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School of Psychology

Volume 1 of 1

An Exploration of the Relationship between Parental Stress and Psychopathology within the context of Childhood Attention Deficit and Hyperactivity

by

David Martin Nathaniel Beattie

Thesis for the degree of Doctor of Clinical Psychology

2012 Cohort

UNIVERSITY OF SOUTHAMPTON

ABSTRACT

FACULTY OF SOCIAL AND HUMAN SCIENCES

Psychology

Thesis for the degree of Doctor of Clinical Psychology

AN EXPLORATION OF THE RELATIONSHIP BETWEEN PARENTAL STRESS AND PSYCHOPATHOLOGY WITHIN THE CONTEXT OF CHILDHOOD ATTENTION DEFICIT AND HYPERACTIVITY

David Martin Nathaniel Beattie

The first part of this thesis is a systematic review of the literature on parental stress and mental health within the context of child ADHD. A total of 23 studies met inclusion criteria and a range of parental stress measures were employed. Findings suggest that irrespective of the parental stress measure, the level of stress experienced by parents of children with ADHD was elevated compared to non-clinical controls. Within studies that compared the degree of parental stress to other child clinical disorders, such as learning disability, autism or conduct disorder, the level of stress experienced by parents of children with ADHD was generally equivalent and occasionally lower. Rates of depression were found to be elevated for parents of children with ADHD compared to non-clinical controls. Parent-level interventions were found to reduce both parental stress and the degree of parental depression. However, the mechanisms by which these factors interact and influence one another are unclear. The review highlighted the need to investigate these mechanisms further, whilst controlling for covariates, such as child learning disability and autism. The review also highlighted a dearth of studies exploring these factors within a UK sample, which inspired the empiral study detailed in the second part of this thesis.

The second part of this thesis is an empirical paper investigating the relationship between child ADHD, parenting stress and maternal psychopathology within a UK sample. Findings showed that parents of children with an ADHD diagnosis experienced significantly higher stress, depression and anxiety compared to parents of non-clinical controls. Parenting stress was found to partially mediate the relationship between child ADHD, maternal depression and anxiety. Clinical and theoretical implications of these findings were discussed and directions for future research suggested.

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DECLARATION OF AUTHORSHIP

I, DAVID MARTIN NATHANIEL BEATTIE declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research.

An Exploration of the Relationship between Parenting Stress and Psychopathology within the context of Childhood Attention Deficit and Hyperactivity

I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University;
2. Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
3. Where I have consulted the published work of others, this is always clearly attributed;
4. Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
5. I have acknowledged all main sources of help;
6. Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
7. None of this work has been published before submission [or] Parts of this work have been published as: [please list references below]:

Signed: .....

Date: .....

Acknowledgements

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Chapter 1: Systematic Literature Review: Child Attention Deficit Hyperactivity Disorder, Parental Stress and Parent Mental Health

1.1 Introduction

In the UK, there are an estimated 26 million parents of dependent children (i.e. Children aged 0-16 or 16-18 in full time education, Office for National Statistics, 2015). Although all parenting can be challenging (Crnic & Acevedo, 1995), parenting a child who has a neurodevelopmental and/or psychopathological condition could present additional challenges which results in increased stress (Abidin, 1990). This stress could contribute to an increased risk of ill health for parents, including parent psychopathology, which could impair their functioning in terms of parent-focussed interventions for child ADHD, in addition to general wellbeing of parents.

1.1.1 Attention Deficit Hyperactivity Disorder

Attention Deficit Hyperactivity Disorder (ADHD, as per the DSM-5, American Psychiatric Association, 2013) and Hyperkinetic Disorder (World Health Organization, 1992) are defined as a neurodevelopmental disorder with onset before 12 years of age. The DSM-5 lists 18 primary symptoms of ADHD and divides these into two domains; inattention and hyperactivity/impulsivity. Symptoms are based on behavioural observations signifying abnormally high levels of maladaptive impulsivity, hyperactivity and inattention (National Institute for Health and Care Excellence; NICE, 2008). At least 6 behaviours/symptoms in one domain are required for an ADHD diagnosis (DSM-5, American Psychiatric Association, 2013). According to the latest estimates, 3-5% of children meet diagnostic criteria for ADHD (Finzi-Dottan, Triwitz, & Golubchik, 2011), which could amount to 665,000 children in the UK alone.

1.1.2 Stress

From a biological perspective, stress can be generally conceptualised as a disturbance or threat to homeostasis, which can disrupt typical functioning (Goldstein, 2010). Neurobiological systems within the brain attempt to adapt by activating the sympathethic-adrenomedullary (SAM) and the hypothalamic-pituitary-adrenocortical (HPA) axis (A. C. Johnson, 2015). Together, the SAM and HPA subsystems operate to return the organism to a state of homeostasis through

physiological and/or behavioural change (McEwen & Wingfield, 2003). This process of readjustment is referred to as allostasis, and this process is activated regardless of whether the threat is psychological or physiological in nature.

