanco et al., 2008; Cadigan et al., 2019) and others reporting higher rates of certain difficulties, such as alcohol use disorders (Blanco et al., 2008) and psychological distress (Cvetkovski et al., 2012). Financial issues that students can experience have been indicated as a possible explanation for some of the higher prevalence rates found (Cvetkovski et al., 2012).

It is important to consider the potential factors contributing to the increased prevalence of mental health problems in University students. Starting University can bring about a range of new academic, emotional, and social challenges and demands (Wynaden et al., 2013). Furthermore, the age at which many people attend University coincides with the average age of onset for anxiety and substance use disorders (Kessler et al., 2007). A systematic review of 11 studies by Storrie et al. (2010) looked at mental health problems for University students worldwide. They found that there were many subsequent difficulties linked to student mental health problems including social isolation, academic load, accommodation, and financial issues. A survey of over 1800 students carried out in 2019 by Randstad Student Support found that 37% of students reported deteriorating mental health, with 64% stating that University life negatively affected their wellbeing. The three most common factors which impacted on wellbeing were academic stress, financial pressures, and balancing studies with work. Furthermore, 55% of students had considered leaving their course with the three most common reasons being experiencing a mental health problem, being unable to cope with the stress, and not feeling supported enough (Randstad Student Support, 2020).

An issue which seems to compound the impact of these increased risk factors for student mental health problems is stigma and a perceived 'silence'. Thus, reduced help seeking can arise from students either not being aware of available services or experiencing barriers in accessing them (Storrie et al., 2010). Furthermore, Storrie et al. (2010) found in a systematic review of 11 studies there was a lack of willingness in students to seek help due to the perceived impact this might have on their studies and future job opportunities. Brown (2018) reported that although the rate of students accessing support for mental health problems is increasing, there is still stigma related to accessing mental health support; thus, the number of students accessing support is low compared to the number experiencing mental health problems. This finding regarding help-seeking has been supported by the WHO who reported that 16.4% of students with a mental health problem had accessed treatment within the past 12 months (Auerbach et al., 2016). Due to the high prevalence of mental health problems in addition to the various risk factors identified for student populations and relatively low level of students accessing support, research has indicated the need for interventions to be offered to students by Universities in a proactive manner (Kim et al., 2011).

## *Resilience*

Connor and Davidson (2003) defined resilience as the successful ability to cope with stress which is a dynamic process that can change during the lifespan and in response to life circumstances. Vella and Pai (2019) commented that there is no single agreed definition of resilience; however, there seems to be consensus that it relates to the ability to bounce back following stressful life events. The authors identify that over time, definitions have moved towards a process-based understanding as opposed to defining resilience as a stable

personality trait. The process-based definitions see resilience as a dynamic interactive process whereby resilience is derived from a range of sources, including the context an individual is part of, instead of solely from personal attributes. To explain the development of resilience, Ungar and Theron (2020) described that many processes, for example, biological, social, psychological, and ecological, interact in a way in which the individual can sustain or improve their mental wellbeing when they have been challenged by risk factors.

## *Resilience and mental health problems*

Studies have investigated the relationships between resilience and mental health problems, for example, using correlation studies. A meta-analysis by Färber and Rosendahl (2018) of 55 studies found significant moderate positive associations between resilience and perceived increased mental health. Also, Wermelinger Avila et al. (2017) meta-analysed 7 studies and found negative associations between depression and resilience in older adults. To address some of the issues associated with correlational and cross-sectional studies, such as not being able to infer cause and effect, longitudinal studies have been used. Wu et al. (2020) found that for Chinese University students, higher levels of resilience predicted lower levels of mental health problems at a 1-year time point. This study indicates the longer-term associations between levels of resilience and mental health problems.

It has been identified that resilience can have a mediating (where resilience explains the relationship) and moderating (whereby resilience affects the strength of the relationship) role in relation to mental health problems for a range of populations. Support has come from both cross-sectional and longitudinal studies. Studies have found that resilience significantly moderated symptoms of depression for individuals who have experienced

trauma (Wingo et al., 2010), cyberbullying (Santos et al., 2020) and have severe health conditions (Liu et al., 2015). Resilience has also been found to be a significant partial mediating factor in relation to anxiety symptoms for cancer patients (Hu et al., 2018; Li & Wang, 2016) and as a mediating factor in relation to wellbeing for individuals with dismissing and preoccupied attachment styles (Karreman & Vingerhoets, 2012).

Moderating and mediating effects of resilience have been explored in relation to the student population. Lin et al. (2020) surveyed over 7800 students from five Chinese and one German University. Resilience was a significant partial mediating factor between a history of bullying and mental health problems. Furthermore, Kokou-Kpolou et al. (2020) identified that resilience was found to both moderate and mediate the relationship between perceived stress and symptoms of depression in French University students. With an increase in perceived stress, students who had moderate to high levels of resilience reported less severe symptoms of depression.

Due to the associations reported, research has highlighted resilience as a protective factor against mental health problems (Arnetz et al., 2013; Moore & Woodcock, 2017; Santos et al., 2020) including for University students (McGillivray & Pidgeon, 2015). This finding has been supported by Peng et al. (2012) who found that for a sample of nearly 2000 Chinese University students, resilience was the strongest predictor of mental health problems explaining 43.2% of variance; thus, resilience can serve to promote more positive outcomes for students.

## *Resilience interventions*

Due to the nature of resilience being a process whereby individuals can recover from adversity and the associations with mental health problems, it has many clinical

implications, including the use of resilience interventions in a variety of settings and with different populations. Fritz et al. (2018) carried out a systematic review of 22 studies and found empirical support for 20 out of 42 resilience enhancing factors at an individual, family, and community level. The authors identified that interventions could focus on these resilience enhancing factors to increase resilience and reduce the risk of mental health problems. Prince-Embury and Saklofske (2014) identified that resilience interventions can differ from those based on the medical model which aim to reduce symptoms, whereas resilience interventions tend to take the approach of preventative and growth-based models which focus on existing strengths and increasing resources.

Liu et al. (2020) conducted a large-scale meta-analysis of 268 studies on the efficacy of resilience interventions which included child, adolescent, and adult populations. The authors found that resilience interventions included in the analysis were based on a range of approaches which were, mindfulness, physical activity (for example, sports), social support, psychoeducation, evidence-based (for example, Cognitive Behavioural Therapy (CBT)), and alternative approaches (for example, music). The authors found effect sizes which ranged from negligible to moderate with social support, mindfulness, evidence-based and alternative approaches evidencing the largest effect sizes. The overall effect size (Hedges' g) of all resilience intervention approaches was small but significant ($g$ = 0.48). The findings demonstrate the importance of the intervention approach. Joyce et al. (2018) also carried out a meta-analysis of 11 randomised controlled trials which investigated the effectiveness of resilience interventions on levels of resilience in adults. The authors found the intervention approaches used were CBT, mindfulness and mixed (both CBT and mindfulness). The effect sizes (using standardised mean difference (SMD)) were reported, and similar to Liu et al. (2020), a small but significant effect size of 0.44 was found for the

overall effectiveness of resilience interventions in increasing resilience levels. The largest effect size was found for the interventions which used a mixed approach (CBT and mindfulness) (SMD = 0.51), then a mindfulness approach (SMD = 0.46) and a CBT approach (SMD = 0.27). Again, these findings highlight the importance of the approach the resilience intervention used and could indicate the need for interventions which use a combination of approaches. The findings reported by Liu et al. (2020) and Joyce et al. (2018) have been further supported by previous meta-analyses, for example Leppin et al. (2014) who conducted a meta-analysis of 25 studies which evaluated the effectiveness of resilience interventions on increasing resilience levels, wellbeing, and self-efficacy and reducing levels of depression, anxiety, and stress for adults. The authors reported effect sizes and found interventions significantly increased resilience levels with a small effect (SMD = 0.37) and significantly reduced symptoms of depression (SMD = -0.51) and stress (SMD = -0.53) which were both moderate effect sizes. Furthermore, Vanhove et al. (2016) meta-analysed 37 studies looking at the effectiveness of resilience interventions on wellbeing, psychosocial functioning (for example, anxiety and depression) and performance in organisational contexts. The authors found that the overall effect size (using Cohen's d) for all outcomes was small ($d$ = 0.21); however, these effects were not maintained at follow-up with the overall effect size reducing to one which did not meet the recommended size for a small effect ($d$ = 0.07). Thus, the literature regarding the effectiveness of resilience interventions seems to be fairly consistent in terms of producing small effect sizes.

## *Review question*

Literature has identified that University students experience high levels of mental health problems and can find University demands challenging; thus, as resilience interventions have been found to be efficacious for other populations, they could offer intervention possibilities for this group. Studies vary in the way in which effectiveness is measured, with some studies focusing on changes in resilience levels, whilst others investigate changes to symptomatology (Liu et al., 2020). Therefore, this review focuses on both areas. The aim of this review is to answer the following question: *How effective are resilience interventions in increasing resilience and decreasing symptomatology for University students?*

# Method

## *Electronic database search*

A search of the literature was carried out on 14th May 2020. The search terms were informed by several reviews involving resilience interventions and University students. These reviews were Chmitorz et al. (2018); Galante et al. (2018); Milne et al. (2016) and Leppin et al. (2014). The development of the search terms was also assisted by librarians from the University of Birmingham. The search terms used are shown below in Table 1. Using these search terms, the databases Medline (from 1946 onwards), PsycINFO (from 1967 onwards), Scopus (from 1960 onwards) and Web of Science (from 1900 onwards) were searched. The meta-analysis was registered on PROSPERO, registration number: CRD42020205505.

The searches were re-run on 4th May 2021 to identify if there were any further studies which met the inclusion criteria. Two studies were identified (Chow et al., 2020; Roig et al 2020); however, as the meta-analytic synthesis and write-up had already been concluded, these studies were not included in this meta-analysis.

*Table 1. Search terms*

| Construct | Search strategy number | Search terms | Combined | Combined |
|---|---|---|---|---|
| **Resilience** | 1 | Resilience<br>Resilien*<br>Resilient<br>Resiliency<br>Psychological resilience<br>Psychological endurance<br>Psychological hardiness | OR | |
| **Effectiveness** | 2 | Efficacy<br>Efficac*<br>Effect*<br>Impact | OR | |
| **Intervention** | 3 | Intervention*<br>Treatment*<br>Prevent*<br>Train*<br>Program*<br>Group treatment<br>Group intervention | OR | AND |
| **University students** | 4 | College student*<br>Higher education*<br>University student*<br>Higher education student*<br>Undergraduate<br>Postgraduate<br>Tertiary education<br>Tertiary student | OR | |

Please note: Searches were limited to peer reviewed journals and adult participants.
An asterisk (*) was used to find variations of a word

## *Inclusion and Exclusion Criteria*

Following a search of the literature, studies were excluded based on the criteria described in Table 2, which were based on PICO (population, intervention, comparison, outcome). A key aspect of the criteria was the inclusion of resilience interventions only as there were many studies that evaluated the effectiveness of interventions on participants' resilience levels. However, this review was looking specifically at the effectiveness of resilience interventions due to the findings of existing literature regarding the effectiveness of

resilience interventions for various populations. The criteria regarding University students included a range of students undertaking any higher education course, for example, Undergraduate, Masters and Doctoral level students.

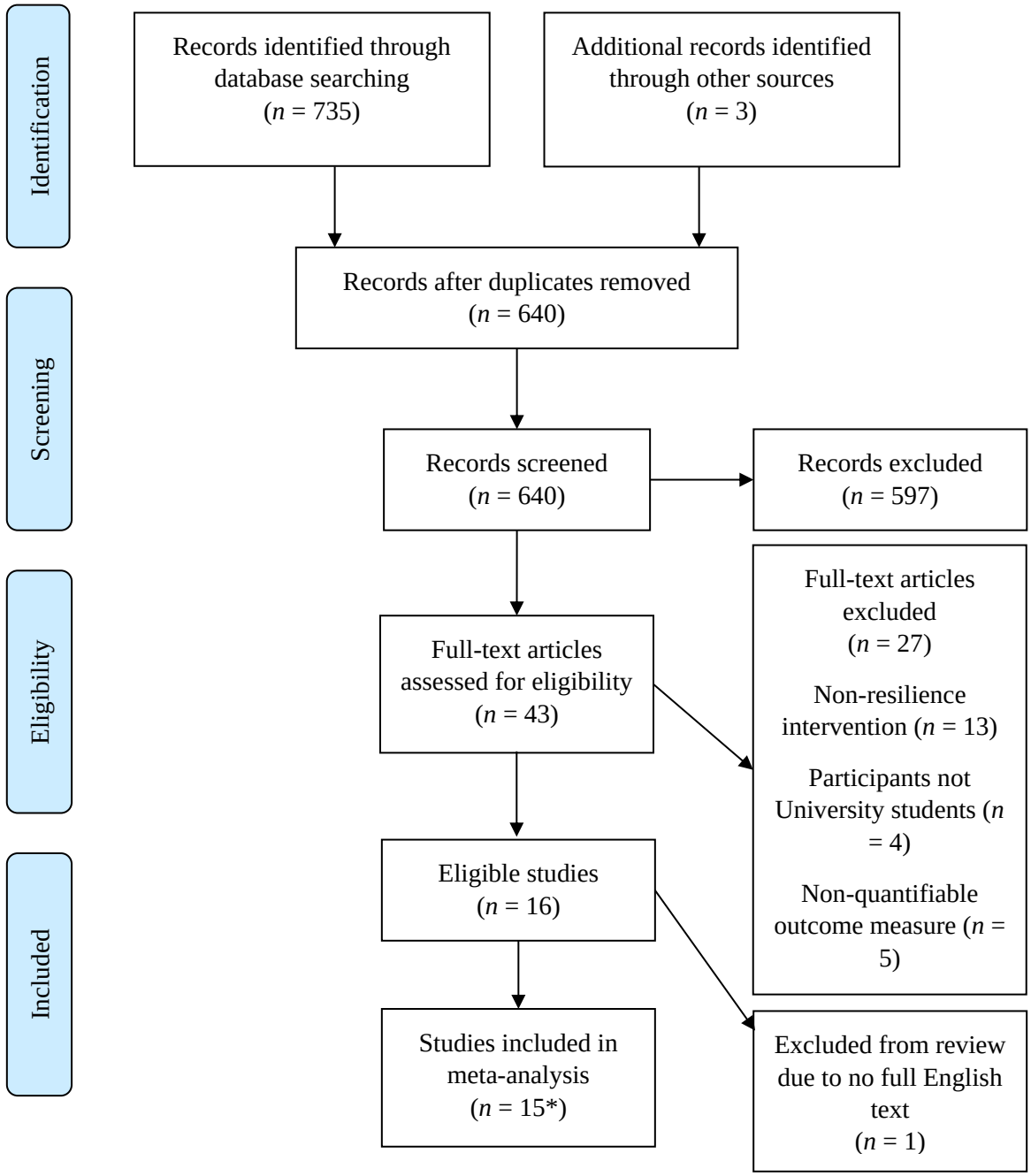
*Table 2. Inclusion criteria with rationale*

| Inclusion criteria | Rationale |
|---|---|
| **Intervention**<br>*The intervention is described as a resilience intervention* | This review was aimed specifically at studies which used a resilience intervention as the focus was regarding whether these interventions can be efficacious. Thus, to be included, studies needed to describe the intervention as a resilience intervention. Studies were excluded if they did not describe the intervention as a resilience intervention. |
| **Type of article**<br>*Intervention studies* | Non-intervention studies were excluded, for example, meta-analyses, opinion pieces and study protocols. The study needed to be evaluating the effectiveness of an intervention. Cross-sectional and longitudinal studies were included. |
| **Participants**<br>*The participants are University students* | This review was interested in exploring how effective resilience interventions were for a particular group – University students. |
| **Data collection**<br>*At least two data collection time points* | To ensure that the findings answer the review question regarding effectiveness of the intervention. Pre- and post-intervention data was required as a minimum and studies with follow-up data collection were included. |
| **Outcome data**<br>*Quantifiable outcome measure* | To ensure that the outcomes of the study can be analysed as effect sizes. Data needed to be in the format of numerical scores on outcome measures. |
| **Relevance**<br>*On the topic of the review* | Any studies which were not on the topic of the review question would be excluded. |

## *Results of Search*

Figure 1 shows the results of the search. 735 articles were identified from the database search in addition to 3 articles identified from a Google scholar and reference list search. 640 articles remained after duplicates were removed. Articles were screened by title and abstract, which led to 597 being excluded. The reasons for exclusion at this stage were: not on the topic of the review, non-interventional studies, non-resilience interventions, participants were not University students, and non-quantifiable outcome measures.

Following this, 43 articles were eligible for full text review and 27 excluded, please see Figure 1 for further details. This led to 16 eligible studies being identified. Of the 16 studies, 1 had no full English text available. The author of this study was contacted via email; however, no response was received, which left 15 studies to be meta-analysed. Reference lists of the 15 identified studies were also searched but this did not lead to any further studies being included. There was one study (Gerson & Fernandez, 2013) which included 2 studies within the one article (Study 1 and Study 2). Therefore, 15 articles are included in this review, which encapsulates an overall total of 16 studies meta-analysed.




*Please note: Gerson and Fernandez (2013) contained two studies within the one article; thus, the number of studies analysed was 16.

*Figure 1. Search results and selection, adapted from PRISMA flow diagram (Moher et al., 2010)*

## *Data extraction*

All data extraction was completed by the author.

*Method of data extraction*

For most of the primary studies treatment outcome was reported as a mean (or mean difference), a standard deviation and number of participants (*n*) for both the treatment and control group. From these, the Hedges' g standardised mean difference (SMD) and standard error were calculated for each outcome measure. When means, standard deviation and n-sizes were not reported then *F* or *t* statistics were transformed into estimates of Hedges' g when the sample sizes were reported. It should be noted that effect sizes as reported in primary studies are frequently calculated from data that has been adjusted for the association with one or more covariates. Such adjustments emphasise the idiosyncratic character of the reported effect and may result in increasing heterogeneity (i.e., dissimilarity with the effects reported within the other primary studies). The contribution of adjusted effect size to overall heterogeneity was examined empirically by considering whether problematic heterogeneity was identified in the random effects model.

For the purposes of clarity, effect size directions were altered so that a positive effect size indicates a positive treatment effect. Conversely, a negative effect size indicates a negative treatment effect.

*Reporting multiple outcomes from a primary study*.

Multiple reporting of outcomes can result from primary studies reporting multiple measures of the same outcome or reporting the same outcome measure in multiple subgroups. In this meta-analysis, there were two studies for which multiple measures of the

same outcome were reported (Games et al., 2020; Steinhardt & Dolbier, 2008). Therefore, the multiple outcomes were combined in a single quantitative outcome using the procedures described by Borenstein et al. (2021).

For several of the studies reporting on symptomatology, there are a range of outcome measures included. The inclusion of multiple reporting of outcomes from the same primary study may result in a slight reduction in confidence intervals for the random effects model as the sample size of that primary study will be included more than once (Van den Noortgate et al., 2015).

## *Characteristics and Summary of meta-analysed studies*

The studies were divided into two categories – those which reported changes in resilience as the outcome and those which reported changes in symptomatology as the outcome. There were 4 studies which reported changes in both resilience and symptomatology; thus, they were included in both categories (Akeman et al., 2019; Games et al., 2020; Houston et al., 2017; Steinhardt & Dolbier, 2008). There were 8 studies which reported changes in resilience outcome measures and 12 studies which reported changes in psychiatric symptomatology outcome measures. Table 3 and Table 4 show the outcome measures that were used in both categories in addition to the treatment effect reported for each outcome measure.

*Table 3. Measure of treatment effect reported for resilience outcome measures*

| Study name | Outcome measure | Number of participants (total sample) | Treatment effect (Hedges' g) |
|---|---|---|---|
| **Akeman et al. (2019)** | CD-RISC | 252 | 0.10 |
| **Chandler et al. (2015)** | The Resilience Scale | 28 | 0.48 |
| **Games et al. (2020)** | DARS | 51 | -0.13 |
| **Gerson & Fernandez (2013) (Study 1)** | CD-RISC | 28 | 0.30 |
| **Houston et al. (2017)** | CD-RISC | 119 | -0.05 |
| **Moffett & Bartram (2017)** | CD-RISC 10 | 79 | 0.29 |
| **Peng et al. (2014)** | CD-RISC | 60 | 0.46 |
| **Steinhardt & Dolbier (2008)** | CD-RISC and DRS | 57 | 0.51 |

Please note: Hedges' g is a measure of effect size: 0.2 indicates a small effect size, 0.5 a moderate effect size and 0.8 a large effect size. A positive effect size indicates an increase in resilience and favours the intervention.
CD-RISC: Connor-Davidson Resilience Scale (Connor & Davidson, 2003). The Resilience Scale (Wagnild & Young, 1993). DARS: Devereux Adult Resilience Scale (Mackrain, 2007). CD-RISC 10 (Campbell-Sills & Stein, 2007). DRS: Dispositional Resilience Scale (Bartone et al., 1989).

In the symptomatology category there were a range of outcome measures used (Table 4). Due to some studies reporting multiple outcome measures, they have been labelled a, b or c to differentiate them. This review aimed to determine the effectiveness of resilience interventions in increasing resilience and reducing symptomatology; thus, the statistical analysis was carried out for both the resilience category and the symptomatology category.

*Table 4. Measure of treatment effect reported for symptomatology outcome measures*

| Study name | Outcome measure | Construct of distress | Number of participants (total sample) | Treatment effect (Hedges' g) |
|---|---|---|---|---|
| **Akbari (2017) a** | OHQ | Happiness | 30 | 1.68 |
| **Akbari (2017) b** | Buss and Perry Aggression scale | Aggression | 30 | 2.80 |
| **Akeman et al. (2019) a** | PROMIS depression | Depression | 252 | 0.06 |
| **Akeman et al. (2019) b** | PROMIS anxiety | Anxiety | 252 | 0.16 |
| **Akeman et al. (2019) c** | PSS | Stress | 252 | 0.18 |
| **Chandler et al. (2020)** | PSS | Stress | 56 | 0.67 |
| **Dolbier et al. (2009)** | Modified PTGI | Stress-related growth | 57 | 0.34 |
| **Games et al. (2020) a** | DASS-21 | Psychological distress | 51 | 0.39 |
| **Games et al. (2020) b** | RSES | Self-esteem | 51 | -0.06 |
| **Gerson & Fernandez (2013) (Study 2)** | BDI-II | Depression | 64 | 0.50 |
| **Houston et al. (2017) a** | CES-D | Depression | 119 | 0.18 |
| **Houston et al. (2017) b** | GAD-7 | Anxiety | 119 | 0.20 |
| **Rose et al. (2013)** | PSS | Stress | 59 | 0.55 |
| **Shatkin et al. (2016) a** | PSS | Stress | 54 | 0.48 |
| **Shatkin et al. (2016) b** | Brief COPE Scale | Coping | 54 | 0.63 |
| **Steinhardt & Dolbier (2008) a** | CES-D | Depression | 57 | 0.59 |
| **Steinhardt & Dolbier (2008) b** | PSS | Stress | 57 | 0.51 |
| **Victor et al. (2017) a** | RSES | Self-esteem | 53 | 0.26 |
| **Victor et al. (2017) b** | BSI | Psychological distress | 53 | 0.36 |
| **Zamirinejad et al. (2014)** | BDI-II | Depression | 22 | 2.70 |

Please note: a positive effect size favours the intervention
OHQ: Oxford Happiness Questionnaire (Hills & Argyle, 2002). Buss and Perry Aggression Scale (Buss & Perry, 1992). PROMIS depression and anxiety: Patient-Reported Outcomes Measurement Information System (Cella et al., 2010). PSS: Perceived Stress Scale (Cohen et al., 1983). Modified PTGI: Post Traumatic Growth Inventory (Tedeschi & Calhoun, 1996). DASS-21: Depression Anxiety Stress Scale (Lovibond & Lovibond, 1995). RSES: Rosenberg Self-Esteem scale (Rosenberg, 1965). BDI-II: Beck Depression Inventory (Beck et al., 1996). CES-D: Centre for Epidemiological Studies Depression Scale (Radloff, 1977). GAD-7: Generalised Anxiety Disorder Scale (Spitzer et al., 2006). Brief COPE Scale (Carver, 1997). BSI: Brief Symptom Inventory (Derogatis, 1993).