The degree of stress experienced by parents can be conceptualised as parental stress. A subtype of parental stress is parenting stress. For the purposes of this review, the stress experienced by parents will be investigated in terms of parental stress generally as well as the distict subtype of parental stress, namely parenting stress. Both of these terms are clarified below in point 1.1.2.1 and point 1.1.2.1.1.

1.1.2.1 Parental Stress

The demands of being a parent creates stress for most parents (Graziano, McNamara, Geffken, & Reid, 2011) and can involve both normative everyday difficulties experienced by all parents (Crnic & Greenberg, 1990), such as bereavement, loss of employment and ill-health, or the stress and distress resulting from the parent-child interaction (Abidin, 1995). Parental stress refers to the general stress that is experienced by parents and is not dependent exclusively on parent and child factors, but is instead a measure of general life stresses within and outside the role of being a parent.

1.1.2.1.1 Parenting stress

Parenting stress has been defined as ‘‘the aversive psychological reaction to the demands of being a parent’’ (Deater-Deckard, 1998, p. 315). In other words, parenting stress results when a parents’ resources for coping with the demands of parenting are outweighed by the perceived demands of parenting their child. If not managed, this can lead to distress, which is most commonly defined as an aversive, negative state in which adaption and coping mechanisms fail to return the organism to physiological and/or psychological homeostasis (Carstens & Moberg, 2000). Parenting distress can be defined as an elevated level of stress, i.e. above normative values.

For clarity, within this review, parenting stress is regarded as a type of parental stress, but parental stress includes other stresses as detailed in point 1.1.2.1.

1.2 Aims and objectives of Literature Review

The association between parenting stress and the presence of childhood ADHD has been demonstrated in numerous studies across many countries (Mash & Johnston, 1983; Theule, Wiener, Tannock, & Jenkins, 2010). However, previous reviews have not incorporated the role of parental stress more generally. Whilst acknowledging the presence of higher parenting stress for the parents of children diagnosed with ADHD, the lack of exploration of other stressors and their magnitude presents a potentially useful area of investigation that previous studies have neglected.

Therefore this review aims to examine associations between parental stress, including parenting stress, and the presence of childhood ADHD. Further to this, associations with parental psychopathology, including depression, anxiety and ADHD will also be incorporated.

1.2.1 Objectives

1. To identify measures of stress in parents of children with ADHD
2. To explore the levels of stress in parents of children with ADHD and if this varies across studies
3. To investigate the levels of parental depression and anxiety in identified studies
4. To review and critique the literature on stress and mental health in parents of children with ADHD.
5. To identify and suggest ways to reduce stress in this population.

1.3 Method

1.3.1 Identification of the literature

1.3.1.1 Inclusion criteria

To meet the inclusion criteria, articles needed to conform to the following requirements:

Published in a peer-reviewed journal; written or translated into English; articles must have investigated both the parents' stress AND their children's ADHD behaviour. Reviews into parental stress or parenting distress were also eligible. Criteria for the children's ADHD diagnosis were

necessary for inclusion, but the diagnosis method was purposely liberal so as to maximise the number of articles identified at the initial stage. The criteria for parental stress were also purposely liberal so as to maximise the number of articles identified.

1.3.1.2 Exclusion criteria

The following types of studies were considered beyond the scope of this review:

(a) Purely qualitative studies;

(b) Case studies.

1.3.1.3 Search strategy

Firstly, a search of internet-based bibliographic databases (PsycINFO and Web of Science) was conducted, spanning January 1988 to December 2015 and January 1990 to December 2015 respectively. Abstracts were screened and full-text articles of suitable studies were reviewed for eligibility. Next, the reference lists of included articles were scanned for relevant studies. Bibliographic databases were used to retrieve the abstracts of these studies and where deemed relevant, full-text versions were reviewed, scrutinised, and where appropriate, included in the body of work comprising this review.

1.3.1.3.1 PsycInfo bibliographic search: Articles indexed under the following keywords: (‘parent*’ OR ‘maternal’ OR ‘paternal’) AND (‘stress’ OR ‘distress’ OR ‘*stress’) AND (‘attention deficit disorder’ OR ‘adhd’).

1.3.1.3.2 Web of Science: Topic OR Title terms were (‘attention deficit hyperactivity disorder’ OR ‘attention deficit/hyperac*’ OR ‘ADHD’)AND (‘stress’ OR ‘*stress*’) AND (‘parent*’ OR ‘matern*’ or ‘mother’ OR ‘patern*’ OR ‘father’)

1.3.1.3.3 MEDLINE: Abstract terms were (‘attention deficit hyperactivity disorder’ OR ‘attention deficit/hyperac*’ OR ‘ADHD’) AND (‘stress’ OR ‘*stress*’) AND (‘parent*’ OR ‘matern*’ or ‘mother’ OR ‘patern*’ OR ‘father’). Pubmed was not searched due to the considerable overlap between MEDLINE and Pubmed.