The resilience interventions used in the studies varied greatly. Some used a named intervention, for example, Penn Resilience Program, whereas others used generic resilience training. All studies collected data at pre- and post-intervention; Games et al. (2020) also collected data at a 6-month follow-up point and Zamirinejad et al. (2014) also collected data at a 2-month follow-up point. As only 2 studies included a follow-up, the meta-analysis was conducted with the post-intervention data only. The studies varied in terms of the participants as they were from various level of study, including Undergraduate and Postgraduate University students. Table 5 outlines details of the interventions and participants.

*Table 5. Study and participant information*

| Study name | Study information | | | | | | | Participant information | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Intervention** | **Control condition** | **Delivery method** | **Number of sessions** | **Length of sessions (in minutes)** | **Duration of intervention (in weeks unless otherwise stated)** | **Country of study** | **% male and female** | **Mean age (in years)** | **Ethnicity** | **Student status** |
| **Akbari (2017)** | Resilience training | Yes | Group | 12 | 75 | Not stated | Iran | 40% male; 60% female | 21.58 | Not stated | Nursing students |
| **Akeman et al. (2019)** | Resilience intervention based on CBT, BA and mindfulness | Yes | Group | 4 | 50 | 4 | USA | 42% male; 58% female | 18.82 | 70% White; 3% American Indian; 4% Black; 5% Asian; 1% Middle Eastern; 16% Mixed Race; 1% Other | First year undergraduate students |
| **Chandler et al. (2015)** | Empower Resilience Intervention (ERI) | Yes | Group | 4 | 60 | 4 | USA | 100% female (inclusion criteria – female participants) | Mean not stated; age range 18-24 with 2 participants aged 25+ | 75% White; 3.6% African American; 14.3% Asian; 3.6% Hispanic; 3.6% Other | Undergraduate students |
| **Chandler et al. (2020)** | Resilience training model of the ABCS | Yes | Group | 10 | 60 | 5 | USA | 82.1% male; 17.9% female | 18.3 | 66.1% African American; 1 participant Hispanic | First year undergraduate students |
| **Dolbier et al. (2009)** | Transforming lives through resilience education | Yes | Group | 4 | 120 | 4 | USA | 16% male; 84% female | 21 | 42.2% White; 25% Asian; 21.9% Hispanic; 4.7% Black; 6.3% Other | Undergraduate, masters and doctoral students |
| **Games et al. (2020)** | Adult Resilience Program (ARP) | Yes | Group | 1 | 480 | 1 day | Singapore | 23.75% male; 76.25% female | 27.17 | Not stated | University students from first year to sixth year |
| **Gerson & Fernandez (2013) (Study 1)** | Program for accelerated thriving and health (PATH) | Yes | Group | 3 | 90 | 3 | USA | 39% male; 61% female | 19.9 | 42.2% White; 25% Asian; 21.9% Hispanic; 4.7% | Undergraduate students |

| Study name | Study information | | | | | | | Participant information | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Black; 6.3% Other | |
| **Gerson & Fernandez (2013) (Study 2)** | Program for accelerated thriving and health (PATH) | Yes | Group | 3 | 30-50 | 6 days | USA | 18.7% male; 81.3% female | 21.58 | 61.3% White; 18.8% Hispanic; 12.5% Asian; 7.5% Black | Undergraduate students |
| **Houston et al. (2017)** | Resilience and Coping Intervention (RCI) | Yes | Group | 3 | 45-60 | 3 | USA | 27.9% male; 72.1% female | Mean not stated; age range 18-23 | 68.2% White; 12.4% Black; 9.4% Other; 7% Asian; 3.1% Hispanic | Undergraduate students |
| **Moffett & Bartram (2017)** | Self-care and wellbeing workshop focusing on resilience building strategies | No | Group | 1 | 360 | 1 day | UK | 11.4% male; 88.6% female | 19.8 | Not stated | Undergraduate veterinary students |
| **Peng et al. (2014)** | Penn Resilience Program (PRP) | Yes | Group | 10 | 90-120 | 10 | China | 70% male; 30% female | 19.78 | Not stated | Medical students |
| **Rose et al. (2013)** | Stress management and resilience training for optimal performance (SMART-OP) | Yes | Individual online | 6 | 30-50 | 6 | USA | 50% male; 50% female | 27.32 | 52% White; 32% Asian; 9% Hispanic; 7% Other | Postgraduate students |
| **Shatkin et al. (2016)** | Risk and Resilience course (R&R) | Yes | Group | Not stated | Not stated | 1 academic year | USA | 10.2% male; 89.8% female | 20.83 | 50% White; 20.35% Hispanic; 19.91% Asian; 3.54 Black; 6.2% Other | Undergraduate students |
| **Steinhardt & Dolbier (2008)** | Transforming lives through resilience education | Yes | Group | 4 | 120 | 4 | USA | 18% male; 82% female | 21 | 43.9% White; 26.3% Asian; 19.3% Hispanic; 5.3% African American; 5.2% Other | Undergraduate, masters and doctoral students |

| Study name | Study information | | | | | | | Participant information | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Victor et al. (2017)** | Personal Model of Resilience (PMR) | Yes | Group | 3 | 2x 90<br>1x 30 | 3 | Germany | 19% male;<br>81% female | Not stated | Not stated | First year undergraduate students |
| **Zamirinejad et al. (2014)** | Resilience training | Yes | Group | 8 | 90 | 3 | Iran | 100% female (inclusion criteria – female participants) | 20.86 | Not stated | Medical science students |

CBT: Cognitive Behavioural Therapy. BA: Behavioural Activation. ABCS: Active coping, Building strength, increasing Cognitive awareness and facilitating Social support.

## *Assessment of methodological quality*

### *Study design hierarchy*

The designs of the study in this review conform to one of three types: randomised controlled trials (RCT), non-randomised controlled trials (NRCT), and before and after studies (BAS).

### *Risk of bias assessment*

A set of quality criteria were developed to assess risk of bias within this literature. Higgins et al. (2011) identified that there are issues with assessing study quality based solely on a quality scale as they tend to amalgamate the quality of reporting with the study conduct leading to inconsistencies. Thus, the authors suggested that quality criteria should be based on the internal validity of a study and relevance to the review being carried out. Based on these considerations as outlined by Higgins et al. (2011), the quality criteria in this meta-analysis were adapted from existing frameworks including: Downs and Black (1998), 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). The resulting quality framework assessed risk of bias in 7 domains: Selection Bias, Performance Bias, Treatment Fidelity, Detection Bias, Statistical Bias, Reporting Bias, and Generalisability Bias. Each domain was rated as either Low, Unclear or High risk (Table 6).

*Table 6. Quality appraisal tool*

| Domain | Low risk of bias | Unclear risk of bias | High risk of bias |
|---|---|---|---|
| **Selection Bias** | Participants are randomised to intervention or control groups and this is reported. The design of the study is within-subjects. | Participants are pseudo-randomised or partly randomised and/or participant characteristics are not reported. | Participants are not randomised to the groups and/or there are clear differences between participant characteristics. |
| **Performance Bias** | Participants and facilitators are blinded. No clear differences between the groups which could have affected performance. | Participants or facilitators are blinded. Some differences between the groups which may affect performance. | No blinding of participants and facilitators. Systematic differences between the groups regarding factors which could affect performance, for example, being rewarded for participation or not attending the same number of sessions. |
| **Treatment Fidelity** | Group procedures and resilience intervention methods reported. Facilitators are trained in delivering the resilience intervention. Treatment fidelity reported. | Group procedures and resilience intervention methods reported. Unclear if facilitators have been trained in delivering the intervention or whether there was treatment fidelity. | Group procedures and resilience intervention methods not reported. The training of facilitators is not described, or their training is inappropriate. No treatment fidelity reported. |
| **Detection Bias** | Study design is a randomised controlled trial. Outcome measures are clearly defined, valid and reliable and implemented consistently across all participants. | Study design is a non-randomised controlled trial. Outcome measures not clearly reported and/or there are possible issues regarding validity and reliability. Unclear if outcome measures implemented consistently. | Study design is a before and after study. Issues with validity and reliability of the outcome measures and /or they are implemented differently across participants. |
| **Statistical Bias** | Dropout rate below 10%. Appropriate statistical testing used including ITT. | Dropout rate between 10-30%. Statistical test unclear. | Dropout rate was greater than 30%. Statistics not reported or inappropriate statistical test used. |
| **Reporting Bias** | All results of measures as outlined in the method reported. | Not all results of measures outlined in the method reported. | Results of measures outlined in the method are not all reported. Only significant results are reported. |
| **Generalisability** | Sample is sufficient for generalisation and is representative of the target population. | Sample is sufficient for generalisation but with idiosyncratic features. | Small sample size which is inadequate to detect an effect and/or is unrepresentative of the target population. |

### *Results of the risk of bias assessment*

Each study was awarded a total quality index score. Firstly, each study was scored based on the research design used, these scores were 30 points for an RCT, 20 points for a NRCT and 10 points for a BAS. These scores were determined by the author to give an appropriate weighting to the studies based on the quality of their research design. The studies were then reviewed in relation to each of the 7 risk of bias domains. Using the criteria detailed in Table 6 each study was awarded a score of 0 (high risk) represented in red, 1 (unclear risk) represented in yellow or 2 (low risk) represented in green. Within each domain there were several elements identified which the study needed to meet to be given each rating. To ensure an objective method as possible, ratings were based on the highest level of risk the study had been given. For example, in the case of statistical bias, if a study had a dropout rate below 10% (low risk) but did not report all statistics (high risk), then it would be given an overall rating of high risk for that domain. The highest possible score a study could be awarded was 44 indicating an RCT design (30 points) and low risk for each of the seven risk of bias domains (14 points). To calculate the overall quality index score, the points awarded for study design (10, 20 or 30) were added to the sum of the seven areas of risk of bias which was then expressed as a percentage. For example, 30 + 8 = 38/44 (86%). Table 7 shows the risk of bias ratings and total quality index score for each study.

*Table 7. Summary of applied quality criteria*

| | Selection bias | Performance bias | Treatment fidelity | Detection bias | Statistical bias | Reporting bias | Generalisability | Study design | Quality Index |
|---|---|---|---|---|---|---|---|---|---|
| Akbari (2017) | | | | | | | | RCT | 86% |
| Akeman et al. (2019) | | | | | | | | NRCT | 66% |
| Chandler et al. (2015) | | | | | | | | RCT | 89% |
| Chandler et al. (2020) | | | | | | | | NRCT | 61% |
| Dolbier et al. (2009) | | | | | | | | RCT | 89% |
| Games et al. (2020) | | | | | | | | RCT | 91% |
| Gerson & Fernandez (2013) (1) | | | | | | | | RCT | 86% |
| Gerson & Fernandez (2013) (2) | | | | | | | | RCT | 89% |
| Houston et al. (2017) | | | | | | | | RCT | 95% |
| Moffett & Bartram (2017) | | | | | | | | BAS | 36% |
| Peng et al. (2014) | | | | | | | | NRCT | 68% |
| Rose et al. (2013) | | | | | | | | RCT | 93% |
| Shatkin et al. (2016) | | | | | | | | NRCT | 64% |
| Steinhardt & Dolbier (2008) | | | | | | | | RCT | 91% |
| Victor et al. (2017) | | | | | | | | RCT | 91% |
| Zamirinejad et al. (2014) | | | | | | | | NRCT | 61% |

Please note: Red indicates high risk of bias, amber indicates unclear risk of bias and green indicates low risk of bias

To determine inter-rater reliability a second rater with experience in reviewing research reviewed 25% of the studies and it was found that inter-rater reliability was excellent (kappa = 0.95). Table 8 shows the kappa scores for each domain.

*Table 8. Kappa scores for each domain*

| | **Selection bias** | **Performance bias** | **Treatment fidelity** | **Detection bias** | **Statistical bias** | **Reporting bias** | **Generalisability** |
|---|---|---|---|---|---|---|---|
| **Kappa** | 1.00 | 0.63 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

*Summary*

The risk of bias across all studies for all domains was mixed; however, the majority of studies were rated as high quality. Overall, total quality scores ranged from 36% which was due to the research design used, to 95% which was an RCT with low risk of bias for all but one domain. Performance bias had the highest risk of bias across all domains as all studies were rated high or unclear risk. One of the main explanations was that studies gave higher financial incentives for the treatment group than the control group. Conversely, Reporting bias had the lowest risk of bias as most studies had reported on all outcome measures in the results. Despite ratings of high and unclear risk, all studies were included in the initial analysis due to the low number of studies in this area.

# Results

The analysis was carried out separately for the category of studies reporting on changes in resilience levels (8 studies) and the category of studies reporting on changes in symptomatology (12 studies). Thus, the results are presented in two sections – Resilience and Symptomatology.

## *Resilience*

*Selection of the meta-analytic model*

The distribution of primary study effects is shown in Figure 2. The variance of the true effect ($tau^2$) was calculated using the DerSimonian-Laird estimate (1986).

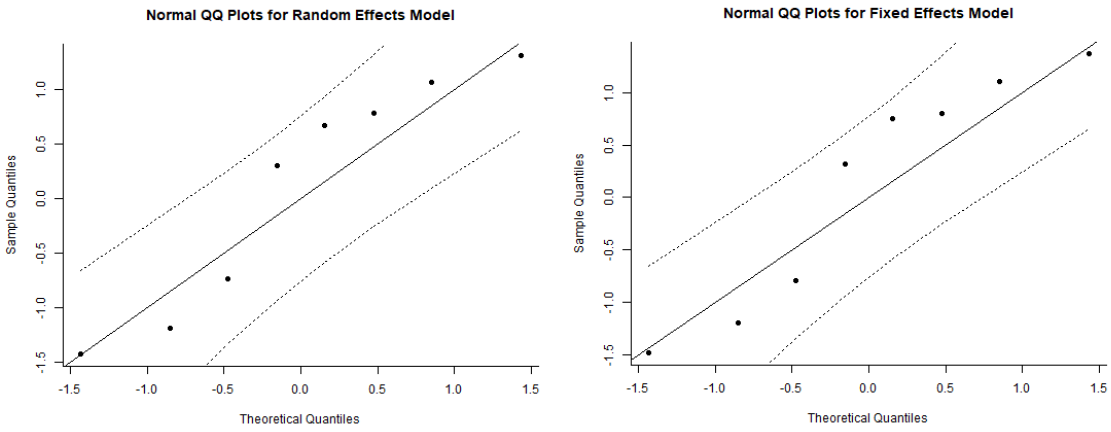



*Figure 2. QQ plot of the distribution of standardised mean difference within the resilience primary studies using the random effect model (left) and fixed effects model (right)*

As can be seen from Figure 2, there is no evidence of non-normality in the distribution of (SMD) within the primary studies. Therefore, this indicates that the use of the DerSimonian-Laird estimate (1986) is an appropriate method for the calculation of the variation of the true effect.

*Effectiveness of resilience interventions in increasing resilience*

The treatment effects described in the primary studies are reported in Table 9. There were 8 studies reporting a total of 674 participants. Participants were selected from the University student population, regardless of level of study. Therefore, participants were included who were studying both Undergraduate and Postgraduate degrees. In all studies, participants took part in group interventions.

*Table 9. Effectiveness of resilience interventions in increasing resilience*

| | SMD | Lower 95% CI | Upper 95% CI | %W (random) |
|---|---|---|---|---|
| **Akeman et al. (2019)** | 0.102 | -0.1613; | 0.3652 | 28.2 |
| **Chandler et al. (2015)** | 0.4898 | -0.2576; | 1.2372 | 4.2 |
| **Games et al. (2020)** | -0.1337 | -0.6842; | 0.4167 | 7.5 |
| **Gerson & Fernandez (2013) (1)** | 0.3064 | -0.4135; | 1.0262 | 4.5 |
| **Houston et al. (2017)** | -0.0585 | -0.4180; | 0.3011 | 16.5 |
| **Moffett & Bartram (2017)** | 0.2968 | -0.0168; | 0.6103 | 21 |
| **Peng et al. (2014)** | 0.4686 | -0.0444; | 0.9815 | 8.6 |
| **Steinhardt & Dolbier (2008)** | 0.5148 | 0.0275; | 1.0021 | 9.5 |

Of the 8 studies, although 7 reported statistically non-significant effects,the direction of effects seem to favour the intervention for resilience; however, it is important to note that all of the confidence intervals, except in one study (Steinhardt & Dolbier, 2008) included 0. A random effects models was calculated using the generic inverse variance method (see Figure 3). When the entire group of studies is considered together a statistically significant effect favouring the intervention was observed. The random effects model suggested a weighted average of SMD = 0.1946 ($z$ = 2.47, $p$ = .0137) and a 95% confidence interval of between 0.04 to 0.35. A treatment effect of this magnitude would be considered negligeible.

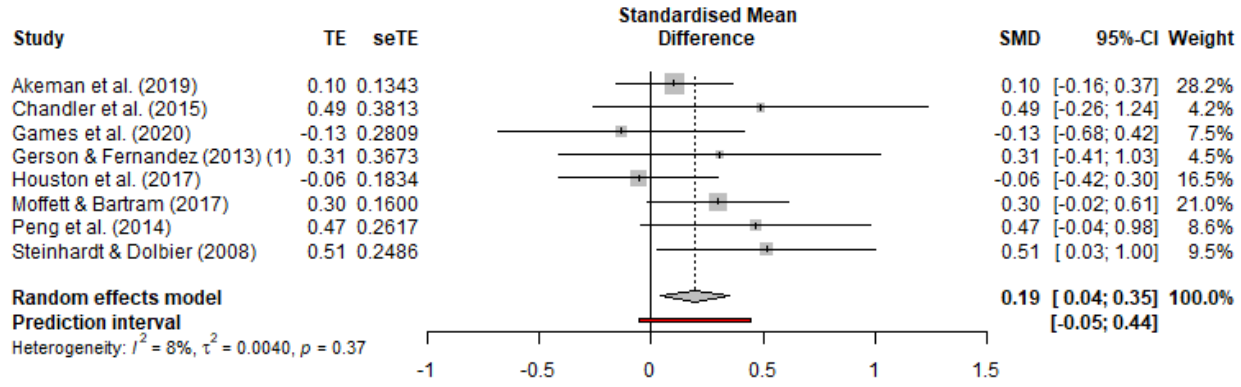
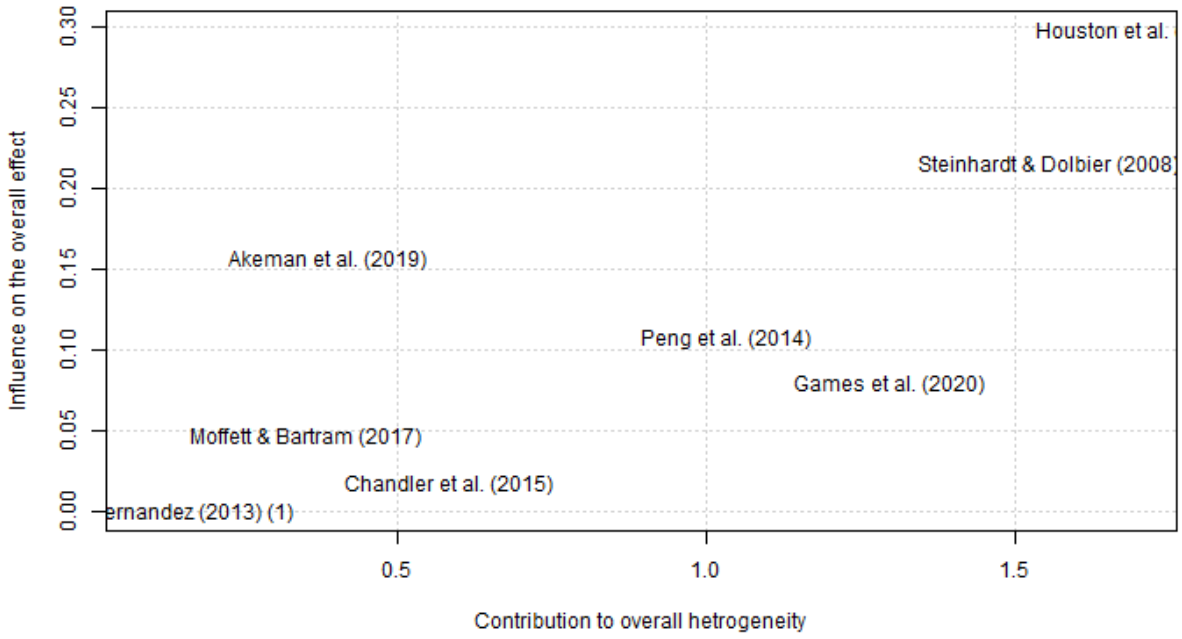



*Figure 3. Forest plot of standardised mean difference*

An acceptable level of heterogeneity in the primary studies was observed (Higgin's $I^2$ = 8%, $tau^2$ = 0.0040, $p$ = .37). This suggests that this group of studies is reporting a coherent and consistent effect size.

*The impact of influential primary studies*

The impact of disproportionately influential studies was assessed using a "leave-one-out" analysis, in which the random effects model was calculated with each of the primary studies removed in turn and change in weighted average effect size (i.e., influence) and change in heterogeneity (i.e., discrepancy) recorded. The result of this "leave-one-out" analysis is presented on the Baujat plot (Baujat et al., 2002) in Figure 4.




Please 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.

*Figure 4. Baujat diagnostic plot of sources of heterogeneity*

As shown in Figure 4, Houston et al. (2017) and Steinhardt and Dolbier (2008) are both discrepant with the bulk of the literature in terms of heterogeneity and are influential in terms of affecting the result of the meta-analytic synthesis. They had total quality scores of 95% and 91% respectively. The random effects model was recalculated with these 2 studies removed. The corrected random effects model reported a synthesis of SMD = 0.2060 (95% CI 0.0380 to 0.3740, $p$ = .01). The corrected random effects model evidences an approximately 6% increase relative to the uncorrected estimate. The slight increase in effect size when 2 studies with high total quality scores are removed indicates the possibility that studies with lower quality scores seem to have found larger effect sizes.

The studies by Houston et al. (2017) and Steinhardt and Dolbier (2008) were reviewed using the inclusion criteria to identify any factors that may account for their influence and discrepancy which may indicate they should be removed from the analysis. There were no

clear reasons identified which could account for these studies reporting results that are discrepant from the rest of the literature; thus, the studies were not removed from the overall analysis.

*The effect of risk of bias in the primary studies*

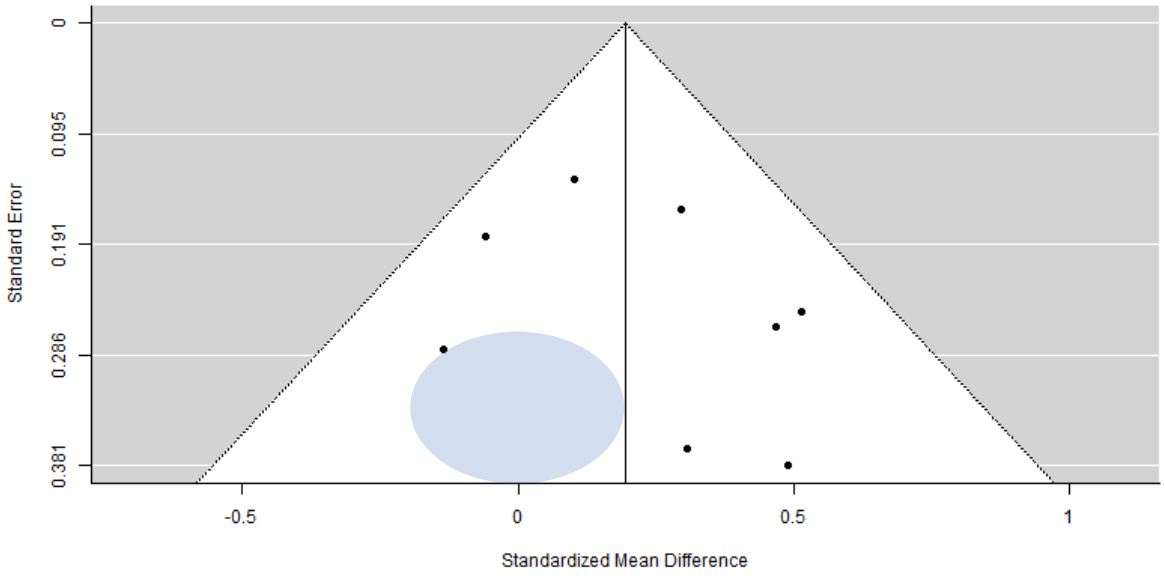
The quality effects model was calculated using the total score from the risk of bias ratings reported in Table 7. This score considers the score allocated for study design and the ratings of risk of bias as reported in Table 6.

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 effect model reported a synthesis of SMD = 0.1763 ($z$ = 2.14, $p$ = .03) and a 95% confidence interval of between 0.01 to 0.34. The quality effects model evidences an approximately 9% decrease relative to the uncorrected random effects estimate. Accordingly, when the synthesis includes information about the methodological quality of the studies there is a negligible change in the weighted average of these studies. Again, this seems to suggest that studies with a lower total quality score found larger effect sizes.

*The impact of publication and small study biases*

Publication bias is caused by the tendency for statistically significant results to be published compared with the reticence to publish papers with non-significant results (Thornton & Lee, 2000). Small study bias is the tendency for studies with smaller sample sizes to show greater variability in their measurement of the intervention effect (Sterne et al., 2000). These biases can be identified using a funnel plot which plots the magnitude of the study's SMD estimate against the square root of the study's sampling variances. If there is an absence of publication bias, the effects from the studies with small sample sizes which show greater variability will

scatter more widely at the bottom of the plot compared to studies with larger samples at the top which will lie closer to the overall meta-analytic effect, creating a symmetrical funnel shape. If there is an absence of studies in the area of the plot associated with small sample sizes and non-significant results (shaded in blue in Figure 5 then it is likely there is some publication bias leading to an overestimation of the true effect. The funnel plot of SMD is presented in Figure 5.

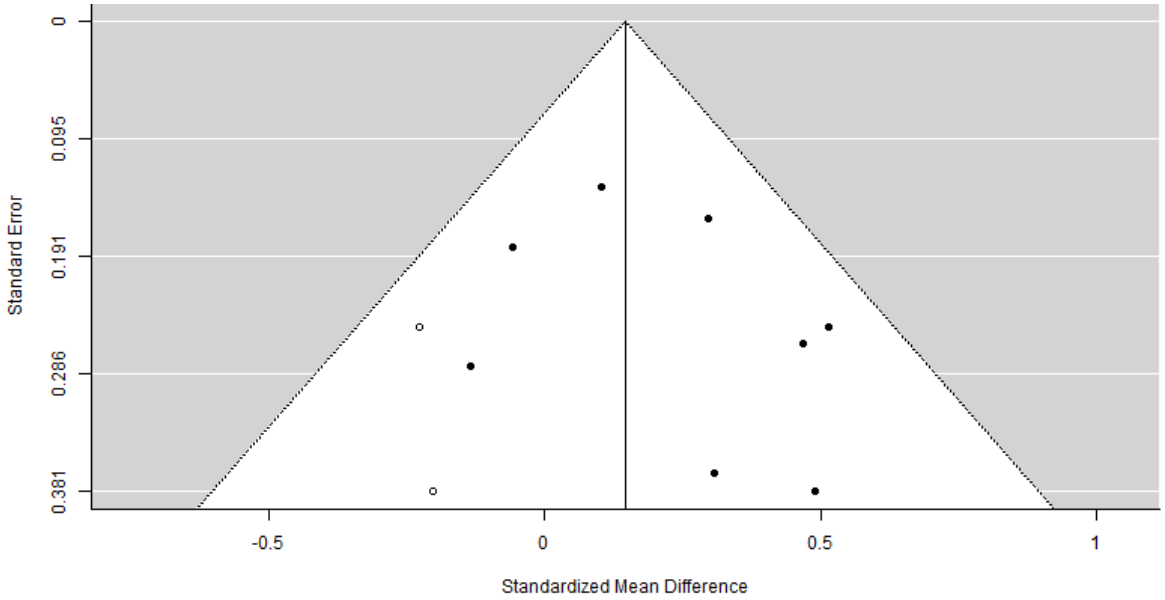



Please note: The 95% confidence interval of the expected distribution of standardised mean difference is shown as an inverted "funnel". The area in blue is that associated with null or small effect in the sample size.

*Figure 5. Funnel plot of the standardised mean difference*

As can be seen from Figure 5, there is clear evidence of publication bias in the distribution of SMD. The effect of publication bias was simulated using a trim and fill procedure (Duval & Tweedle, 2000). The trim and fill procedure builds upon the assumption that publication bias would lead to asymmetry in the funnel plot. The trim and fill procedure iteratively removes the most extreme small studies from the side of the funnel plot associated with positive effects, re-computing the effect size at each iteration until the funnel plot is symmetric about the (corrected) effect size. While this trimming yields the adjusted effect size, it also reduces

the variance of the effects, resulting in biased and narrow confidence intervals. Therefore, the original studies are returned into the analysis, and the procedure imputes a mirror image on the side of the funnel plot associated with negative effects for each of the previous removed studies (Figure 6).




Please note: The 95% confidence interval of the expected distribution of standardised mean difference is shown as an inverted "funnel". White dots are imputed by the trim and fill procedure.

*Figure 6. Funnel plot of the standardised mean difference using the trim and fill procedure*

The trim and fill procedure yielded a corrected random effects model of SMD = 0.1461 (95% CI -0.0125 to 0.3046). The corrected random effects model evidences an approximately 25% decrease relative to the uncorrected estimate.

Rosenthal (1979) describes the calculation of a failsafe number; this method calculates the number of studies with non-significant results which would need to be included in the meta-analysis for the overall effect to be non-significant ($p > .05$). This procedure suggests that 15 studies would be required to reduce the observed SMD = 0.1946 to non-significance, suggesting that the observed SMD = 0.1946 is vulnerable to publication bias and the

conclusions of this meta-analysis may change with the publication of future studies. In other words, the findings are not particularly robust, likely due to the small effect sizes.

*The association between the treatment effect and duration of the intervention*

A meta regression was undertaken to test the significance of the association between the duration of the intervention and the treatment effect (SMD). For the 8 studies in the Resilience analysis, the duration of interventions ranged from 1 day to 70 days. As can be seen from Table 10 the association was statistically non-significant.

*Table 10. Meta regression of duration of intervention and SMD*

| | **Coefficient** | **SE** | **Z** | **P** |
|---|---|---|---|---|
| **Duration of intervention** | 0.0041 | 0.0044 | 0.9301 | 0.3523 |

*Impact of follow-up data*

One study (Games et al., 2020) in the Resilience analysis obtained data from participants at a 6-month follow-up. The SMD for this study was -0.13; however, it increased to 0.13 when calculated at the follow-up time point, indicating a small increase in resilience from post-intervention to follow-up.

To summarise, a negligible effect size (SMD = 0.19) was found for the effectiveness of resilience interventions in increasing resilience levels. The effect size was statistically significant but slightly reduced when the quality effects model was used. There was no association between duration and effectiveness of interventions.

## *Symptomatology*

*Selection of the meta-analytic model for changes in symptomatology*

The distribution of primary study effects is shown in Figure 7. The variance of the true effect ($tau^2$) was calculated using the DerSimonian-Laird estimate (1986).

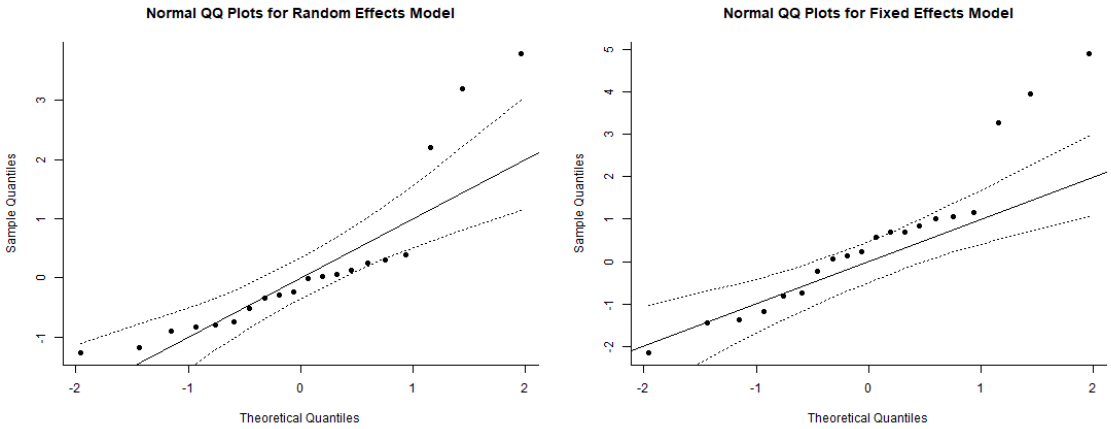



*Figure 7. QQ plot of the distribution of standardised mean difference within the symptomatology primary studies using the random effects model (left) and fixed effects model (right)*

As can be seen from Figure 7, there is some evidence of non-normality in the distribution of SMD within the primary studies. However, the majority of the primary study SMD fall within the 95% confidence intervals for the expected normal values. Therefore, this indicates that the use of the DerSimonian-Laird estimate (1986) is an appropriate method for the calculation of the variation of the true effect.

*Effectiveness of resilience interventions in decreasing symptomatology and the effect of risk of bias in the primary studies*

The treatment effects described in the primary studies categorised by type of symptom are reported in Figure 8. There were 12 studies reporting a total of 904 participants. Due to some

studies reporting multiple outcome measures, they were labelled a, b or c to differentiate them. Participants were selected from the University student population, regardless of level of study. Therefore, participants were included who were studying both Undergraduate and Postgraduate degrees. In all but one study (Rose et al., 2013) participants took part in group interventions.

Initially, a random effects models was calculated using the generic inverse variance method. When including all studies, the random effects model suggested a weighted average of SMD = 0.4943 ($z = 4.96$, $p < .001$) and a 95% confidence interval of between 0.30 to 0.69 (Figure 8). A treatment effect of this magnitude would be considered small.

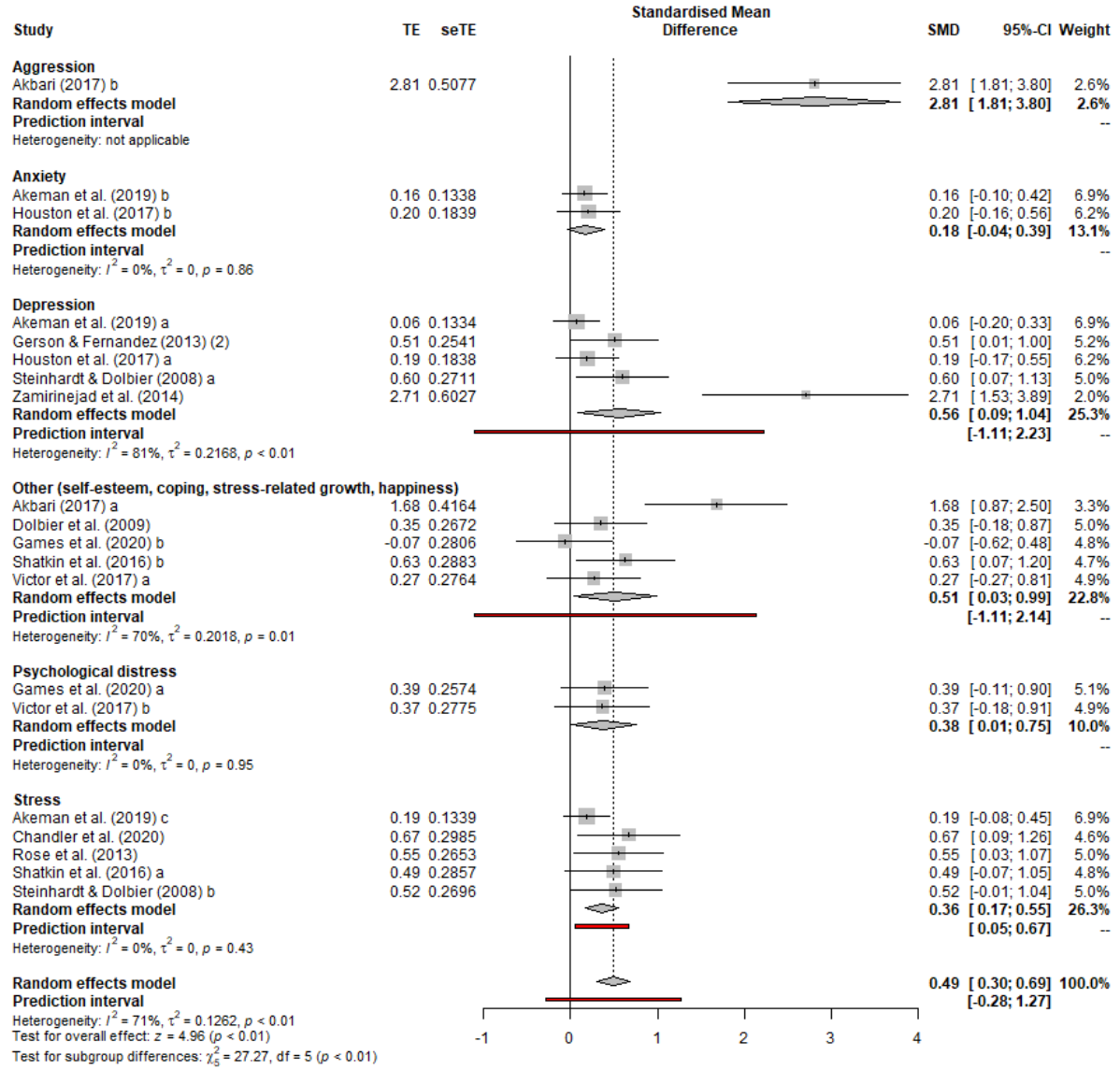



*Figure 8. Forest plot of standardised mean difference*

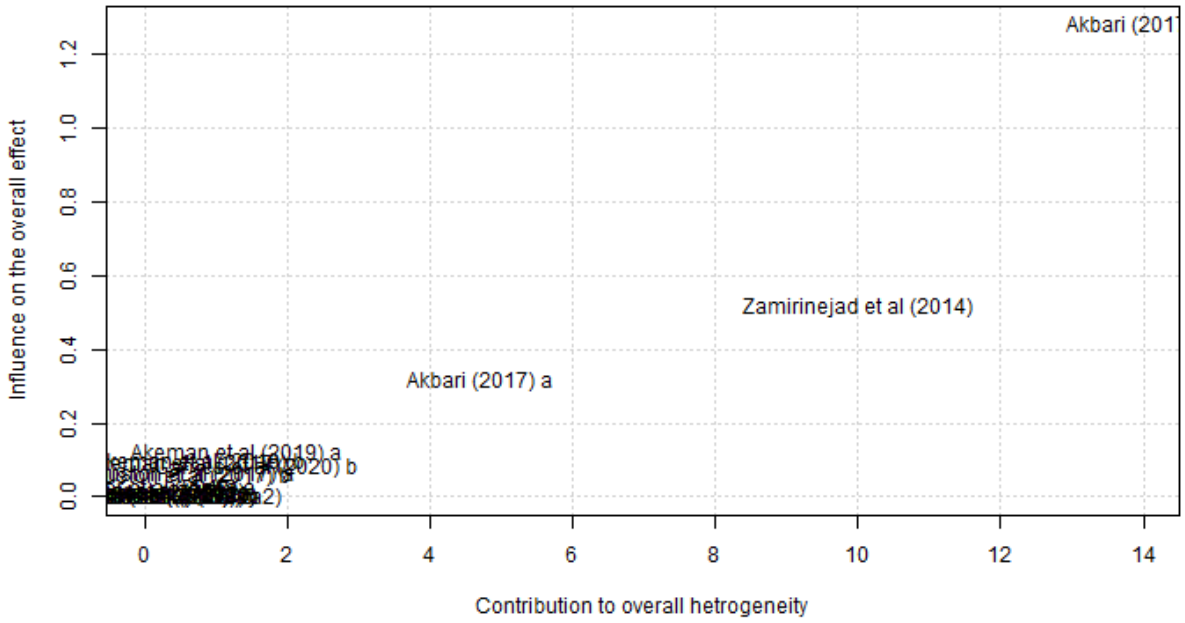
To investigate the different outcomes within the symptomatology analysis, a random effects models was calculated using the generic inverse variance method for each subgroup (Table 11). The subgroup category 'Other' refers to the group of outcome measures that measured changes in self-esteem, coping, stress-related growth, and happiness. Treatment effect differences between the subgroups were statistically significant ($p < .01$).

*Table 11. Effectiveness of resilience interventions in decreasing symptomatology*

| | SMD | Lower 95% CI | Upper 95% CI | %W (random) | Interpretation of effect size |
|---|---|---|---|---|---|
| **Aggression** | 2.81 | 1.81 | 3.80 | 2.6 | Large |
| **Anxiety** | 0.18 | -0.04 | 0.39 | 13.1 | Negligible |
| **Depression** | 0.56 | 0.09 | 1.04 | 25.3 | Moderate |
| **Other** | 0.51 | 0.03 | 0.99 | 22.8 | Moderate |
| **Psychological distress** | 0.38 | 0.01 | 0.75 | 10.0 | Small |
| **Stress** | 0.36 | 0.17 | 0.55 | 26.3 | Small |

*The impact of influential primary studies*

The impact of disproportionately influential studies was assessed using a "leave-one-out" analysis which is presented on the Baujat plot (Baujat et al., 2002) in Figure 9.




Please 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.

*Figure 9. Baujat diagnostic plot of sources of heterogeneity*

As shown in Figure 9, Akbari (2017) and Zamirinejad et al. (2014) are discrepant with the bulk of the literature and are influential in terms of the meta-analytic synthesis. The random

effects model was recalculated with the 2 studies showing disproportionate influence removed. The corrected random effects model reported a synthesis of SMD = 0.2703 (95% CI 0.17 to 0.37, $p < .001$). The corrected random effects model evidences an approximately 45% decrease relative to the uncorrected estimate.

To identify any factors which may account for their influence and discrepancy and indicate whether they should be removed from the analysis, these 2 studies were reviewed in line with the inclusion criteria. Following review, it was determined that there were no clear reasons to remove Zamirinejad et al. (2014); thus, this study was not excluded from the subsequent analyses. After reviewing Akbari (2017) it was noted that this study used measures of aggression (Buss and Perry Aggression Scale – Buss & Perry, 1992) and happiness (Oxford Happiness Questionnaire – Hills & Argyle, 2002). Although these measures are different to others in the symptomatology construct, this was not deemed sufficient to exclude the study from the analysis. Thus, this study was not removed from the overall analysis.

*The effect of 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 Table 7. This score considers the score allocated for study design and the ratings of risk of bias as reported in Table 6. The quality effects model suggested a weighted average of SMD = 0.4882 ($z = 4.84$, $p < .001$) and a 95% confidence interval of between 0.29 to 0.69, which is an approximately 1% decrease relative to the uncorrected random effects estimate. Accordingly, when the synthesis includes information about the methodological quality of the studies there was a negligible change in the weighted average of these studies. In other words, the total quality scores of the studies do not seem to have a large impact on the overall effect sizes found. The quality effects model as compared to the random effects model for each subgroup is shown in Table 12.

*Table 12. Random effects model and Quality effects model for SMD*

| | Random Effects Model | | | | Quality Effects Model | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **SMD** | **95% CI** | **$I^2$** | **No. of studies** | **SMD** | **95% CI** | **$I^2$** | **No. of studies** | **% change** |
| **Aggression** | 2.81 | 1.81 to 8.80 | 0% | 1 | 2.81 | 1.81 to 3.80 | 0% | 1 | 0 |
| **Anxiety** | 0.18 | -0.04 to 0.39 | 0% | 2 | 0.18 | -0.04 to 0.39 | 0% | 2 | 0 |
| **Depression** | 0.56 | 0.09 to 1.04 | 81% | 5 | 0.52 | 0.04 to 1.0 | 81% | 5 | -7 |
| **Other** | 0.51 | 0.03 to 0.99 | 70% | 5 | 0.49 | 0.01 to 0.97 | 70% | 5 | -4 |
| **Psychological distress** | 0.38 | 0.01 to 0.75 | 0% | 2 | 0.38 | 0.01 to 0.75 | 0% | 2 | 0 |
| **Stress** | 0.36 | 0.17 to 0.55 | 0% | 5 | 0.38 | 0.18 to 0.57 | 0% | 5 | +6 |

*Impact of follow-up data*

Two studies (Games et al., 2020; Zamirinejad et al., 2014) in the Symptomatology analysis obtained data from participants at a 6-month and 2-month follow-up, respectively. The SMD for these studies decreased when calculated at the follow-up time point, which is shown in Table 13. The changes in SMD indicate that from post-intervention to follow-up there is an increase in depression and psychological distress, and a decrease in self-esteem.

*Table 13. SMD at post-intervention and follow-up*

| | **SMD at post-intervention** | **SMD at follow-up** |
|---|---|---|
| **Games et al. (2020) – psychological distress** | 0.39 | 0.27 |
| **Games et al. (2020) – self-esteem** | -0.07 | -0.31 |
| **Zamirinejad et al. (2014) – depression** | 2.71 | 1.88 |

Due to the relatively low number of studies in each subgroup it was not possible to conduct further analyses such as publication bias.

To summarise, a small effect size (SMD = 0.49) was found for the effectiveness of resilience interventions in decreasing symptomatology. The effect size was statistically significant but slightly reduced when the quality effects model was used.

# Discussion

This meta-analysis aimed to determine the effectiveness of resilience interventions in both increasing resilience and reducing symptomatology for University students. To address these aims, 16 primary studies were systematically identified and analysed.

*Effectiveness of resilience interventions in increasing resilience*

A statistically significant positive effect size was found for the effectiveness of resilience interventions in increasing resilience levels. This effect size would be seen as negligible meaning that it would not meet the level considered for a small effect size. This finding seems to be consistent with other literature in this area (Joyce et al., 2018; Leppin et al., 2014; Liu et al., 2020; Vanhove et al., 2016). When the quality effects model was applied to the data the effect size was further reduced, but still statistically significant. This finding suggests that if better quality studies were carried out, then a smaller overall effect size would be the likely finding. The reduction in effect size when using the quality effects model was negligible; thus, this seems to indicate that the results found in this analysis are reflective of the small effect sizes as opposed to being significantly affected by the quality of the studies.

It was identified that there was an impact of publication bias, with the effect size reducing when this was accounted for. It is possible that, due to the relatively low number of studies in this area, the effect size could change with the publication of future studies. However, it is important to consider the overall high quality of methodological quality in this review and findings of previous meta-analyses regarding resilience interventions. Therefore, this seems to lead to the conclusion that future research may find similar results to those reported in this meta-analysis.

*Effectiveness of resilience interventions in reducing symptomatology*

A statistically significant small positive effect size was found for the effectiveness of resilience interventions in reducing symptomatology overall. Due to the various psychological constructs being investigated in the symptomatology category of studies, they were analysed as subgroups. Within this analysis the effect sizes ranged from negligible to large and evidenced a statistically significant difference between subgroups (large – aggression; moderate – depression, 'other'; small – psychological distress, stress; negligible – anxiety). Again, when the quality effects model was used there was a slight reduction in the overall effect size which was still statistically significant, leading to similar conclusions as were drawn for the resilience analysis that the findings in this analysis are reflective of the overall small effect sizes as opposed to being significantly affected by the quality of the studies.

*Discussion of findings*

The findings of this meta-analysis show that although statistically significant, the effect sizes were negligible and small, indicating that resilience interventions are not strongly efficacious for University students. One possible explanation for these findings are the many variations between interventions including delivery, duration, and theoretical underpinnings. Leppin et al. (2014) identified differences in the structure and theoretical approach of resilience interventions; also, previous meta-analyses have found variations in the way in which interventions are delivered, for example, the use of CBT and mindfulness-based approaches. (Liu et al., 2020). Within this meta-analysis a range of resilience interventions with varying approaches were used. It could be argued that debates regarding an accepted definition of resilience (Yoon et al., 2020) make it more challenging for researchers to develop

interventions based on this concept, leading to broad differences between interventions with no clear certainty regarding which, if any, are more efficacious.

There were statistically significant differences found in the symptomatology analysis between subgroups. Possibly, the content of interventions effectively reduced some symptoms more than others. For example, components of the resilience interventions included CBT based techniques such as behavioural activation (BA); thus, as CBT and BA are both National Institute for Health and Care Excellence (NICE) recommended treatments for depression (NICE, 2009), this could contribute to the moderate effect sizes found for this subgroup. A moderate effect size was also found for the 'Other' subgroup which incorporated self-esteem, coping, happiness, and stress-related growth. Thus, it could be that resilience interventions that focused on aspects such as coping skills may lead to improvements in these areas.

An important factor to consider regarding the findings of this meta-analysis is the selection of participants. In 12 of the 16 primary studies, participants were recruited through students volunteering. Participants in the remaining 4 primary studies were offered the opportunity to participate as part of the course they were enrolled in. It could be argued that participants volunteered due to mental health problems they were experiencing and saw this as a way of getting support without having to formally seek mental health support, especially as stigma has been identified as a barrier for students seeking help (Storrie et al., 2010). Thus, if participants were commencing the resilience intervention with high levels of mental health problems or symptoms and were not receiving individualised support from a mental health service, then this could explain the small effect sizes found. Another possible explanation for the findings is that students may have already had a high level of resilience. It has been identified in this meta-analysis that students face additional challenges when attending University (Wynaden., et al 2013). Thus, it could be that through these experiences they had

already learnt skills such as problem solving which helped to bolster their resilience. As such, the interventions may not have had as much of an effect as their resilience levels were already at a high level.

It was found that duration of the intervention did not have a statistically significant association with the effectiveness of the intervention in increasing resilience levels. The interventions included in this analysis ranged in duration from 1 day to 10 weeks. Thus, these findings indicate that a longer intervention does not necessarily mean that it is more efficacious. This finding is contrary to previous studies, for example, Cleary et al. (2018) conducted a systematic review of 33 studies looking at the effectiveness of resilience interventions for health professionals in increasing resilience and found a trend towards longer durations being more likely to demonstrate significant improvements. A possible explanation for the statistically non-significant finding in this review could be related to the population being studied. It could be that as University students have been identified as having difficulties in balancing workload (Randstad Student Support, 2020) then a longer intervention may not be as advantageous for them as it increases the time pressures they may be experiencing. To note, a further meta-regression on the symptomatology analysis was not carried out due to the low number of studies in each subgroup.

The meta-analysed studies primarily collected data at two time points, pre- and post-intervention, expect for two studies which collected follow-up data at a 2-month and a 6-month time point. Thus, it has not been possible to thoroughly investigate the impact of resilience interventions over time. It is possible that longitudinal studies may find different effect sizes from the ones reported in this meta-analysis. However, the findings indicated in this review identified that at follow-up time points resilience levels increased slightly but depression and psychological distress increased, and self-esteem decreased. Also, previous

studies have noted the reduced impact of resilience interventions over time (Dray et al., 2017).

The way in which resilience interventions are being delivered currently has not been found to be strongly efficacious for University students, even though it has been identified that the interventions are being offered in multiple ways. Thus, this leads to the need for further exploration into the way in which interventions are delivered. Lewis et al. (2020) discussed the increasing use of resilience interventions in mental health and educational settings. However, the authors commented on the problems of focusing on individual level resilience and not accounting for the wider socio-economic context. By taking an individual perspective, resilience is seen as something which should be developed on an individual level as opposed to addressing wider systemic issues. The authors discussed that interventions can also adopt the approach of aiming to increase resilience in the individual whilst not considering the context within which a young person is living. Furthermore, the skills learnt during an intervention may not be easily integrated into the everyday lives of young people (Lewis et al., 2020). This could relate to the context in which University students are living which will often involve being away from home whilst dealing with more stressful life events. Thus, it may be that although they have been involved in a resilience intervention, the real-world applicability of this is reduced due to their current life circumstances. The concepts outlined by Lewis et al. (2020) have been supported by Royle (2017) who identified that instead of interventions being offered as additional, wellbeing and resilience should be embedded as part of a holistic educational system. To develop a system in which resilience is embedded holistically, Pianta and Walsh (1998) discuss the importance of early prevention approaches in schools and moving away from individuals being taught isolated skills by external facilitators for short periods of time. The authors commented that exposing young people to a range of additional professionals or programmes can be a source of additional

stress, especially for children who may already be experiencing instability and discontinuity. Instead, the authors suggest building on existing social relationships and using these as a basis for resilient development. The authors also suggested that schools can be a hub for community-based activities and services for children and families, which again helps to involve existing people in the child's life, leading to a more integrated system. Support for a holistic approach has come from a recent study by Crooks et al. (2020) who identified that schools can be ideal places to build resilience, especially for children who have been exposed to trauma. The authors also commented on the importance of building interventions into existing infrastructures as this can improve access and reduce the stigma related to mental ill-health. Furthermore, the authors identify the need to take a whole-school approach and engage the family and community. Literature has also explored resilience development being embedded into workplace organisational systems. Huey and Palaganas (2020) synthesised 9 systematic reviews and identified that environmental and organisational factors were key in building resilience. Examples of how resilience could be built within workplace systems included work-life balance, meaningful recognition, and social support. The authors suggested that these areas can be focused on in several ways, for example, assisting with time management, promoting healthy living, and team-building activities. Thus, the literature highlights the need for resilience interventions to be embedded holistically within systems by focusing on a range of factors including, developing existing social relationships, family and community involvement, and work-life balance. Also, the literature has indicated that schools are ideal systems to use this approach as they can provide settings which facilitate supportive environments and primary prevention approaches.

It is also important to consider alternative psychological interventions which can support University students. A recent meta-analysis was carried out by Barnett et al. (2021) of 84 studies to review the effectiveness of psychological interventions for University students. The

authors analysed a range of interventions which were CBT, mindfulness and meditation, psychoeducation, relaxation, other (for example, music therapy), social support, social skills training, multi-modal, positive psychology, and attention training. The authors found a wide range of effect sizes from negligible to large but found that the most used interventions, CBT and mindfulness, were generally effective for depression, anxiety and eating disorders. The authors noted that after conducting a meta-regression, they found that transdiagnostic approaches were associated with significant symptom reduction and this may be an approach which suits the student population most effectively due to the commonality of subthreshold comorbid difficulties, as highlighted by Levin et al. (2014). Due to the broad range of effect sizes found, both in this present meta-analysis and the one conducted by Barnett et al. (2021), it is possible that a move away from existing frameworks of resilience interventions and a move towards transdiagnostic and holistic interventions being offered within University courses, could be a more effective way to support the student population.

### *Limitations of the literature*

The debate regarding an agreed definition for resilience brings into question outcome measures used to measure this construct. The outcome measures developed are based on a range of definitions and, as such, there could be differences in what is being measured. This could affect the findings of this review as studies utilised a range of resilience outcome measures and it is not clear whether the same construct was being measured across studies. Furthermore, the majority (14 out of 16 primary studies) used pre- and post-intervention outcome measures to evaluate the effectiveness of the intervention and only 2 collected follow-up data. Studies have identified that individual levels of resilience can change over time and do not stay constant (Khanlou & Wray, 2014). Thus, collecting data using an

outcome measure and at only two time points may not be reflective of the changing nature of resilience through the lifespan.

### *Limitations of the review*

The symptomatology analysis measured changes using a wide range of outcome measures covering broad areas of psychological distress. However, this analysis included some constructs which would be seen as areas to be increased or improved upon – self-esteem, happiness, coping and stress-related growth. These constructs were labelled as 'Other' in the analysis. There is a possibility that there may be differences in the way in which the interventions are designed to either increase constructs, for example self-esteem, as opposed to aiming to decrease constructs such as depression, anxiety, and stress. Thus, it could be argued that the 'Other' constructs should have been included in a separate analysis. However, many of the studies which included these constructs also measured changes in areas of psychological distress, which seems to indicate that the interventions were not designed differently related to the construct they were measuring change in.

### *Future Research*

This review has highlighted that although the literature on resilience has been growing there is still a level of uncertainty about an agreed definition and broad differences in the way in which resilience interventions are delivered. These issues indicate the need for future research to determine a clear definition upon which possible interventions can be based. However, to better reflect the developing understanding of resilience as a process incorporating wider systemic issues as opposed to solely focusing on increasing resilience on an individual level, it may be that current methods of delivering interventions need to be reconsidered. Thus, another area of future research regards the concept of embedding

resilience and wellbeing into systems in a holistic way by focusing on social relationships and involvement of family and community. It has been discussed that there are many demands placed on University students; thus, it is important to use interventions in a way which enhance rather than lessen their ability to cope. For example, it is possible that attending a group resilience intervention each week may detract from their study time and be detrimental to their academic work and time management. Therefore, this indicates the need for interventions to enhance resilience, coping skills and wellbeing being integral to educational systems as opposed to separate entities. Furthermore, as resilience has been identified as a process which changes throughout the lifespan, this would indicate the need for more longitudinal research.

## *Clinical implications*

Based on the findings of this meta-analysis, clinical implications have been proposed:

- Educational systems could consider taking a holistic approach whereby there is a focus on resilience building and wellbeing as an integral aspect of their approach as opposed to being a separate intervention. This approach could help with the difficulties students can have in balancing workload, whilst also addressing the issue regarding stigma about seeking help for mental health problems. It also acknowledges that the problem is not located within the individual but within a system which can change to support students. Furthermore, there can be implications for wider systems, such as workplaces, to build supportive environments with a focus on social relationships and community involvement which can facilitate resilience.
- To evaluate effectiveness of interventions, it may be more useful to do this in a longitudinal manner, for example across the duration of a University degree. This is

particularly due to the understanding of resilience being a process which changes throughout life.

- As there have been issues discussed regarding measurement of resilience, it could indicate the need for alternative ways in which to evaluate the effectiveness of interventions instead of focusing on resilience levels or symptomatology. For example, in the case of students, this could relate to level of engagement with peers, family and studies, enjoyment in activities and quality of life.

## *Conclusion*

The findings show that although statistically significant effect sizes were found, these were negligible and small; furthermore, other studies have found larger effect sizes for alternative interventions such as CBT, which leads to the conclusion that resilience interventions are not the most effective interventions to use with University students, based on their current delivery methods. A key area for future research is to consider how interventions to improve resilience and wellbeing can move from an individualised to a holistic approach and be incorporated into the structure of University courses in a way which is efficacious whilst not detrimentally affecting academic work.

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Note: Meta-analysed studies are indicated by an asterisk (*)

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# How is resilience associated with depression, anxiety, post-traumatic stress (PTSD) and wellbeing for individuals who have experienced childhood trauma?

## Abstract

*Introduction:* Childhood trauma has frequently been identified as a risk factor for developing mental health disorders in adulthood. However, research has also recognised that not everyone who experiences childhood trauma will develop mental health disorders with resilience being indicated as a factor which may mediate this relationship.

*Method:* Individuals who had experienced childhood trauma and were aged between 18 to 25, volunteered to take part in an online survey. Data were collected on their experiences of trauma, current levels of mental health, wellbeing, and resilience. A total of 58 participants completed the study with an average age of 22.45 years ($SD$ = 2.42).

*Results:* A significant moderate positive association ($r$ = .31, $p$ < .05) was found between childhood trauma and PTSD but not between childhood trauma and depression, anxiety, or wellbeing. Resilience was not found to be a moderator or a mediator between childhood trauma and PTSD; however, a multiple regression model was significant indicating that both resilience ($\beta$ = -.41, $p$ = .009) and childhood trauma ($\beta$ = 4.18, $p$ = .004) contribute independently to PTSD.

*Conclusion:* Although resilience did not mediate or moderate the relationship between childhood trauma and adult mental health difficulties, it has an independent effect on PTSD.

*Clinical implications:* As childhood trauma is associated with PTSD there are implications for the planning of both reactive and preventative interventions.

*Future research:* The need for further research into a range of factors, such as resilience and social support, which may be able to offer a protective function for mental health difficulties for individuals who have experienced childhood trauma is indicated.

# Introduction

## *Childhood trauma and mental health*

Childhood trauma is one of the most commonly identified risk factors for a range of mental health disorders in adulthood. This includes links between childhood trauma and depression (Humphreys et al., 2020), anxiety (Li et al., 2016), bipolar disorder (Zhang et al., 2020), psychotic experiences (Croft et al., 2019) and psychosis (Stanton et al., 2020). Furthermore, implications of childhood trauma can include reduced health-related quality of life (Afifi et al., 2007), increased risk of physical health disorders (Noteboom et al., 2021) and reduced emotional wellbeing (Beilharz et al., 2020).

The terms child trauma or childhood maltreatment which are both used in the literature (childhood trauma will be used throughout this study for clarity) often refer to several categories of abuse and neglect that a child may experience. These include emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect (Watts-English et al., 2006). Prevalence of childhood trauma can be difficult to determine as victims may feel unable to disclose and others may not be able to recognise that abuse is taking place; thus, studies are unable to reflect true prevalence rates (Office for National Statistics, 2020). However, the World Health Organization (WHO) have reported worldwide statistics that 1 in 2 children experience violence, 1 in 3 experience emotional abuse, 1 in 4 children live in a household with a mother who is experiencing domestic abuse, and 1 in 5 women and 1 in 13 men have reported being sexually abused prior to the age of 17 (WHO, 2020). Thus, these figures indicate the widespread and global nature of childhood trauma.

The incidence of mental health disorders in adulthood for people who have experienced childhood trauma has been frequently reported. A large-scale meta-analysis of 184 studies by Nelson et al. (2017) identified that 45.6% of adult participants with depression had

experienced a form of childhood trauma, with 19.1% having experienced more than one form. The highest prevalence was found for emotional neglect, with 43.2% of participants reporting this form of childhood trauma. The authors also analysed the risk level for developing depression in adulthood when the individual had experienced childhood trauma. They found that when an individual has experienced one form of childhood trauma, they are 2.8 times more likely to develop depression and this increases to 3.6 times more likely when the individual has experienced more than one form of childhood trauma. These findings were supported by Zhang et al. (2020) who carried out a cross-cultural meta-analysis including 23 studies from nine countries. Of the adult participants in the analysis who had major depressive disorder, prevalence rates were found of 17% for childhood physical abuse, 19% of childhood sexual abuse, 31% for childhood physical neglect, 33% for childhood emotional abuse and 37% for childhood emotional neglect. They also found that of the adults in the analysis who had bipolar disorder, prevalence rates were found of 18% for childhood physical abuse, 22% for childhood sexual abuse, 30% for childhood emotional abuse, 30% for childhood physical neglect and 31% for childhood emotional neglect. For both the participants with major depressive disorder and bipolar disorder, the highest prevalence rates were found for experiences of childhood emotional neglect. Furthermore, Chen et al. (2010) conducted a meta-analysis and systematic review of studies looking at associations between a history of childhood sexual abuse and diagnosis of mental health disorders. It was found that childhood sexual abuse was significantly associated with a lifetime diagnosis of a range of mental health disorders including depression, anxiety, post-traumatic stress disorder (PTSD), eating disorders, sleep disorders and suicide attempts. A recent meta-analysis by McKay et al. (2021) of 23 studies supports the findings which have been reported. They found significant associations between specific forms of childhood trauma (bullying, emotional abuse, physical neglect, parental loss, general trauma) and mental health disorders in adulthood.

Watts-English et al. (2006) explained these associations by identifying that trauma during crucial periods of brain development in childhood can have a disruptive impact on the neurodevelopmental processes of the child and contribute to negative long-term consequences. The authors identify that three neurobiological stress response systems (limbic-hypothalamic-pituitary-adrenal-axis, serotonin system and sympathetic nervous system) have a significant influence on brain development, reaction to stress, arousal, emotion regulation, physical and cognitive development. Furthermore, if chronic stress is experienced this can have a negative effect on the immune system. These various systems are connected on many levels; thus, if one system is dysregulated it can affect the other systems. It is thought that dysregulation of neurobiological stress systems can lead to development of symptoms of PTSD (re-experiencing of the trauma, hyperarousal, and avoidance). The authors reviewed magnetic resonance imaging (MRI) studies which found reduced brain volume in several areas, including prefrontal cortex, right temporal lobe and cerebral cortex in children who had experienced trauma compared to those who had not. Findings also suggested that when trauma started at an earlier age and had a longer duration, the effects on the brain volume were more significant; thus, indicating the harmful effect of chronic abuse on brain development (Watts-English et al., 2006). Studies have also found that the hypothalamic-pituitary-adrenal (HPA) axis functioning may be altered by childhood trauma and link to increased risk for negative health outcomes; furthermore, it has been found that the HPA axis can be prone to acute stress dysregulation when trauma is experienced in infancy (Kuhlman et al., 2015).

Considering the literature presented thus far, there is a strong evidence base to propose that many people develop mental health problems after experiences of childhood trauma. However, there has also been research related to individuals who do not develop mental health problems following childhood trauma.

Vázquez (2013) reported that 60% of people experience a traumatic event in their life but only 1-2% develop PTSD. Also, Philippe et al. (2011) found that a significant number of people who have experienced traumatic events stay psychologically healthy. Yehuda et al. (2006) state that being exposed to trauma will not necessarily lead to an individual developing mental health disorders. They identify that exposure to childhood trauma can impact on the development of mental health disorders but can also have a protective or inoculating function dependent on the timing and intensity of the exposure. The authors discuss that challenges in life can prompt psychological mechanisms to be activated which can result in improved adaptation to these difficulties; thus, the individual develops characteristics to cope.

## *Resilience*

Literature has been developing to explore the mechanisms involved in keeping individuals psychologically healthy following childhood trauma and how they can serve as protective factors for mental health disorders. Although much research has been carried out which identifies resilience as one of these mechanisms, there is still debate regarding how to define the construct of resilience (Yoon et al., 2020). Connor and Davidson (2003) identified that resilience can be seen as a measure of successful ability to cope with stress. They define resilience as a dynamic as opposed to static process which can change during the lifespan, in different contexts and in response to life circumstances. Whereas Ungar et al. (2013) identified that resilience develops from interactions which take place between an individual and their environment and is defined as the capacity to use internal and external resources such as psychosocial and cultural resources. To address the issues regarding defining resilience, Yoon et al. (2020) carried out a qualitative study with practitioners who worked with children who had experienced trauma. They found five themes related to a definition of

resilience which were largely in line with previous theories and models of resilience. The themes were; thriving, surviving, perseverance, advocating for self, and reconciling and integrating traumatic experiences into a healthy identity development.

Resilience has been identified as a concept which built on literature regarding some individuals having better outcomes than others despite experiencing similar stressful life experiences. Rutter (2013) discussed that resilience may develop when individuals experience repeated short-term exposures to negative life experiences as they learn how to cope. However, the author identified the importance of being in a context which allows the individual to successfully learn to cope. The author also highlighted the importance of an individual having self-reflective abilities to be able to consider what has and has not gone well, in addition to a determination to cope with challenges. Bonanno (2004) commented that due to the fact much of the literature on the way in which people cope with trauma has come from those experiencing significant psychological effects, resilience may have been underestimated and seen as rare.

Resilience has been identified as both a mediating and moderating factor between childhood trauma and the development of mental health disorders. Mediating factors refer to those which explain a relationship between two concepts and moderating factors refer to those which explain the strength of a relationship between two concepts (Fairchild & MacKinnon, 2009). Philippe et al. (2011) found that ego-resiliency, which is described as a "personality component" (p.585), had a partially mediating role between childhood trauma and anxiety, depression, and self-harm. The authors also found that this mediating relationship was much stronger for emotional abuse, emotional neglect, and physical neglect categories of trauma and much weaker for physical or sexual abuse categories of trauma. Resilience has been found to play both a partially mediating role (Ding et al., 2017; Vieira et al., 2020) and a moderating role (Ding et al., 2017; Wingo et al., 2010) between childhood trauma and

depressive symptoms. A systematic review of 22 studies was carried out by Fritz et al. (2018) to identify whether resilience factors moderated and/or mediated the relationship between childhood trauma and mental health disorders. They discussed that resilience is improved by resilience enhancing factors which have a positive effect on the adjustment process when an individual has experienced childhood trauma. Fritz et al. (2018) found that there were 20 out of 42 resilience enhancing factors which both moderated and/or mediated the relationship between childhood trauma and mental health disorders at the individual, family, and community level. Examples of these empirically supported resilience enhancing factors are; high mental flexibility, high distress tolerance, high self-esteem, low insecure attachment, high family cohesion, high positive parenting, high extended family support, and high social support. However, there has also been contrary evidence with resilience not found as a mediating factor. A longitudinal study by Ward et al. (2020) investigated whether resilience was a mediator between childhood trauma and depression for adults over 50 and there was no evidence that resilience was a mediating factor.

It is important to consider that although literature has supported the role of resilience as a mediator and/or moderator between childhood trauma and mental health disorders, this does not necessarily mean this is the only factor. Rutter (2013) commented that resilience can be developed by exposure to challenges when the individual is able to cope successfully, suggesting that additional factors, for example family support, can be important in mediating the relationship. The systematic review by Fritz et al. (2018) has gone some way to investigating these factors in more detail by breaking down the concept of resilience into separate resilience enhancing factors. However, the authors acknowledge that there is still uncertainty regarding to what extent these factors overlap in their prediction of overall resilience to mental health disorders.

## *Models of resilience*

Many studies have proposed theories and models regarding how resilience impacts on the relationship between childhood trauma and mental health disorders. Metzl and Morrell (2008) commented that there are four main categories of resilience model. The first relates to resilience being a stable characteristic or personality trait and there are various individual attributes associated with this, such as problem-solving skills and internal locus of control. The second category of model sees resilience as an outcome of an individual being able to positively adapt to difficult life events. Thus, resilience is seen as a type of adaptation. The third category of model combines aspects from both the first and second type of model and is often seen as being developed by Luthar (2003) as cited in Metzl and Morrell (2008). This model focuses more on processes which interact when an individual has experienced difficult life events. The fourth, and final, category of model sees resilience not on an individual level but on a cultural and community level, whereby an individual develops resilience in the context of their relationships and connections with others.

### *Multi-system model of resilience*

Although models of resilience have been proposed, Liu et al. (2017) commented that existing models were not able to fully capture the multidimensional nature of resilience. The authors introduced a new model, the multi-system model of resilience (MSMR) (Figure 1), which addressed limitations of previous models and reflects the dynamic process of resilience across the lifespan. The model has three layers and the authors commented that becoming resilient does not occur in isolation, instead it is an interactive process between the layers in the model.

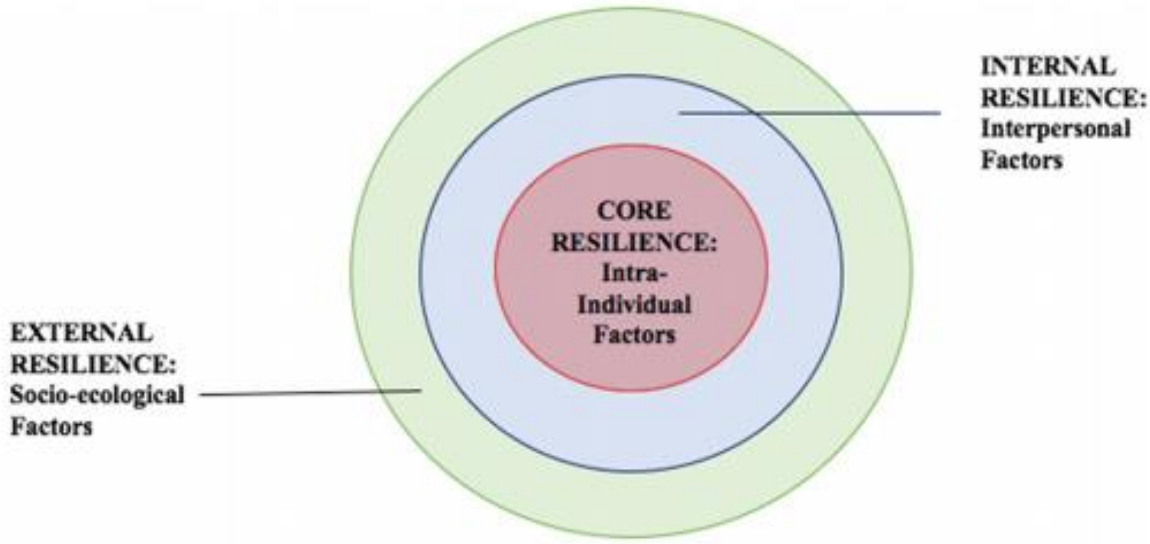


*Figure 1. Multi-system model of resilience; reproduced with permission from the authors (Liu et al., 2017)*

*Core resilience: Intra-individual factors*

These factors relate to those which come from the individual and could include aspects such as health, physiology and the systems which respond to trauma. The authors commented that often the physiological aspects of resilience have not been investigated extensively; however, as areas such as the HPA axis are indicated in trauma research, then it is important to understand the biological functioning related to resilience. Liu et al. (2017) state that to understand resilience more fundamentally, then physiological functioning could be explored further. Factors related to health behaviours are also included in the model, for example, diet, sleep, and exercise as these are often linked to improved wellbeing and resilience. Finally, the authors include genetic and demographic aspects such as age, ethnicity, and gender as these also relate to resilience. Overall, this layer of the model focuses on the stable characteristics throughout an individual's life which act as a foundation for subsequent processes which interact and facilitate resilience.

*Internal resilience: Interpersonal factors*

These factors relate to those which are developed over time or can be acquired and often are affected by others, for example, friends, family, and the interactions with them. Based on previous research, Liu et al. (2017) include factors such as coping style, autonomy, resourcefulness, and social competence. The factors tend to be similar in the way in which they positively correlate with adaptive outcomes; thus, are considered to reflect resilience. The authors commented on the need for these factors to be evaluated across events as resilience is not consistent over time.

*External resilience: Socio-ecological factors*

The authors commented that previous literature has failed to take into account the varied contexts in which an individual is part of during their life. The socio-ecological factors relate to both large-scale and community-based factors. They will include factors such as socioeconomic status and geographical location which can facilitate resilience throughout life. Within this layer is the consideration of an individual's access to these external factors, for example, healthcare, education, and social services. The community-based factors take into account aspects such as availability of support services within the community. The authors also commented on other relevant factors which may contribute to resilience such as perceived social status and cultural ideology. It is proposed that these external sources of resilience will interact with the previous two layers to determine outcomes and the way in which the individual functions.

## *Young adult mental health*

Studies have shown that adolescence and young adulthood is a crucial time in relation to mental health, with 75% of all mental health disorders first emerging before the age of 25

(Kessler et al., 2005; Murphy & Fonagy, 2012). Sadler et al. (2018) investigated the mental health of children and young people in England in 2017. The authors found that in 2017, 1 in 8 young people aged between 5 and 19 had a mental health disorder. Also, 1 in 20 in this age group had 2 or more mental health disorders. The authors also looked at the economic and family context related to mental health disorders. Those who lived in lower socioeconomic households tended to have higher levels of mental health disorders. Furthermore, 38.2% of young people living in the least healthily functioning family had a mental health disorder compared to 8.3% in the most healthily functioning family. Although the authors do not comment specifically on childhood trauma, they found that young people with a mental health disorder were more likely to have experienced a form of adversity in their lives, for example, parental separation.

A follow-up to this survey was conducted by Vizard et al. (2020). It was found that the rates of mental health disorders had increased with 1 in 6 young people aged 5 to 16 having a mental health disorder compared to 1 in 9 during 2017. It is important to note that this follow-up survey was conducted during the COVID-19 pandemic which could have affected the findings due to increased rates of mental health disorders experienced during this time period (Vindegaard & Benros, 2020). Dooley and Fitzgerald (2012) identified that between the ages of 12 to 25 there is a decrease in protective factors, for example, a reduction in self-esteem and positive coping strategies. Thus, this period of young adulthood is a vulnerable time as individuals may feel as though they are experiencing increased mental health difficulties with a reduced capacity to cope.

## *Present study*

The present study aims to explore the links between childhood trauma and a range of mental health disorders and wellbeing. As there have been studies which have found resilience to be

both a moderating and mediating factor, this study will investigate whether resilience mediates and/or moderates the relationship between childhood trauma and mental health disorders, specifically depression, anxiety, and PTSD. Furthermore, Mguni et al. (2012) identified that wellbeing is strongly associated with resilience and this should not be overlooked as the interactions between these two concepts can help us understand further what can help people cope and have improved outcomes. The study focuses on the area of young adult mental health, with participants ranging from 18 to 25 years old.

## *Research question*

This study aims to address the following question: *How is resilience associated with depression, anxiety, post-traumatic stress disorder (PTSD) and wellbeing for individuals who have experienced childhood trauma?* Secondary questions relate to possible links between gender, ethnicity, aspects related to trauma and mental health outcomes.

# Method

## *Ethics and Sampling*

The study was approved and sponsored by the University of Birmingham. Ethical approval for the study was granted by the University of Birmingham ethics committee (reference number: ERN_19-1631), please see Appendix A.

Participants were recruited through convenience sampling where individuals who were interested in participating used a web link or QR code to access the online system Qualtrics (Qualtrics, Provo, UT, USA) where they completed the study. The participants were able to volunteer for the study if they met the inclusion criteria (Table 1). Participants were excluded if they were not in the 18 to 25 age bracket or if they had not experienced a traumatic event prior to the age of 18 which occurred at least 1 month ago. If this was the case, then the Qualtrics system automatically generated a page which explained that they had not met the inclusion criteria. The study was advertised in a variety of ways including through social media (Facebook, Instagram, and Twitter) and posters in local community venues in the Birmingham area.

*Table 1. Inclusion criteria and rationale*

| Inclusion criteria | Rationale |
|---|---|
| **Aged between 18-25** | The study was focused on the area of young adult mental health. |
| **Experienced a traumatic event prior to the age of 18** | To explore the links between resilience and mental health for individuals who have experienced childhood trauma as there are often links between these experiences and mental health difficulties. To be eligible for the study the participants must have had at least one traumatic event. If a participant indicated that they had not experienced a traumatic event prior to 18 then the Qualtrics online system automatically ended the study at this point. |
| **The traumatic event must have been at least one month ago** | This timescale was used as it is in line with the DSM-5 diagnostic criteria which identifies that following a traumatic event there may be a period of up to one month in which individuals experience symptoms such as flashbacks and increased distress which is classed as Acute Stress Disorder (APA, 2013). Thus, the responses of participants may be influenced by this if their traumatic event was less than one month ago. |

## *Participants*

In total, 120 individuals accessed the Qualtrics online system, from which a total of 58 participants completed the study (48% participation rate). The average age of participants was 22.45 years (*SD* = 2.42). Figure 2 shows a breakdown of the points at which participants exited the survey.

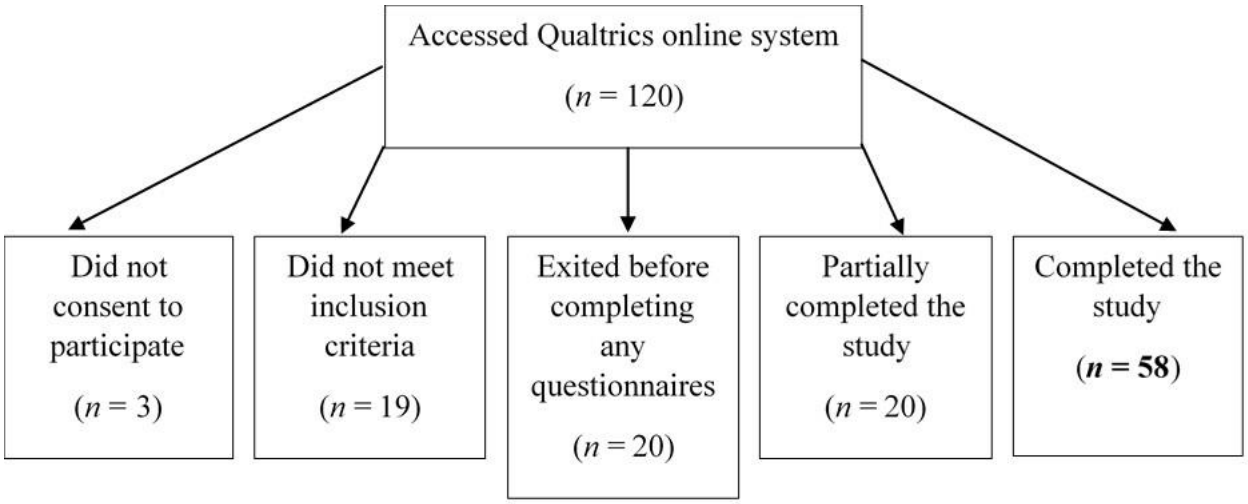


*Figure 2. Points at which participants exited the survey*

The 58 participants who completed the study consisted of 83% women (48 participants), 15% men (9 participants) and 2% who described their gender as 'other' (1 participant). Participants who completed the study came from a diverse range of ethnic backgrounds, employment types and levels of education (Table 2).

*Table 2. Ethnicity, employment status and education level of participants*

| | n and % of participants | | | | | |
|---|---|---|---|---|---|---|
| **Ethnicity** | **White (British/ Irish/ Other)** | **Asian/Asian British (Pakistani/ Indian/ Bangladeshi)** | **Black/Black British (African/ Caribbean)** | **Mixed/ multiple ethnic background or any other ethnic background** | | |
| | 43 (74%) | 8 (14%) | 4 (7%) | 3 (5%) | | |
| **Employment status** | **Student and employed** | **Employed full time** | **Student (not employed)** | **Unemployed** | **Employed part time** | **Self-employed** |
| | 20 (35%) | 17 (29%) | 14 (24%) | 4 (7%) | 2 (3%) | 1 (2%) |
| **Highest education level completed** | **Post-secondary education (e.g., A Levels)** | **Vocational qualification (e.g., BTEC, NVQ4)** | **Postgraduate degree (e.g., MA, MSc)** | **Undergraduate degree (e.g., BA, BSc)** | **Secondary education (e.g., GCSEs)** | |
| | 22 (38%) | 11 (19%) | 10 (17%) | 9 (16%) | 6 (10%) | |

53% of participants reported that they had been diagnosed with a mental health problem, with the most common being anxiety and/or depression. The other disorders which were self-reported by participants were: obsessive compulsive disorder, anorexia, PTSD, complex PTSD, post-natal depression, panic disorder, selective mutism, borderline personality disorder and social anxiety disorder. Overall, there was an even split between the participants in relation to having received psychological therapy, with 50% having had some form of therapy, most commonly Cognitive Behavioural Therapy (CBT). Other forms of therapy which were self -reported by participants were: counselling, Eye Movement Desensitisation

and Reprocessing (EMDR), psychotherapy, Dialectical Behaviour Therapy (DBT), schema therapy, family therapy, hypnosis, Neuro-linguistic Programming (NLP) and therapy within Child and Adolescent Mental Health Services (CAMHS). Finally, 33% of participants had received medical treatment which consisted of pharmacological (15 participants), inpatient (1 participant) or a combination of pharmacological and inpatient or home treatment interventions (3 participants).

## *Procedure*

Following ethical approval, the study was widely advertised using a recruitment strategy which targeted a community sample. This involved advertising the study in a range of locations in the local community within the Birmingham area and on social media platforms. If participants were interested in participating, they accessed the Qualtrics online system and completed the study online. All participants remained anonymous as they provided no identifiable information. Participants were given the right to withdraw from the study by a set date and could do this by contacting the researcher and providing a unique code. They were informed that after this set date, they would not be able to withdraw from the study as data would be analysed. No participants withdrew from the study.

## *Measures*

Participants completed questionnaires on the Qualtrics online system, which are described below in the order in which they were presented to participants. This order was selected so that information could be collected about current mental health symptoms initially prior to asking about traumatic experiences. It was thought that if questions were asked about traumatic experiences first then there was a possibility this could have affected responses on the mental health outcomes. The final questionnaire was related to resilience which was

placed at the end in order to finish on a positive note to consider the wellbeing of the participants.

*Demographic questionnaire*

This questionnaire was developed by the author and included questions on gender, age, ethnicity, employment status, the level of education completed, the level of education being studied currently (if applicable), previous mental health diagnoses and related psychological and pharmacological treatment.

*Depression: The Patient Health Questionnaire (PHQ-9)*

The PHQ-9 (Spitzer et al., 1999) is a 9-item questionnaire used to identify symptoms of depression. The PHQ-9 includes items such as: 'little interest or pleasure in doing things' and 'poor appetite or overeating'. The PHQ-9 is a measure which is relatively short and easy to use, and it has been found to have high internal consistency with studies finding Cronbach's α of 0.85 (Adewuya et al., 2006; Bian at al., 2011).

*Anxiety: Generalised Anxiety Disorder Scale (GAD-7)*

The GAD-7 (Spitzer et al., 2006) is a 7-item questionnaire used to identify symptoms of anxiety. The GAD-7 includes items such as: 'feeling nervous, anxious or on edge' and 'not being able to stop or control worrying'. This measure has been found to be valid, efficient and has high internal consistency with Cronbach's α of 0.92 (Spitzer et al., 2006).

*PTSD: The Impact of Events Scale-Revised (IES-R)*

The Impact of Events Scale (Horowitz et al., 1979) was revised to create the Impact of Events Scale-Revised (Weiss & Marmar, 1997) which is seen as a better reflection of the diagnostic criteria for PTSD. The IES-R is a 22-item questionnaire which measures PTSD symptoms

including intrusion, avoidance, and hyperarousal (Christianson & Marren, 2012). Example items include: 'any reminder brought back feelings about it' and 'I had trouble staying asleep'. The clinical cut off point for a probable diagnosis of PTSD is 33 and above (Creamer et al., 2003). The IES-R has been shown to have high internal consistency with Cronbach's α ranging from 0.79 to 0.96 (Creamer et al., 2003; Weiss & Marmar, 1997).

*Wellbeing: The Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS)*

The WEMWBS (Tennant et al., 2007) is a 14-item questionnaire which was developed by a group of experts in order to design a measure focusing on positive aspects of mental health and using only positively worded items. Example items include: 'I've been feeling good about myself' and 'I've been feeling close to other people'. The measure correlated highly with other measures of mental wellbeing. It was found to be a short and psychometrically robust scale, with high internal consistency - Cronbach's α of 0.89 and 0.91 and test-retest reliability of 0.83 (Tennant et al., 2007).

*Childhood trauma: The Trauma History Questionnaire (THQ)*

The THQ (Green, 1996) is a 24-item widely used questionnaire to determine the traumatic events an individual has experienced. Example items include: 'has anyone, including family members or friends, ever attacked you with a gun, knife or some other weapon?' and 'have you ever had a serious accident at work, in a car, or somewhere else?'. The THQ is applicable for a range of populations including the population surveyed in the present study, it assesses for events likely to be traumatic, and it has good cultural validity. The THQ has test-retest reliability ranging from 0.51 to 0.91 for the specific events asked about in the questionnaire (Green, 1996; Hooper et al., 2011; Norris & Hamblen, 2004).

*Resilience: Connor-Davidson Resilience Scale (CD-RISC)*

The CD-RISC (Connor & Davidson, 2003) is a 25-item questionnaire which determines an individual's level of resilience. Due to copyright, example items cannot be provided; however, questions are asked related to how people cope in difficult situations and about protective factors they may have. The CD-RISC has been found to have favourable psychometric ratings (Windle et al., 2011) and has been shown to be reliable and valid in various cultures (Karaırmak, 2010; Khoshouei, 2009; Singh & Yu, 2010; Yu & Zhang, 2007). The CD-RISC has high internal consistency with Cronbach's α of 0.89 and test-retest reliability of 0.87 (Connor & Davidson, 2003).

Table 3 shows a description of the scoring and score interpretation for each outcome measure.

*Table 3. Scoring and score interpretation of outcome measures*

| Outcome measure | Timescale | Scoring | Score range | Interpretation of score |
|---|---|---|---|---|
| **PHQ-9** | Responses based on how individuals have felt over the past two weeks | Score given based on how often they have experienced the symptom:<br>0 – not at all<br>1 – several days<br>2 – more than half the days<br>3 – nearly every day | 0 – 27 | 0 - 4 minimal levels of depression<br>5 - 9 mild depression<br>10 - 14 moderate depression<br>15 - 19 moderately severe depression 20 - 27 severe depression |
| **GAD-7** | Responses based on how individuals have felt over the past two weeks | Score given based on how often they have experienced the symptom:<br>0 – not at all<br>1 – several days<br>2 – more than half the days<br>3 – nearly every day | 0 – 21 | 0 - 4 minimal levels of anxiety<br>5 - 9 mild anxiety<br>10 - 14 moderate anxiety<br>15 - 21 severe anxiety |
| **IES-R** | Responses based on how individuals have felt during the past week in respect to the traumatic event(s) that have occurred | Score given based on how often they have experienced the symptom:<br>0 - not at all<br>1 - a little bit<br>2 - moderately<br>3 - quite a bit<br>4 – extremely | 0 – 88 | Higher scores indicate higher levels of PTSD<br>33 and above is the clinical cut off for probably diagnosis of PTSD |
| **WEMWBS** | Responses based on how individuals have felt over the past two weeks | Score given based on how often they have felt that way:<br>1 - none of the time<br>2 - rarely<br>3 - some of the time<br>4 - often<br>5 - all of the time | 14 – 70 | Higher scores indicate higher levels of wellbeing |
| **THQ** | Individuals answer based on their lifetime experience of the traumatic events | Score based on occurrence of the traumatic event:<br>Yes or no<br>Frequency of the traumatic event<br>Age(s) at which it occurred | 0 – 24 | A higher score indicates more traumatic events have been experienced |
| **CD-RISC** | Responses based on how individuals have felt over the past month | Score given based on whether the statement is:<br>0 - not true at all<br>1 - rarely true<br>2 - sometimes true<br>3 - often true<br>4 - true nearly all the time | 0 – 100 | Higher scores indicate higher levels of resilience |

## *Analytic method*

The distribution of the outcome variables was assessed for deviation from normality using the one-sample Kolmogorov-Smirnov test. Only the THQ and the frequency of traumas showed significant deviation from distributional assumptions (Table 4). For these variables, where appropriate, the conclusions from parametric analyses were verified using the non-parametric equivalent of the analysis. In this case, there were no differences in the overall conclusions found when using parametric and non-parametric tests; thus, only parametric tests are reported.

*Table 4. Tests of distributional assumptions*

| | PHQ-9 | GAD-7 | IES-R | WEMWBS | THQ | Age at first trauma | Frequency of traumas | CD-RISC |
|---|---|---|---|---|---|---|---|---|
| **Test statistic** | .09 | .09 | .12 | .08 | .19 | .12 | .31 | .07 |
| **P value** | .72 | .77 | .37 | .81 | .03* | .39 | .00* | .91 |

Please note: * denotes a significant difference at p<. 05

### *Descriptive statistics and t-test differences*

Descriptive statistics were used to describe and explore the data. T-tests were used to identify whether there were differences between participants with regards to, gender, ethnicity and whether they had received psychological therapy or not.

### *Correlation*

Correlation analysis is used to identify the strength and direction of an association between two variables (Gogtay & Thatte, 2017). To explore relationships between variables, the data were analysed (using Pearson correlation) to ascertain if there were correlations between aspects related to trauma (THQ, age at first trauma, frequency of traumas) and the mental health outcomes (PHQ-9, GAD-7, IES-R and WEMWBS).

*Moderator and mediator analysis*

Bennett (2000) stated that mediator and moderator variables are able to provide information about the relationship between independent variables and outcome variables. In this present study the analyses explored whether the mediator variable (resilience) explained how the association occurs between the independent (childhood trauma) and outcome variables (mental health outcomes); also, whether the moderator variable (resilience) affected the strength or direction of the association between independent (childhood trauma) and outcome variables (mental health outcomes). Thus, a mediation analysis was carried out to determine whether resilience mediated the relationship between childhood trauma and mental health outcomes. Then a moderation analysis was carried out to determine whether resilience moderated the relationship between childhood trauma and mental health outcomes. It is important to note that moderation and mediation analyses were only carried out on the variables which had evidenced an established statistical association.

# Results

## *Descriptive statistics*

Table 5 depicts the descriptive statistics for the aspects of trauma and the mental health related outcomes. Means and standard deviations are shown for each outcome in addition to the minimum and maximum scores. It also shows the skewness and kurtosis which relate to the distribution of the data. Skewness indicates the lack of symmetry and kurtosis indicates the level of outliers in the data set relative to a normal distribution. Skew and kurtosis values of 0 would indicate normal distribution (Kim, 2013).

*Table 5. Descriptive statistics for mental health outcomes and aspects of trauma*

| | Mean | SD | Minimum score | Maximum score | Skewness | Kurtosis |
|---|---|---|---|---|---|---|
| **THQ** | 3.67 | 1.98 | 1 | 9 | 0.69 (*SE* = 0.31) | -0.23 (*SE* = 0.62) |
| **Age at first trauma** | 11.19 | 4.18 | 1 | 17 | -0.32 (*SE* = 0.31) | -0.88 (*SE* = 0.62) |
| **Frequency of traumas** | 9.83 | 17.85 | 1 | 109 | 3.90 (*SE* = 0.31) | 17.62 (*SE* = 0.62) |
| **PHQ-9** | 11.16 | 6.59 | 0 | 25 | 0.13 (*SE* = 0.31) | -0.91 (*SE* = 0.62) |
| **GAD-7** | 10.00 | 5.89 | 0 | 21 | 0.18 (*SE* = 0.31) | -0.88 (*SE* = 0.62) |
| **IES-R** | 33.28 | 22.20 | 0 | 78 | 0.12 (*SE* = 0.31) | -0.99 (*SE* = 0.62) |
| **WEMWBS** | 43.21 | 9.34 | 22 | 68 | 0.19 (*SE* = 0.31) | 0.69 *(SE* = 0.62) |
| **CD-RISC** | 61.48 | 18.09 | 21 | 98 | -0.24 (*SE* = 0.31) | -0.32 (*SE* = 0.62) |

Table 5 shows that the mean score for childhood trauma (THQ) was 3.67 which indicates that participants had experienced over 3 categories of trauma prior to the age of 18. Furthermore, on average, these traumas were first experienced at the age of 11.19 and occurred 9.83 times. The mean scores for mental health outcomes indicated that participants were experiencing moderate levels of depression (PHQ-9) and moderate levels of anxiety (GAD-7). The mean PTSD scores (IES-R) were above the clinical cut off point for a probable diagnosis. The

possible total score for wellbeing (WEMWBS) ranges from 14 to 70. In terms of resilience (CD-RISC), the possible total score ranges from 0 to 100.

As can be seen from Table 5 many of the mental health and trauma related outcome show extreme scores for skew and kurtosis as compared to a value of 0 which indicates normal distribution. Therefore, bootstrapped standard error and significance tests (with 1000 resamples) were used wherever possible as the bootstrap procedure for estimating variation and significance does not rely on parametric assumptions (Wright & Herrington, 2011).

The data were explored in relation to the different categories of trauma experienced by the participants. 90% of participants (52 participants) had experienced 2 or more categories of trauma and 10% (6 participants) had experienced 1 category of trauma. Following data collection, the author reviewed the THQ and assigned categories of trauma based on the responses given by participants. The categories of trauma reported were emotional abuse or neglect, sexual assault/abuse, physical assault/abuse, bereavement/serious illness of a close person, serious illness/injury/accident, parental separation, mugging/robbery/home break-in, fear of being seriously injured/killed, man-made disaster, stalking, and terrorist attack. Table 6 shows the percentage of participants who reported experiencing the different categories of trauma and the gender differences. Please note that as the majority of participants experienced 2 or more categories of trauma, percentages are not totalled out of 100%.

*Table 6. Categories of trauma reported and gender differences*

| | n and % of participants who reported this category (58 participants) | n and % of women who reported this category (48 participants) | n and % of men who reported this category (9 participants) | n and % of 'other' gender who reported this category (1 participant) |
|---|---|---|---|---|
| **Emotional abuse or neglect** | 16 (28%) | 14 (29%) | 1 (11%) | 1 (100%) |
| **Physical abuse/ assault** | 13 (22%) | 9 (19%) | 4 (44%) | 0 |
| **Sexual abuse/ assault** | 23 (40%) | 21 (44%) | 1 (11%) | 1 (100%) |
| **Serious illness/ injury/ accident** | 14 (24%) | 12 (25%) | 2 (22%) | 0 |
| **Bereavement/ serious illness of a close person** | 24 (41%) | 18 (38%) | 5 (56%) | 1 (100%) |
| **Mugging/ robbery/ home break-in** | 22 (38%) | 16 (33%) | 5 (56%) | 1 (100%) |
| **Parental separation** | 10 (17%) | 9 (19%) | 1 (11%) | 0 |
| **Fear of being seriously injured/ killed** | 3 (5%) | 3 (6%) | 0 | 0 |
| **Man-made disaster** | 3 (5%) | 3 (6%) | 0 | 0 |
| **Stalked** | 1 (2%) | 1 (2%) | 0 | 0 |
| **Terrorist attack** | 1 (2%) | 1 (2%) | 0 | 0 |

## *Relationship between gender and ethnicity to mental health outcomes and aspects of trauma*

The data were analysed using a t-test to identify whether there were any significant differences between men and women for the mental health outcomes or the aspects of trauma. Please note that although there was an 'other' category for gender, it was not possible to include these data in the analysis as there was only 1 participant in this category.

*Table 7. Descriptive statistics and t test differences between gender and mental health outcomes and aspects of trauma*

| | Women | | Men | |
|---|---|---|---|---|
| | **Mean** | **SD** | **Mean** | **SD** |
| **THQ** | 3.58 | 1.94 | 3.89 | 2.21 |
| **Age at first trauma** | 11.02 | 4.15 | 12.89 | 3.66 |
| **Frequency of traumas** | 10.63 | 19.36 | 4.22 | 3.03 |
| **PHQ-9** | 11.19 | 7.03 | 9.89 | 2.09 |
| **GAD-7** | 10.44 | 5.87 | 6.44 | 3.68 |
| **IES-R** | 33.50 | 22.52 | 29.89 | 21.66 |
| **WEMWBS** | 43.58 | 9.95 | 42.33 | 5.03 |

Table 7 shows the gender differences for mental health and aspects of trauma. No statistically significant differences were found on any of the variables between women and men. However, the female participants showed a trend towards poorer mental health with higher scores on the PHQ-9, GAD-7 and IES-R.

The data were also analysed using a pairwise t-test and the Bonferroni correction to identify whether there were any significant differences between ethnicities for the mental health outcomes or the aspects of trauma.

*Table 8. Descriptive statistics and t test differences between ethnicity and mental health outcomes and aspects of trauma*

| | Asian/Asian British (Pakistani/ Indian/ Bangladeshi) | | Black/Black British (African/ Caribbean) | | Mixed ethnic background/ any other ethnic background | | White (British/ Irish/ Other) | |
|---|---|---|---|---|---|---|---|---|
| | **Mean** | **SD** | **Mean** | **SD** | **Mean** | **SD** | **Mean** | **SD** |
| **THQ** | 3.38 | 2.45 | 5.25 | 1.26 | 4.67 | 3.22 | 3.51 | 1.83 |
| **Age at first trauma** | 14.75* | 2.25 | 6.50* | 2.65 | 10.67 | 3.79 | 11.00 | 4.14 |
| **Frequency of traumas** | 4.75 | 4.53 | 11.75 | 6.99 | 9.00 | 7.00 | 10.65 | 20.42 |
| **PHQ-9** | 9.00 | 6.82 | 5.75 | 5.06 | 9.67 | 4.16 | 12.16 | 6.60 |
| **GAD-7** | 8.25 | 6.65 | 10.00 | 3.83 | 7.00 | 6.00 | 10.54 | 5.95 |
| **IES-R** | 24.63 | 20.08 | 24.00 | 20.35 | 38.33 | 26.35 | 35.40 | 22.59 |
| **WEMWBS** | 44.88 | 12.82 | 46.50 | 4.36 | 44.00 | 8.54 | 42.54 | 9.17 |

Please note: * denotes a significant difference at $p < .05$

As shown by Table 8 there were no significant differences between the scores on the THQ, frequency of traumas, PHQ-9, GAD-7, IES-R or WEMWBS for participants of different ethnicities. However, it was found that the participants identifying as Asian/Asian British

were significantly older and participants identifying as Black/Black British were significantly younger when they experienced their first trauma than the participants identifying as White and mixed ethnic background/any other ethnic background.

## *Impact of psychological therapy*

The data were analysed using a t-test to explore whether there were differences for participants who had received psychological therapy and those who had not in relation to the mental health outcomes.

*Table 9. Descriptive statistics and t test differences between participants who have and have not had therapy*

| | Psychological therapy | N | Mean | SD | p value |
|---|---|---|---|---|---|
| **PHQ-9** | No | 29 | 8.97 | 6.43 | 0.01* |
| | Yes | 29 | 13.34 | 6.08 | |
| **GAD-7** | No | 29 | 7.45 | 5.26 | 0.001* |
| | Yes | 29 | 12.55 | 5.42 | |
| **IES-R** | No | 29 | 30.55 | 23.03 | 0.36 |
| | Yes | 29 | 36.00 | 21.39 | |
| **WEMWBS** | No | 29 | 45.41 | 9.70 | 0.07 |
| | Yes | 29 | 41.00 | 8.57 | |
| **CD-RISC** | No | 29 | 68.97 | 16.32 | 0.001* |
| | Yes | 29 | 54.00 | 16.84 | |

Please note: * denotes a significant difference at $p < .05$

As can be seen from Table 9 the participants who had received psychological therapy had significantly higher scores for depression (PHQ-9) and anxiety (GAD-7) and significantly lower scores for resilience (CD-RISC). There were no significant differences found for the PTSD (IES-R) or wellbeing (WEMWBS) outcomes.

## *Relationships between mental health outcomes and aspects of trauma*

A series of inter-correlations were carried out to explore relationships between the outcome measures of mental health and the aspects of trauma. The Pearson r correlation matrix using the bootstrapped significance test is shown in Table 10.

*Table 10. Intercorrelations between mental health outcomes and aspects of trauma*

| | THQ | Age at first trauma | Frequency of traumas | PHQ-9 | GAD-7 | IES-R | WEMWBS |
|---|---|---|---|---|---|---|---|
| **THQ** | 1 | - | - | - | - | - | - |
| **Age at first trauma** | -.30* | 1 | - | - | - | - | - |
| **Frequency of traumas** | .35** | -.23 | 1 | - | - | - | - |
| **PHQ-9** | .09 | -.12 | .23 | 1 | - | - | - |
| **GAD-7** | .20 | -.32* | .20 | .68** | 1 | - | - |
| **IES-R** | .31* | -.12 | .37** | .69** | .48** | 1 | - |
| **WEMWBS** | -.01 | -.06 | -.15 | -.68** | -.53** | -.39** | 1 |

Please note: * denotes the correlation is significant at $p < .05$
** denotes the correlation is significant at $p < .01$

As can be seen from Table 10 there were significant positive associations found between IES-R and THQ score ($r = 0.31$), and IES-R and frequency of traumas ($r = 0.37$). There were significant negative associations found between the WEMWBS and PHQ-9 ($r = -0.68$), GAD-7 ($r = -0.53$) and IES-R ($r = -0.39$). Also, there was a significant negative association found between the GAD-7 and age of first trauma ($r = -0.32$). There were also significant associations found between outcomes within the mental health and trauma related categories, for example, PHQ-9 and GAD-7; THQ score and frequency of traumas.

## *Relationship between childhood trauma and mental health outcomes*

The correlation analysis reported in Table 10 was used to determine whether childhood trauma (THQ) was associated with mental health (PHQ-9, GAD-7, IES-R) and wellbeing (WEMWBS) outcomes. As shown in Table 10 the only significant positive association was between the THQ and IES-R ($r = .31$, $p = 0.05$). Thus, given an established relationship between the THQ and the IES-R, moderation and mediation analyses were carried out only on these variables.

### *Mediation and moderation analyses between childhood trauma and PTSD*

The mediation and moderation analyses were calculated using the SPSS PROCESS procedure (models 1 and 4) and bootstrap estimation of the indirect effects. Bootstrap estimation was used as it does not rely on theoretical assumptions regarding distribution; also, it is robust to smaller sample sizes (Boos, 2003). Figure 3 shows the mediation and moderation analyses which were carried out. Plot A describes the direct effect of childhood trauma on adult PTSD, plot B is the effect of childhood trauma on adult PTSD mediated by resilience and plot C is the effect of childhood trauma on adult PTSD moderated by resilience. Please note that for the purpose of these analyses, resilience was reverse scored; thus, a lower score on the CD-RISC indicated a higher overall level of resilience.

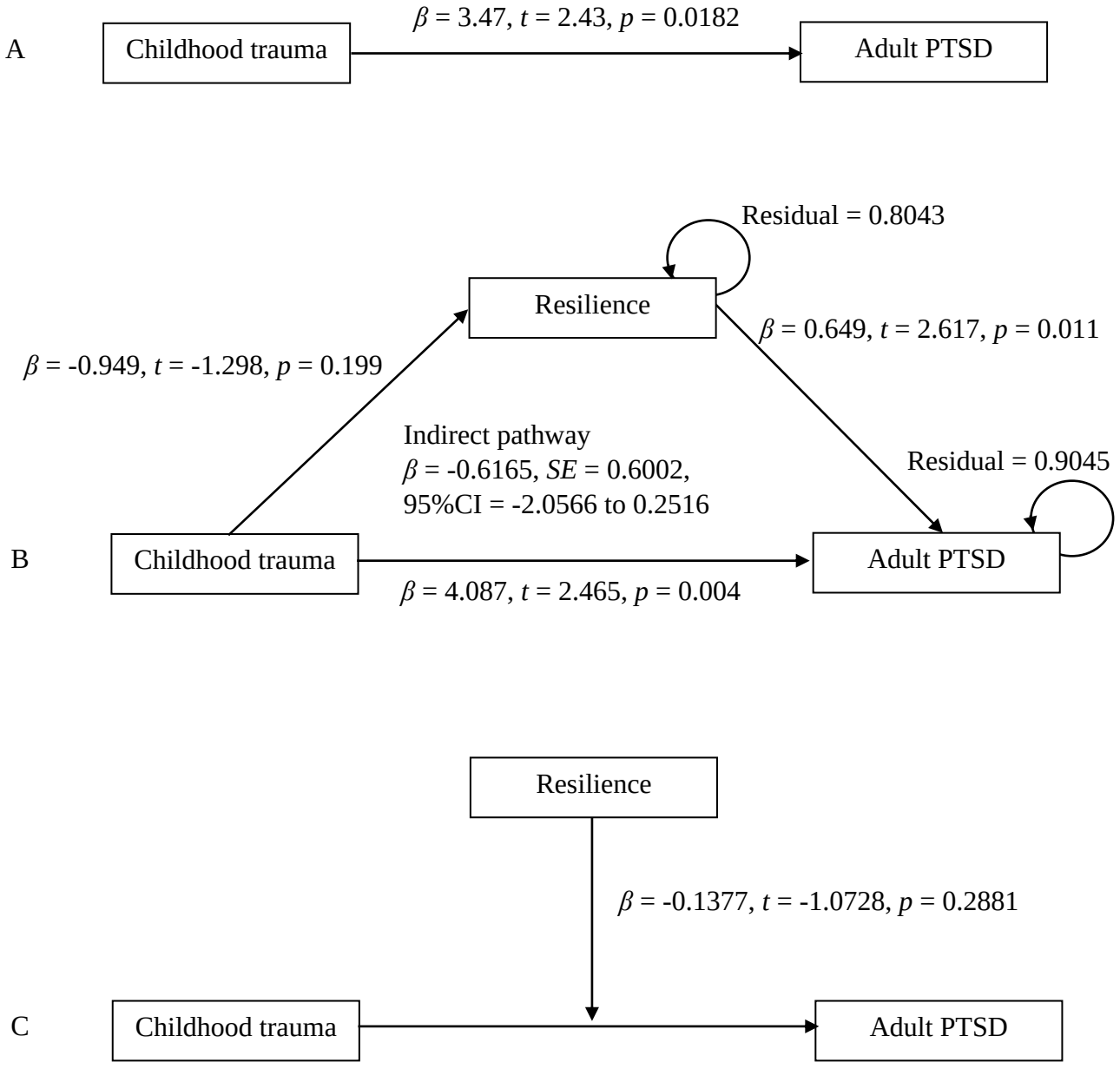


*Figure 3. Mediation and moderation analyses between childhood trauma and adult PTSD, resilience is reverse scored*

As can be seen from Figure 3 plot A the direct effect of childhood trauma on adult PTSD evidenced statistical significance ($t$ = 2.43, $p$ = .02). In plot B, the mediation analysis, the relationship between childhood trauma and adult resilience was not statistically significant ($t$ = -1.30, $p$ = .20); however, the relationship between adult resilience and adult PTSD did evidence a significant association ($t$ = 2.62, $p$ = .01). The total effect for the indirect

pathway was not statistically significant ($\beta$ = -0.62, 95%CI -2.06 to 0.25). Therefore, the mediated pathway was not supported by these data.

The moderator model was also calculated (see Figure 3 plot C), in which resilience changes the strength of the relationship between childhood trauma on adult PTSD. A moderation analysis was carried out to determine whether the relationship between childhood trauma (THQ) and adult PTSD (IES-R) was moderated by resilience (CD-RISC) using the SPSS PROCESS procedure. For a moderation effect to be statistically significant then the main effect for the moderator and the interaction must both be significant. For the model described in Figure 3 plot C, the interaction between the moderator (resilience) and the THQ was not statistically significant ($t$ = -1.07, $p$ = 0.29); therefore, the moderation model is not supported by these data.

Subsequently, a multiple regression was carried out to investigate whether resilience and childhood trauma could significantly predict adult PTSD. The results of the regression indicated that the model explained 20% of variance and the model was a significant predictor of adult PTSD, $F(2, 55) = 6.97$, $p$ = .002. Resilience contributed significantly to the model ($\beta$ = -.41, $p$ = .009) as well as childhood trauma ($\beta$ = 4.18, $p$ = .004). Please note, resilience was not reverse scored in the multiple regression. This model is depicted in Figure 4.

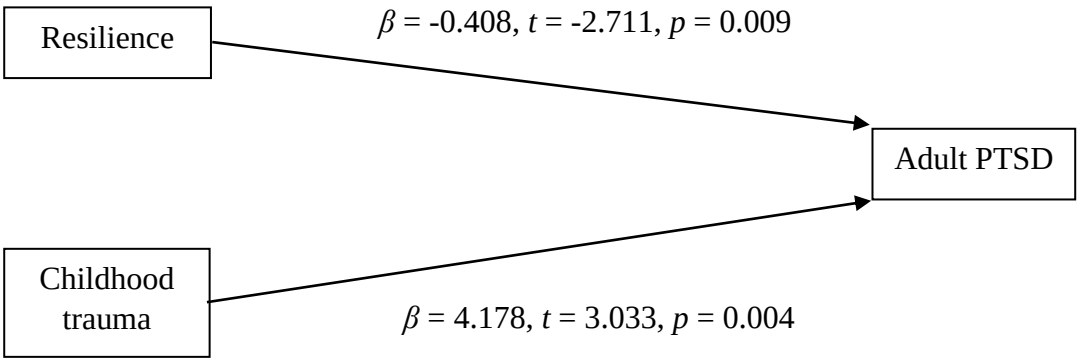


*Figure 4. Regression of resilience and childhood trauma to adult PTSD*

The results of the mediation and moderation analysis suggest that the most appropriate model for the relationship between childhood trauma, resilience and adult PTSD is one in which resilience and childhood trauma have an independent contribution to adult PTSD (multiple regression model).

# Discussion

This study aimed to investigate the associations between childhood trauma, depression, anxiety, PTSD, wellbeing, and resilience for individuals aged 18 to 25. Childhood trauma was significantly associated with PTSD but not depression, anxiety, or wellbeing. It was found that resilience was neither a moderating or mediating factor between childhood trauma and adult PTSD; however, both childhood trauma and resilience have an independent contribution to adult PTSD. There was a significant negative association between age of first trauma and anxiety; also, there were significant differences between ethnicities related to the age of first trauma. No significant gender differences were found on any of the aspects related to trauma or mental health outcomes.

There were significant positive associations found between the THQ (childhood trauma) and the IES-R (PTSD); however, there were no significant associations found between the THQ and PHQ-9 (depression), GAD-7 (anxiety) or WEMWBS (wellbeing). Thus, when exploring whether resilience was a mediating or moderating factor between childhood trauma and depression, anxiety, PTSD, and wellbeing, only the IES-R was included in the analysis. Resilience was not found to mediate or moderate the relationship between childhood trauma and PTSD, or in other words, it did not explain or affect the strength of the relationship between these two concepts. To explore potential explanations for these findings, the multi-system model of resilience (MSMR) by Liu et al. (2017) which describes the way in which resilience is developed has been considered. The model proposes that resilience is developed through a process involving biological, relational, and cultural factors. It could be that factors related to childhood trauma (for example, the impact of trauma on brain development) are not conducive to the development of resilience

as described by the MSMR. Thus, resilience may not affect the relationship between childhood trauma and PTSD because it is more difficult for individuals who have experienced childhood trauma to develop resilience and they may have lower levels of resilience overall. Thus, although resilience has been reported in previous literature as being a moderating and/or mediating factor between childhood trauma and adult mental health disorders, it could be argued that individuals who have experienced childhood trauma may have lower levels of resilience overall and, as such, resilience is not able to have an effect on the relationship between childhood trauma and PTSD. For example, Mersky and Topitzes (2010) as cited in Widom (2014) found that from a sample of 18- to 24-year-olds, 15.7% of the participants who experienced childhood trauma were resilient compared to nearly 40% of the participants who had not experienced childhood trauma. Furthermore, Flores et al. (2005) found Latino children who had experienced trauma had fewer areas of resilient functioning.

Another potential explanation for the findings of the present study relates to the categories of trauma experienced by the participants. Philippe et al. (2011) found that although ego-resiliency mediated the relationship between emotional abuse, physical neglect, emotional neglect and depression, anxiety, and self-harm; it was not found to be a mediator in the case of sexual abuse or physical abuse. In the present study 62% of participants had experienced sexual or physical abuse; thus, it may be that for these categories of childhood trauma, resilience does not provide as strong a protective function as it may do for other categories of childhood trauma.

The multiple regression model which seems to be the most strongly supported in this present study suggests that resilience and childhood trauma both have independent contributions to adult PTSD as opposed to resilience explaining or affecting the strength of

the relationship. Thus, it seems as though resilience should be seen as one factor which has an impact on adult mental health difficulties instead of the only factor. Studies have shown support for a range of factors which can offer a protective function against developing adult mental health difficulties following childhood trauma. Hopfinger et al. (2016) found that emotion regulation significantly mediated the relationship between childhood trauma and depression severity. Furthermore, Lagdon et al. (2021) found social support, in particular family support, to significantly mediate the relationship between childhood trauma and PTSD, depression, and anxiety. Thus, this literature in addition to the findings from this present study seem to indicate the need for further research into resilience and other factors such as social support and emotional regulation as potential protective factors for mental health problems for individuals who have experienced childhood trauma.

There were positive associations found between childhood trauma and the frequency of traumas with PTSD symptoms. This is in line with previous findings such as Vranceanu et al. (2007) who found that childhood multi-type trauma was directly predictive of PTSD symptoms in adulthood. A longitudinal study by Lewis et al. (2019) found that from a sample of 2232 children born in England and Wales, a third had experienced trauma and a quarter of these individuals went on to develop PTSD by the age of 18. The authors found that the prevalence of PTSD was highest for those who had experienced direct interpersonal assault or threat, especially sexual or physical assault. This seems to be in line with the findings of this study as the majority of participants had experienced direct interpersonal assault or threat.

Contrary to the initial hypothesis, similar associations were not found between childhood trauma and depression or anxiety. Many previous studies have found these links, for example, Mandelli et al. (2015) conducted a meta-analysis of 26 studies and found neglect

and emotional abuse to be significantly associated with depression. This has been further supported by a more recent, large scale meta-analysis of 192 studies by Humphreys et al. (2020) who found that higher childhood trauma scores were significantly associated with depression. As with the previous meta-analysis, they also found that emotional abuse and emotional neglect had the strongest associations with depression. The fact that the present study did not find significant associations between childhood trauma and depression could be explained in terms of the type of trauma that the participants had experienced, as only 28% reported emotional abuse or neglect and, as identified, these types of trauma have often been found to be most closely linked to depression. In terms of anxiety, this has also been linked to childhood trauma, with a meta-analysis finding that individuals who experienced childhood trauma were 2.7 times more likely to experience anxiety disorders in adulthood than those who had not experienced childhood trauma (Li et al., 2016).

A further finding of this study was that when participants experienced their first trauma at a younger age, they had higher anxiety levels. Research has indicated that the HPA axis can be prone to acute stress dysregulation when trauma is experienced in infancy (Kuhlman et al., 2015). The findings of this present study support the work of Watts-English et al. (2006) who identified the more significant impact on brain development when trauma was experienced at a younger age. The findings in this case suggest that a younger age at which trauma is experienced could be a risk factor for increased anxiety levels.

Gender differences were explored in this study in relation to the trauma and mental health outcomes. There were no significant differences found; however, the data showed that, on average, females were younger at their first trauma, experienced more frequent traumas and scored higher on all mental health outcomes including wellbeing. Olff et al. (2007)

reported that women are consistently found to have higher rates of PTSD. One explanation suggested is that women are more likely to experience interpersonal assaults, such as sexual assault, which have the highest probability of the individual developing PTSD. In the present study it was found that 44% of females had experienced sexual assault and 19% had experienced physical assault; meaning that the majority of females in this study (63%) had experienced interpersonal trauma of a physical and/or sexual nature. This differed from the data for males in this study as it was found that 44% had experienced physical assault and 11% had experienced sexual assault. Thus, the proportion of females experiencing sexual assault was higher than for males. This seems to link to other literature in this area which suggests that females experience higher levels of sexual trauma (Olff et al., 2017). Olff et al. (2017) also discuss the age at which individuals experience their first trauma as having an impact on the development of PTSD. The authors stated that it has been found that females have higher rates of PTSD than males when exposed to traumatic events in childhood as opposed to after the age of 15. However, the authors discussed that exposure to trauma of an intense or prolonged nature in childhood is detrimental for both males and females as the brain is undertaking key stages of development and the neurobiology of the individual can be affected, supported by Kuhlman et al. (2015) discussed previously. The average age of first trauma for females was approximately 11 and for males was approximately 13; however, this difference was not significant.

Another area explored was the ethnicity of participants and whether this was related to the mental health related outcomes. There were no significant differences found between ethnicities for the mental health or wellbeing outcomes. This finding is similar to that of a large-scale study looking at the prevalence of anxiety and depression in different ethnic groups in England. It was found that there were some significant differences between the

ethnic groups for rates of anxiety and depression, but these were only in age groups above 35 (Weich et al., 2004). Thus, as the present study only included participants from age 18 to 25, this seems to fit with the findings reported by Weich et al. (2004).

The impact of receiving psychological therapy was explored in relation to the mental health outcomes. Interestingly, participants had higher levels of depression and anxiety and lower levels of resilience when they had received therapy. This could lead to questions regarding the effectiveness of the psychological therapy received but it also seems to highlight that the higher levels of mental health problems and lower levels of resilience for these participants could have been what led them to seek therapy. This has been found in previous research, for example, Schomerus et al. (2013) found that more severe depression and lower levels of resilience were associated with help-seeking. Furthermore, the data collected is not specific in relation to when the therapy occurred, as such, the participants could have been receiving therapy at the time of completing the study.

An important issue of note and a possible explanation for findings in this study is that during the completion of this study, there was a worldwide pandemic of COVID-19. Research showed that this had a detrimental effect on people's mental health. A systematic review of 43 studies carried out by Vindegaard and Benros (2020) found that participants with pre-existing psychiatric symptoms reported that these worsened and participants from the general population had lower psychological wellbeing and higher levels of depression and anxiety as compared to before COVID-19. These issues may have had an impact on the findings of this study as the scores on the mental health outcomes could have been higher and scores on the wellbeing outcome lower than they may have been prior to the COVID-19 pandemic. In addition to the impact that COVID-19 may have had on the self-reported mental health outcomes, it may have also affected the level of participation in the

study. It could have been that people who were eligible for the study may not have volunteered as they did not want to engage in thinking about a time in their life which was distressing, given that the COVID-19 pandemic was an extremely difficult and distressing time. Furthermore, due to the increased use of online communication methods during COVID-19, it could have been that a fatigue of online interaction impacted on the level of participation with an online study.

### *Strengths and limitations*

A strength of this study was the recruitment from a community as opposed to clinical population. Bonanno (2004) identified that much of the literature regarding the way in which people cope with trauma has been developed from those who have experienced significant difficulties and received treatment. Thus, levels of resilience in the population may have been underestimated. Furthermore, by collecting data from a community sample, it allows for participants to be included who are not experiencing current mental health difficulties. This enabled the data to be analysed in relation to the varying levels of mental health difficulties and wellbeing of participants in the sample.

It has been identified that the THQ includes items which could be deemed stressful but unlikely traumatic (Norris & Hamblen, 2004). However, the participants who volunteered for the study specified that they had experienced a traumatic event prior to the age of 18. Thus, the events recorded on the THQ have been experienced as traumatic by the individual. Research has found that a key element which makes an event traumatic is the way in which the individual perceives the experience, particularly that the event is extremely negative, uncontrollable, and sudden (Carlson & Dalenberg, 2000).

The present study used a cross-sectional design whereby participants were asked about their levels of resilience, mental health, wellbeing, and experiences of childhood trauma at one time point. The limitations of using this design include difficulties in making any causal inferences and the results only represent one time point, as different results may have been found at other time points (Levin, 2006). Furthermore, Liu et al. (2017) identify that measuring resilience at one time point is problematic due to the changing nature of resilience across the lifespan.

## *Clinical implications*

- Experiencing childhood trauma, especially if this is more frequent, is associated with PTSD in adulthood. This has implications for the provision of psychological therapy in both child and adult services in order to support individuals who have had these experiences.
- There were gender differences found for interpersonal trauma, with the prevalence of sexual abuse/assault higher for women and the prevalence of physical abuse/assault higher for men. This indicates that it is important to consider a range of factors, including gender and the nature of the trauma experienced, when delivering interventions.
- Resilience did not moderate or mediate the relationship between childhood trauma and PTSD, instead, this study supports the idea that resilience has an independent effect on adult PTSD but is not the sole contributing factor; thus, when focusing on strengthening protective factors for mental health difficulties, this should be done in a holistic way instead of focusing on one aspect.
- Due to the established links between childhood trauma and PTSD, preventative measures as opposed to solely reactive measures, such as psychological therapy,

seem to be indicated. It would seem as though interventions, particularly to support parents, could go some way to reducing the risk of experiencing trauma. Previous research (Siverns & Morgan, 2019; Wurtele & Kenny, 2010) has also highlighted the benefit of professionals supporting parents and offering parent education programmes to help prevent childhood trauma.

## *Future research*

The findings from this study indicate the need for further research into the various factors, such as resilience and social support, which may be able to offer a protective function for mental health difficulties for individuals who have experienced childhood trauma. It would be interesting for future research to consider whether these factors have a mediating and or/moderating effect if they are investigated in an integrated way as opposed to in isolation as has been done in the present study. Future research could lead on from the MSMR (Liu et al., 2017) which is an integrated model and identifies the numerous factors which can lead to an individual becoming resilient. Thus, it seems as though investigating the many factors which impact on adult mental health difficulties is key, as they may also be multifaceted in nature. Future research could also address the methodological limitations identified in this study with using a cross-sectional design. For example, a longitudinal study could help to understand the changing nature of resilience and other protective factors, such as social support, across the lifespan instead of at one time point.

## *Conclusion*

This study found that although resilience did not mediate or moderate the relationship between childhood trauma and adult mental health difficulties, it has an independent effect

on PTSD. Future research could help to identify the multiple factors, and the interactions between them, which offer a protective function against mental health difficulties.

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# Press Release

# Literature Review: The effectiveness of resilience interventions in increasing resilience and reducing symptomatology for University students: a meta-analysis

A rethink of resilience interventions for University students is needed, given the recent evidence from a meta-analysis. This meta-analysis evaluated the effectiveness of resilience interventions in increasing resilience and reducing mental ill-health symptomatology for University students; a group which has been identified as having high prevalence rates of mental health problems (MHFA England, 2020) and a relatively low level of help seeking (Brown, 2018). The findings showed that although statistically significant effect sizes were found, these were negligible and small, indicating that the way in which resilience interventions are being delivered currently has not been found to be strongly efficacious for University students.

Although there is still some debate within the literature regarding an agreed definition of resilience (Yoon et al., 2020), it has been defined as the ability to bounce back from adversity. Based on the concept of resilience, interventions have been developed and have been found to be efficacious with various populations (Joyce et al., 2018; Liu et al., 2020). Thus, this meta-analysis aimed to determine whether these interventions could also be effective for University students. Due to the results found, it was identified that the way in which resilience interventions have been offered to University students currently could be improved by using a holistic approach whereby resilience interventions are integrated into

educational systems. By implementing this style of approach, issues highlighted by Lewis et al. (2020) regarding the socio-economic context being disregarded can be addressed. Lewis et al. (2020) identified that although resilience interventions have been increasingly used in educational settings, there are problems with focusing on individual level resilience and not accounting for the socio-economic context. By taking an individual perspective, resilience is seen as something which should be developed on an individual level as opposed to addressing wider systemic issues.

To identify eligible studies, systematic searches were carried out across 4 databases (Medline, PsycINFO, Scopus, and Web of Science) which resulted in 16 primary studies to be meta-analysed. Overall, the studies encompassed 1578 participants in total with a mean age of 21.38. Studies were carried out in a range of countries including the UK, USA, Iran, Singapore, China, and Germany. Data was extracted from the studies to enable standardised mean differences (SMD) to be calculated. Additionally, the methodological quality of the studies was rated using a quality appraisal tool. The quality of the included studies varied but the majority were rated as high quality. A statistically significant negligible effect size (SMD = 0.19, $p = .01$) was found for the effectiveness of resilience interventions in increasing resilience levels. A statistically significant small effect size (SMD = 0.49, $p < .001$) was found for the effectiveness of resilience interventions in decreasing symptomatology (aggression, anxiety, depression, psychological distress, stress).

Based on the findings of the present meta-analysis, future research was recommended to explore how interventions to improve resilience and wellbeing can move from an individualised to a holistic approach which is incorporated into the structure of educational and organisational systems.

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# Empirical Research Paper: How is resilience associated with depression, anxiety, post-traumatic stress disorder (PTSD) and wellbeing for individuals who have experienced childhood trauma?

Support for the link between childhood trauma and adult post-traumatic stress disorder (PTSD) has been found; however, resilience was not a mediating or moderating factor, in other words, resilience did not explain or affect the strength of this relationship. This is contrary to previous literature which has highlighted resilience as a factor which may explain the relationship between childhood trauma and adulthood mental health disorders (Ding et al., 2017; Vieira et al., 2020). The present study investigated the relationships between resilience and depression, anxiety, post-traumatic stress disorder (PTSD) for individuals who had experienced childhood trauma. Due to the findings of previous literature, it was hypothesised that resilience may have had a mediating or moderating role between childhood trauma and adult PTSD. Instead, it was found that both resilience and childhood trauma contribute independently to PTSD.

This area of study is important to investigate as although childhood trauma has frequently been identified as a risk factor for developing mental health disorders in adulthood, including depression (Humphreys et al., 2020), anxiety (Li et al., 2016) and psychosis (Stanton et al., 2020); there has also been recognition that not everyone who experiences childhood trauma will develop mental health disorders. Yehuda et al. (2006) identified that although exposure to childhood trauma can impact on the development of mental health disorders, it can also have a protective or inoculating function dependent on the timing and

intensity of the exposure. Research into the factors which may account for some individuals developing mental health disorders whilst others do not has identified that resilience can often provide an explanation.

In order to investigate these relationships, data were collected through online surveys from 58 participants who volunteered and were eligible to take part in the study. A total of 58 participants completed the study with an average age of 22.45 years (*SD* = 2.42). The participants consisted of 83% women (48 participants), 15% men (9 participants) and 2% who described their gender as 'other' (1 participant). Furthermore, participants came from a diverse range of ethnic backgrounds, employment types and levels of education. Data from completed outcome measures were analysed.

As discussed, the findings of the present study contrasted with other literature in this area. Possible explanations were considered in relation to the way in which resilience develops as explained by the multi-system model of resilience (MSMR) (Liu et al., 2017). It could be that resilience does not affect the relationship between childhood trauma and adult PTSD because individuals who have experienced childhood trauma may have lower levels of resilience overall. For example, the second layer of the MSMR is the interpersonal factors which are developed over time and affected by others and the interactions with them. Therefore, it could be argued that if individuals did not have appropriate support people in their lives, or that the caregiver was a source of the traumatic experiences, then it would be more difficult for them to develop resilience.

The present study highlighted that further research is needed in order to determine which factors may be able to offer a protective function for mental health difficulties for individuals who have experienced childhood trauma.

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# Appendices

## Literature Review Appendices

### *Appendix A: Summary of University of Birmingham Centre for Applied Psychology meta-analytic method*

*The Omnibus Test*

The omnibus test was calculated using the random effects (RE) model to give an effect size and confidence interval (CI) for each study. Under the random-effects model the goal is not to estimate one true effect (as in the fixed-effects model) but to estimate the mean of a distribution of possible effects. This may show true variation due to the idiosyncratic nature of the intervention and/or participants. The goal of the RE model is to estimate the mean effect in a range of studies, without the overall effect being overinfluenced by one study. The inverse variance RE model was calculated using the DerSimonian and Laird method (1986). This method was chosen as it is used when effects are considered to be normally distributed in the population.

*Handling Problematic Variance*

An effect is considered heterogeneous if it shows variation from the meta-analysis synthesis that cannot be attributed to the true variation in treatment outcome. Heterogeneity can result from a number of factors such as, methodological variation, measurement error or uncontrolled individual differences. Higgins $I^2$ is a commonly used measure of heterogeneity, with greater values of $I^2$ indicating variation in effect that cannot be attributed to true variation in the treatment effect. As there is considerable variation in

methodologies of the primary studies that was used to calculate the meta-analytic synthesis, problematic heterogeneity was defined as a Higgins $I^2$ value greater than 75%.

*The Quality Effects Model*

The quality effects model (Doi & Thalib, 2008) extends the random effects model by including a rating of methodological quality in addition to the sample size in the estimation of precision. In this review the quality effects model was calculated using the total score from the risk of bias ratings reported in the method section. The quality effects model can be interpreted as the meta-analytic synthesis that would have been obtained had all of the studies been of the same methodological quality as the best study in the review.

*Identifying Influential Studies*

To examine whether any studies are exerting a disproportionately high influence on the overall meta-analytic effect, a "leave one out" analysis was carried out. This analysis identifies any studies which have a disproportionate influence on the meta-analytic synthesis, by observing the impact of removing each study in turn. The results of this analysis were examined using the Baujat plot (Baujat et al., 2002). The influential and disproportionate studies were then reviewed again to determine if they should be removed from the analysis.

*Identifying Publication Bias and Small Study Effects*

A funnel plot provides a scatterplot of the treatment effects around the meta-analytic synthesis. By visual and statistical analysis of the funnel plot, publication bias and small study effects will be identified. If publication bias is not present, then studies will be distributed in a funnel shape, with studies with high precision plotted near the average (i.e.,

the meta-analytic synthesis), and studies with low precision spread evenly on both sides of the average, creating a roughly funnel-shaped distribution where the distance from the average is inversely proportionate to the precision of the study. A symmetric inverted funnel shape arises from a 'well-behaved' data set, in which publication bias is unlikely. However, deviation from this shape can indicate publication bias, especially if there is an absence of studies in the region associated with small samples sizes and non-significant effects.

If publication bias is identified, then a trim and fill procedure (Duval & Tweedle, 2000a; Duval & Tweedle, 2000b) will be carried out which gives a corrected and unbiased effect size. Additionally, the fail-safe N will also be calculated (Rosenthal, 1979). The fail-safe N is an estimation of the number of missing studies that would need to be retrieved for the effect to be no longer significant. If this number is large (relative to the number of primary studies in the meta-analysis) then the omnibus test can be considered robust to the effects of publication bias.

*Meta regression*

Meta regression will be used to identify whether a continuous variable (i.e., duration of intervention) affected the size of the intervention effect.

# Empirical Research Paper Appendices

## *Appendix A: Confirmation of ethical approval*

Dear Dr Heinze,

**Re: "How is resilience associated with depression, anxiety, post-traumatic stress disorder (PTSD) and wellbeing for individuals who have experienced childhood trauma?"**
**Application for Ethical Review ERN_19-1631**

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

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

I would like to remind you that any substantive changes to the nature of the study as described in the Application for Ethical Review, 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.

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.

Kind regards,

[redacted]
Research Ethics Officer
Research Support Group

[redacted]

[redacted]

Please remember to submit a new Self-Assessment Form for each new project.
Click Ethical Review Process for further details regarding the University's Ethical Review process.

Click Research Governance for further details regarding the University's Research Governance and Clinical Trials Insurance processes, or
email researchgovernance@contacts.bham.ac.uk with any queries

## *Appendix B: Correlations between mental health outcomes and aspects related to trauma*

| | | | | PHQ-9 | GAD-7 | IES-R | WEMWBS | THQ | Age at first trauma | Frequency of traumas |
|---|---|---|---|---|---|---|---|---|---|---|
| PHQ-9 | Pearson Correlation | | | 1 | .677** | .687** | -.676** | .094 | -.115 | .226 |
| | Sig. (2-tailed) | | | | .000 | .000 | .000 | .482 | .389 | .087 |
| | N | | | 58 | 58 | 58 | 58 | 58 | 58 | 58 |
| | Bootstrap[c] | Bias | | 0 | .003 | .000 | .004 | .001 | -.001 | -.005 |
| | | Std. Error | | 0 | .079 | .056 | .068 | .119 | .147 | .102 |
| | | BCa 95% Confidence Interval | Lower | . | .450 | .574 | -.797 | -.135 | -.377 | -.016 |
| | | | Upper | . | .842 | .786 | -.517 | .331 | .155 | .399 |
| GAD-7 | Pearson Correlation | | | .677** | 1 | .475** | -.526** | .196 | -.318* | .204 |
| | Sig. (2-tailed) | | | .000 | | .000 | .000 | .140 | .015 | .125 |
| | N | | | 58 | 58 | 58 | 58 | 58 | 58 | 58 |
| | Bootstrap[c] | Bias | | .003 | 0 | .005 | .005 | .005 | -.004 | .008 |
| | | Std. Error | | .079 | 0 | .117 | .099 | .110 | .133 | .086 |
| | | BCa 95% Confidence Interval | Lower | .450 | . | .179 | -.699 | -.017 | -.523 | .005 |
| | | | Upper | .842 | . | .710 | -.307 | .438 | -.092 | .429 |
| IES-R | Pearson Correlation | | | .687** | .475** | 1 | -.385** | .309* | -.116 | .371** |
| | Sig. (2-tailed) | | | .000 | .000 | | .003 | .018 | .387 | .004 |
| | N | | | 58 | 58 | 58 | 58 | 58 | 58 | 58 |
| | Bootstrap[c] | Bias | | .000 | .005 | 0 | .003 | -.001 | .001 | -.003 |
| | | Std. Error | | .056 | .117 | 0 | .108 | .116 | .135 | .108 |
| | | BCa 95% Confidence Interval | Lower | .574 | .179 | . | -.591 | .081 | -.375 | .098 |
| | | | Upper | .786 | .710 | . | -.169 | .517 | .153 | .549 |
| WEMWBS | Pearson Correlation | | | -.676** | -.526** | -.385** | 1 | -.009 | -.060 | -.147 |
| | Sig. (2-tailed) | | | .000 | .000 | .003 | | .949 | .655 | .269 |
| | N | | | 58 | 58 | 58 | 58 | 58 | 58 | 58 |
| | Bootstrap[c] | Bias | | .004 | .005 | .003 | 0 | .002 | -.003 | .010 |
| | | Std. Error | | .068 | .099 | .108 | 0 | .120 | .141 | .118 |
| | | BCa 95% Confidence Interval | Lower | -.797 | -.699 | -.591 | . | -.259 | -.344 | -.353 |
| | | | Upper | -.517 | -.307 | -.169 | . | .227 | .215 | .129 |
| THQ | Pearson Correlation | | | .094 | .196 | .309* | -.009 | 1 | -.302* | .350** |
| | Sig. (2-tailed) | | | .482 | .140 | .018 | .949 | | .021 | .007 |
| | N | | | 58 | 58 | 58 | 58 | 58 | 58 | 58 |
| | Bootstrap[c] | Bias | | .001 | .005 | -.001 | .002 | 0 | -.008 | .028 |
| | | Std. Error | | .119 | .110 | .116 | .120 | 0 | .119 | .123 |
| | | BCa 95% Confidence Interval | Lower | -.135 | -.017 | .081 | -.259 | . | -.513 | .094 |
| | | | Upper | .331 | .438 | .517 | .227 | . | -.106 | .668 |
| Age at first trauma | Pearson Correlation | | | -.115 | -.318* | -.116 | -.060 | -.302* | 1 | -.228 |
| | Sig. (2-tailed) | | | .389 | .015 | .387 | .655 | .021 | | .085 |
| | N | | | 58 | 58 | 58 | 58 | 58 | 58 | 58 |
| | Bootstrap[c] | Bias | | -.001 | -.004 | .001 | -.003 | -.008 | 0 | -.010 |
| | | Std. Error | | .147 | .133 | .135 | .141 | .119 | 0 | .083 |
| | | BCa 95% Confidence Interval | Lower | -.377 | -.523 | -.375 | -.344 | -.513 | . | -.377 |
| | | | Upper | .155 | -.092 | .153 | .215 | -.106 | . | -.095 |
| Frequency of traumas | Pearson Correlation | | | .226 | .204 | .371** | -.147 | .350** | -.228 | 1 |
| | Sig. (2-tailed) | | | .087 | .125 | .004 | .269 | .007 | .085 | |
| | N | | | 58 | 58 | 58 | 58 | 58 | 58 | 58 |
| | Bootstrap[c] | Bias | | -.005 | .008 | -.003 | .010 | .028 | -.010 | 0 |
| | | Std. Error | | .102 | .086 | .108 | .118 | .123 | .083 | 0 |
| | | BCa 95% Confidence Interval | Lower | -.016 | .005 | .098 | -.353 | .094 | -.377 | . |
| | | | Upper | .399 | .429 | .549 | .129 | .668 | -.095 | . |

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

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

## *Appendix C: Participant information sheet*

**PARTICIPANT INFORMATION SHEET**

UNIVERSITY OF BIRMINGHAM

***Title of Project:*** How is resilience associated with depression, anxiety, post-traumatic stress disorder (PTSD) and wellbeing for individuals who have experienced childhood trauma?

***Researchers:*** Rachel James: [redacted]
Dr Kareen Heinze: [redacted]
Dr Gary Law: [redacted]

We would like to invite you to participate in our research study. Before you decide, we would like you to understand why we are undertaking this research and what would be involved for you as a participant. Please read the information below carefully which will take up to 5 minutes. **The study involves questions about traumatic events which occurred to you prior to the age of 18. However, we would ask you to not take part in this study if you feel that it would be too upsetting or distressing to think about or be reminded of this event/events.**

- **What is the purpose of this research?**

This study is being run by Rachel James as part of her Clinical Psychology Doctorate at the University of Birmingham. There have been many studies looking at the link between experiences of childhood trauma and development of mental health problems. More recently, studies have begun to look at why some people who experience childhood trauma do not develop mental health problems. One theory is that some people have higher levels of resilience (our ability to cope with and recover from difficulties) which can act as a protective factor against the development of mental health problems. Therefore, this study is aimed at investigating whether people's level of resilience is associated with mental health problems and wellbeing after experiencing trauma prior to the age of 18. This age range is chosen due to the literature in this area making links between childhood trauma and mental health problems.

- **Why have I been invited to take part?**

You have been invited to take part because you identified that you met the inclusion criteria of the study. These are that you are between the ages of 18 and 25 and experienced a traumatic event prior to the age of 18.

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

If you consent to take part in the study, you will be directed through the online system to complete a set of seven questionnaires. This should take roughly 30 minutes. The questionnaires ask about demographic information, mental health problems, wellbeing, traumatic experiences and resilience. Please note that one of the questionnaires will ask about the category and nature of the traumatic event(s) that you have experienced. If there

are any questions that you do not want to answer, then you can select, “Prefer not to answer”.

You can complete the questionnaires in any location with access to a computer and the Internet. However, due to the sensitive nature of some of the questions it is advisable to complete the questionnaires in a confidential environment. Also, it is advisable to complete the questionnaires in an environment as free from distractions as possible to allow for full concentration.

- **What will happen to the information I give?**

The research team will have no identifiable information about you, instead a unique identifying code will be used to differentiate between each participant’s answers. This code will be provided to you when you access the online system to complete the study. The answers you have provided on the questionnaires will be stored electronically on encrypted and password-protected systems. Only the research team will be able to access the data.

- **What will happen if I do not want to carry on with the study?**

There is no obligation to take part in this study. If, after reading this information sheet, you decide that you would prefer not to continue then you can exit the online system. If you start completing the questionnaires and decide you do not want to continue, or if you feel uncomfortable answering the questions, you can exit the online system without giving a reason why.

- **What will happen if I want to withdraw my data from the study after completing it?**

If you decide that you would like to withdraw from the study after submitting your questionnaires, then please email the researcher Rachel James at [redacted] with your unique identifying code by 08/03/2021 and your data will be removed from the study. Please ensure that you note down the researcher’s email address and your unique identifying code when it is provided to you and keep it safe in case you wish to withdraw your data. There are no adverse consequences if you choose to withdraw your data. If you do not email the researcher by 08/03/2021 then your data will be included in the study.

- **Expenses and payments**

Unfortunately, we are not able to pay you for your participation in this study. However, to avoid any costs for expenses, the questionnaires can be completed in any location that is convenient for you.

- **What will happen to the results of the research study?**

The findings of the study will be written up into Rachel James’ Clinical Psychology doctorate, included in the online catalogue of professional theses at the University of Birmingham and presented at a conference. Also, the findings may be published in peer reviewed scientific journals.

- **What happens if I have any further concerns or questions?**

Below are the contact details of the researchers if you wish to ask questions or, if applicable, to remove your data from the study.

- **What if something goes wrong?**

If you have a concern about any aspect of this project, please speak to the project Coordinator Dr Kareen Heinze, who will do their best to answer your query. The researcher should acknowledge your concern within 10 working days and give you an indication of how she intends to deal with it. If you remain unhappy or wish to make a formal complaint, you can contact: Professor Ed Wilding; Head of School; School of Psychology, University of Birmingham, Birmingham, B15 2TT; by email: [redacted] or by phone on [redacted]

- **Contact information**

Rachel James
Dr Kareen Heinze
Dr Gary Law
[redacted]

Thank you for taking the time to read this information.

## *Appendix D: Participant consent form*

**PARTICIPANT CONSENT FORM**

UNIVERSITY OF BIRMINGHAM

Unique identifying code: .....

***Title of Project:*** How is resilience associated with depression, anxiety, post-traumatic stress disorder (PTSD) and wellbeing for individuals who have experienced childhood trauma?

***Researchers:*** Rachel James, Dr Kareen Heinze, Dr Gary Law

Please tick each box if you agree:

1. I confirm that I have read and understood the information sheet dated 06.12.2019 (version 1) 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 am free to withdraw at any time without giving any reason, without my medical care or legal rights being affected ☐
3. I understand that if I wish to withdraw my data from the study after completion, I can do so by contacting the researcher by 08/03/2021 and providing my unique identifying code. ☐
4. I understand that the data I provide will be analysed by the research team and stored anonymously. ☐
5. I agree to take part in the above study. ☐

..... .....

Unique identifying code Date

## *Appendix E: Participant debrief form*

**PARTICIPANT DEBRIEF FORM**

UNIVERSITY OF BIRMINGHAM

***Title of Project:*** How is resilience associated with depression, anxiety, post-traumatic stress disorder (PTSD) and wellbeing for individuals who have experienced childhood trauma?

***Researchers:*** Rachel James, Dr Kareen Heinze, Dr Gary Law

Thank you for taking the time to complete the study, it is very much appreciated.

As mentioned previously, if you wish to ask any questions or remove your data from the study you can email the researcher Rachel James at [redacted] by 08/03/2021 providing your unique identifying code.

Please make a note of the information provided here as you are unable to print from this online system.

Sometimes completing questionnaires and answering personal questions can bring up difficult memories. If you feel as though you want to seek further support, e.g. for experiences you have had in the past or for a mental health problem, we would advise that you visit your GP. We have included details below of services which can offer additional support.

***NHS***

https://www.nhs.uk/

https://www.nhs.uk/using-the-nhs/nhs-services/mental-health-services/how-to-access-mental-health-services/

***The National Association for People Abused in Childhood (NAPAC)***

Offers support to adult survivors of childhood abuse, including physical, sexual and emotional abuse and neglect.

https://napac.org.uk/

***Women's Aid***

Supports women affected by domestic violence.

https://www.womensaid.org.uk/

***SurvivorsUK***

Support for male victims of sexual abuse.

https://www.survivorsuk.org/

***Samaritans***

Available 24/7 for those who wish to talk to someone.

https://www.samaritans.org/ Call: 116 123

If you feel as though you need support to make a disclosure, we would encourage you to seek support from the organisations listed below:

***Victim support***

Offers support to those who have been affected by crime.

https://www.victimsupport.org.uk/

***Police***

To report a crime, you can contact the Police directly.

Non-emergency number: 101 Victim supportline: 0808 1689 111

## *Appendix F: Demographic questionnaire*

1. With which gender do you most identify?

| | Please select one |
|---|---|
| Male | |
| Female | |
| Transgender male | |
| Transgender female | |
| Diverse | |
| Other | |
| Prefer not to say | |

2. Age

| | Please select one |
|---|---|
| 18 | |
| 19 | |
| 20 | |
| 21 | |
| 22 | |
| 23 | |
| 24 | |
| 25 | |

3. How would you describe your ethnicity?

| | Please select one |
|---|---|
| White British | |
| White Irish | |
| White Other | |
| Asian/Asian British – Pakistani | |
| Asian/Asian British – Indian | |
| Asian/Asian British – Bangladeshi | |
| Asian/Asian British – Other | |
| Chinese | |
| Black/Black British – Caribbean | |
| Black/Black British – African | |
| Black/Black British – Other | |
| White and Black Caribbean | |
| White and Black African | |
| White and Asian | |
| Any other mixed/multiple ethnic background | |
| Arab | |
| Any other ethnic background | |

4. How would you describe your current employment status?

| | Please select one |
|---|---|
| Employed full time | |
| Employed part time | |
| Self-employed | |
| Unemployed | |
| Volunteer | |

5. Please select the highest level of education you have completed or are currently studying

| | Completed (please select one) | Currently studying (please select one if applicable) |
|---|---|---|
| Secondary education (GCSE/O-Levels) | | |
| Post-secondary education (College, A-Levels, NVQ3 or below, or similar) | | |
| Vocational Qualification (Diploma, Certificate, BTEC, NVQ4 and above, or similar | | |
| Undergraduate degree (BA, BSc etc) | | |
| Post-graduate degree (MA, MSc etc) | | |
| Doctorate (PhD) | | |
| None of the above | | |

6. Have you ever been given a mental health diagnosis?

| | Please select one |
|---|---|
| Yes | |
| No | |
| If yes, please specify what the diagnosis is…….. | |

7. Have you ever received psychological therapy for a mental health problem?

| | Please select one |
|---|---|
| Yes | |
| No | |
| If yes, please specify what this treatment was…….. | |

8. Have you ever received any medication, hospital or home treatment for a mental health problem?

| | Please select one |
|---|---|
| Yes | |
| No | |
| If yes, please specify what this treatment was…….. | |

## *Appendix G: Patient Health Questionnaire (PHQ-9)*

*Note: all questionnaires (PHQ-9, GAD-7, IES-R, WEMWBS, THQ and CS-RISC) also had an option of "Prefer not to answer".*

Over the last 2 weeks, how often have you been bothered by any of the following problems?

| | **Not at all** | **Several days** | **More than half the days** | **Nearly every day** |
|---|---|---|---|---|
| **Little interest or pleasure in doing things** | 0 | 1 | 2 | 3 |
| **Feeling down, depressed or hopeless** | 0 | 1 | 2 | 3 |
| **Trouble falling or staying asleep, or sleeping too much** | 0 | 1 | 2 | 3 |
| **Feeling tired or having little energy** | 0 | 1 | 2 | 3 |
| **Poor appetite or overeating** | 0 | 1 | 2 | 3 |
| **Feeling bad about yourself – or that you are a failure or you have let yourself or your family down** | 0 | 1 | 2 | 3 |
| **Trouble concentrating on things, such as reading the newspaper or watching television** | 0 | 1 | 2 | 3 |
| **Moving or speaking so slowly that other people could have noticed? Or the opposite – being so fidgety or restless that you have been moving around a lot more than usual** | 0 | 1 | 2 | 3 |
| **Thoughts that you would be better off dead or hurting yourself in some way** | 0 | 1 | 2 | 3 |

If you are having thoughts that you do not want to be alive or of harming yourself in some way, there are services which can offer you support:

- You can speak to your GP
- You can call the Samaritans on 116 123

If you have any plans or intent to harm yourself in any way or feel at risk to yourself, you can:

- Contact your GP and ask for an emergency appointment
- Call 111
- Go to a walk-in clinic
- Go to A&E or call 999

## *Appendix H: Generalised Anxiety Disorder Scale (GAD-7)*

Over the last 2 weeks, how often have you been bothered by any of the following problems?

| | Not at all | Several days | More than half the days | Nearly every day |
|---|---|---|---|---|
| **Feeling nervous, anxious, or on edge** | 0 | 1 | 2 | 3 |
| **Not being able to stop or control worrying** | 0 | 1 | 2 | 3 |
| **Worrying too much about different things** | 0 | 1 | 2 | 3 |
| **Trouble relaxing** | 0 | 1 | 2 | 3 |
| **Being so restless that it's hard to sit still** | 0 | 1 | 2 | 3 |
| **Becoming easily annoyed or irritable** | 0 | 1 | 2 | 3 |
| **Feeling afraid as if something awful might happen** | 0 | 1 | 2 | 3 |

## *Appendix I: Impact of Events Scale-Revised (IES-R)*

Below is a list of difficulties people sometimes have after stressful life events. Please read each item, and then indicate how distressing each difficulty has been for you during the past 7 days with respect to _____(your problem)_____, how much were you distressed or bothered by these difficulties?

| | **Not at all** | **A little bit** | **Moderately** | **Quite a bit** | **Extremely** |
|---|---|---|---|---|---|
| **Any reminder brought back feelings about it** | 0 | 1 | 2 | 3 | 4 |
| **I had trouble staying asleep** | 0 | 1 | 2 | 3 | 4 |
| **Other things kept making me think about it** | 0 | 1 | 2 | 3 | 4 |
| **I felt irritable and angry** | 0 | 1 | 2 | 3 | 4 |
| **I avoided letting myself get upset when I thought about it or was reminded of it** | 0 | 1 | 2 | 3 | 4 |
| **I thought about it when I didn't mean to** | 0 | 1 | 2 | 3 | 4 |
| **I felt as if it hadn't happened or wasn't real** | 0 | 1 | 2 | 3 | 4 |
| **I stayed away from reminders about it** | 0 | 1 | 2 | 3 | 4 |
| **Pictures about it popped into my mind** | 0 | 1 | 2 | 3 | 4 |
| **I was jumpy and easily startled** | 0 | 1 | 2 | 3 | 4 |
| **I tried not to think about it** | 0 | 1 | 2 | 3 | 4 |
| **I was aware that I still had a lot of feelings about it, but I didn't deal with them** | 0 | 1 | 2 | 3 | 4 |
| **My feelings about it were kind of numb** | 0 | 1 | 2 | 3 | 4 |
| **I found myself acting or feeling as though I was back at that time** | 0 | 1 | 2 | 3 | 4 |
| **I had trouble falling asleep** | 0 | 1 | 2 | 3 | 4 |
| **I had waves of strong feelings about it** | 0 | 1 | 2 | 3 | 4 |

| | | | | | |
|---|---|---|---|---|---|
| **I tried to remove it from my memory** | 0 | 1 | 2 | 3 | 4 |
| **I had trouble concentrating** | 0 | 1 | 2 | 3 | 4 |
| **Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea, or a pounding heart** | 0 | 1 | 2 | 3 | 4 |
| **I had dreams about it** | 0 | 1 | 2 | 3 | 4 |
| **I felt watchful or on-guard** | 0 | 1 | 2 | 3 | 4 |
| **I tried not to talk about it** | 0 | 1 | 2 | 3 | 4 |

## *Appendix J: Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS)*

Below are some statements about feelings and thoughts.

Please tick the box that best describes your experience of each over the last 2 weeks.

| | None of the time | Rarely | Some of the time | Often | All of the time |
|---|---|---|---|---|---|
| **I've been feeling optimistic about the future** | 1 | 2 | 3 | 4 | 5 |
| **I've been feeling useful** | 1 | 2 | 3 | 4 | 5 |
| **I've been feeling relaxed** | 1 | 2 | 3 | 4 | 5 |
| **I've been feeling interested in other people** | 1 | 2 | 3 | 4 | 5 |
| **I've had energy to spare** | 1 | 2 | 3 | 4 | 5 |
| **I've been dealing with problems well** | 1 | 2 | 3 | 4 | 5 |
| **I've been thinking clearly** | 1 | 2 | 3 | 4 | 5 |
| **I've been feeling good about myself** | 1 | 2 | 3 | 4 | 5 |
| **I've been feeling close to people** | 1 | 2 | 3 | 4 | 5 |
| **I've been feeling confident** | 1 | 2 | 3 | 4 | 5 |
| **I've been able to make up my own mind about things** | 1 | 2 | 3 | 4 | 5 |
| **I've been feeling loved** | 1 | 2 | 3 | 4 | 5 |
| **I've been interested in new things** | 1 | 2 | 3 | 4 | 5 |
| **I've been feeling cheerful** | 1 | 2 | 3 | 4 | 5 |

## *Appendix K: Trauma History Questionnaire (THQ)*

The following is a series of questions about serious or traumatic life events. These types of events actually occur with some regularity, although we would like to believe they are rare, and they affect how people feel about, react to, and/or think about things subsequently. Knowing about the occurrence of such events, and reactions to them, will help us to develop programs for prevention, education, and other services. The questionnaire is divided into questions covering crime experiences, general disaster and trauma questions, and questions about physical and sexual experiences.

For each event, please indicate (circle) whether it happened and, if it did, the number of times and your approximate age when it happened (give your best guess if you are not sure). Also note the nature of your relationship to the person involved and the specific nature of the event, if appropriate.

| ***Crime-Related Events*** | | **Circle one** | | **If you circled yes, please indicate** | |
|---|---|---|---|---|---|
| | | | | **Number of times** | **Approximate age(s)** |
| **1** | Has anyone ever tried to take something directly from you by using force or the threat of force, such as a stick-up or mugging? | No | Yes | | |
| **2** | Has anyone ever attempted to rob you or actually robbed you (i.e., stolen your personal belongings)? | No | Yes | | |
| **3** | Has anyone ever attempted to or succeeded in breaking into your home when you were <u>not</u> there? | No | Yes | | |
| **4** | Has anyone ever attempted to or succeed in breaking into your home while you <u>were</u> there? | No | Yes | | |
| ***General Disaster and Trauma*** | | **Circle one** | | **If you circled yes, please indicate** | |
| | | | | **Number of times** | **Approximate age(s)** |
| **5** | Have you ever had a serious accident at work, in a car, or somewhere else? (**<u>If yes</u>**, please specify below) | No | Yes | | |

| | | | | | |
|---|---|---|---|---|---|
| **6** | Have you ever experienced a natural disaster such as a tornado, hurricane, flood or major earthquake, etc., where you felt you or your loved ones were in danger of death or injury? (**If yes**, please specify below) | No | Yes | | |
| **7** | Have you ever experienced a "man-made" disaster such as a train crash, building collapse, bank robbery, fire, etc., where you felt you or your loved ones were in danger of death or injury? (**If yes**, please specify below) | No | Yes | | |
| **8** | Have you ever been exposed to dangerous chemicals or radioactivity that might threaten your health? | No | Yes | | |
| **9** | Have you ever been in any other situation in which you were seriously injured? (**If yes**, please specify below) | No | Yes | | |
| **10** | Have you ever been in any other situation in which you feared you might be killed or seriously injured? (**If yes**, please specify below) | No | Yes | | |
| **11** | Have you ever seen someone seriously injured or killed? (**If yes**, please specify who below) _____ | No | Yes | | |
| **12** | Have you ever seen dead bodies (other than at a funeral) or had to handle dead bodies for any reason? (**If yes**, please specify below) | No | Yes | | |
| **13** | Have you ever had a close friend or family member murdered, or killed by a drunk driver? (**If yes**, please specify relationship [e.g., mother, grandson, etc.] below) | No | Yes | | |
| **14** | Have you ever had a spouse, romantic partner, or child die? (**If yes**, please specify relationship below) | No | Yes | | |
| **15** | Have you ever had a serious or life-threatening illness? (**If yes**, please specify below) _____ | No | Yes | | |

| | | | | | |
|---|---|---|---|---|---|
| **16** | Have you ever received news of a serious injury, life-threatening illness, or unexpected death of someone close to you? (**If yes**, please indicate below) | No | Yes | | |
| **17** | Have you ever had to engage in combat while in military service in an official or unofficial war zone? (**If yes**, please indicate where below) _____ | No | Yes | | |
| ***Physical and Sexual Experiences*** | | **Circle one** | | **If you circled yes, please indicate** | |
| | | | | **Repeated?** | **Approximate age(s) and frequency** |
| **18** | Has anyone ever made you have intercourse or oral or anal sex against your will? (**If yes**, please indicate nature of relationship with person [e.g., stranger, friend, relative, parent, sibling] below) | No | Yes | | |
| **19** | Has anyone ever touched private parts of your body, or made you touch theirs, under force or threat? (**If yes**, please indicate nature of relationship with person [e.g., stranger, friend, relative, parent, sibling] below) | No | Yes | | |
| **20** | Other than incidents mentioned in Questions 18 and 19, have there been any other situations in which another person tried to force you to have an unwanted sexual contact? | No | Yes | | |
| **21** | Has anyone, including family members or friends, ever attacked you with a gun, knife, or some other weapon? | No | Yes | | |
| **22** | Has anyone, including family members or friends, ever attacked you without a weapon and seriously injured you? | No | Yes | | |
| **23** | Has anyone in your family ever beaten, spanked, or pushed you hard enough to cause injury? | No | Yes | | |
| **24** | Have you experienced any other extraordinarily stressful situation or event that is not covered above? (**If yes**, please specify below) | No | Yes | | |

## *Appendix L: Connor-Davidson Resilience Scale (CD-RISC)*

Due to copyright, this measure cannot be included in a written format. Permission was granted from the authors for use of the measure in an electronic format for the purpose of this study.