1.3.2 Results – Study selection process

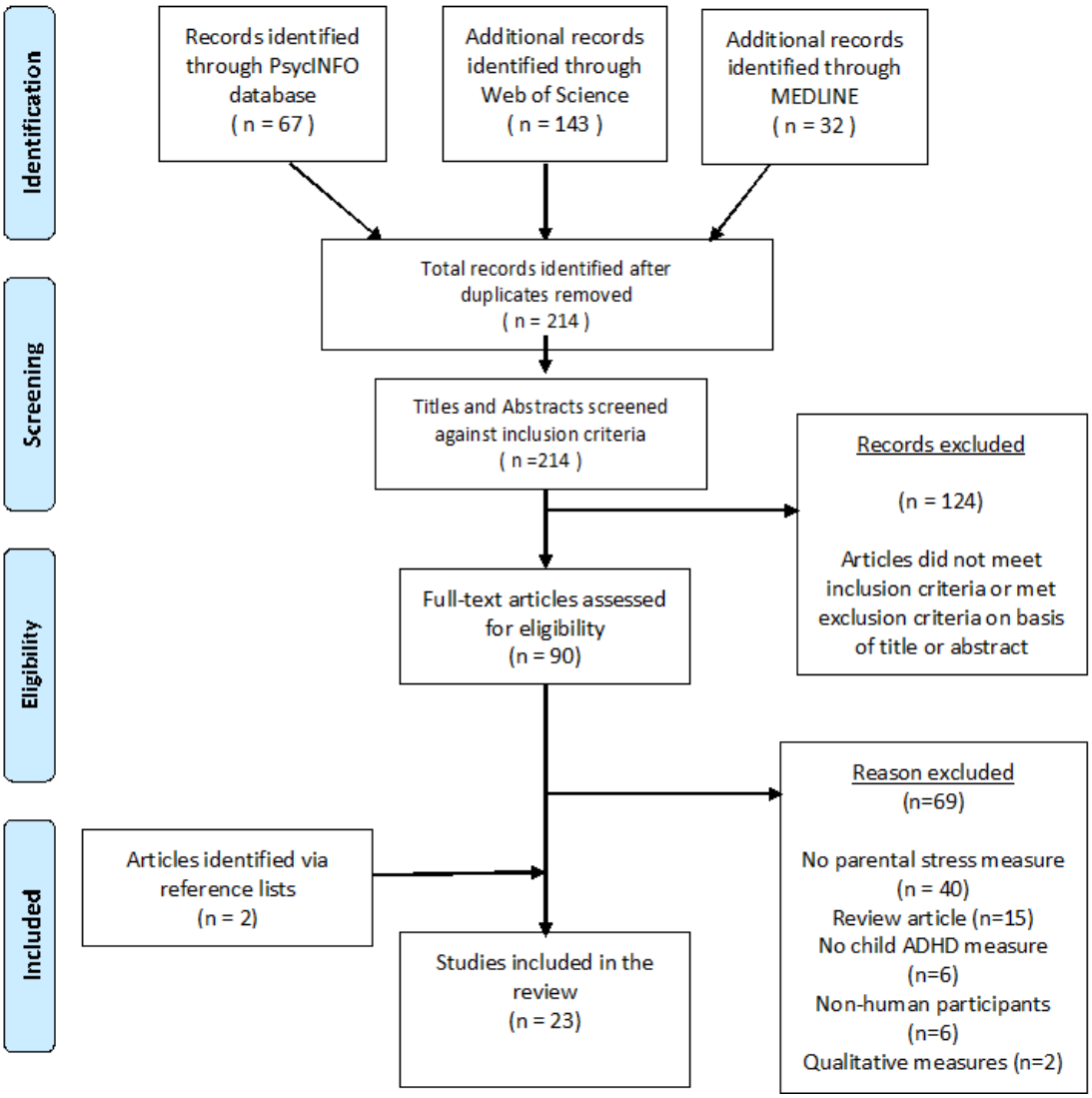


Figure 1. *Study selection flow diagram*

1.3.3 Characteristics of identified studies

A summary of the articles that have been included in this review can be found in Appendix A. References for the 94 excluded articles are also included with a brief explanation for their exclusion.

1.3.3.1 Design

From the articles included, a majority used a cross-sectional questionnaire design (n = 21), eight of which contained both an ADHD and control group. Two studies used a repeated measures design, one of which was a longitudinal study. One study used a prospective cohort design. Participants were self-selected in all but one study (Class et al., 2014), which used national registers to obtain data on participants' stress and health status.

Where reported, participants were mostly recruited from Outpatient paediatric clinics and Universities.

1.3.3.2 Population characteristics and sample size.

More than half of the studies were conducted using samples from North America, with 50% of all included samples from the United States of America (n = 11) and Canada (n = 2). Six studies included European participants, with samples from Sweden (n = 2), the Netherlands (n = 2), Italy (n = 1) and Portugal (n = 1). The remaining studies were conducted in Australia (n = 2), New Zealand (n = 1) and Taiwan (n = 1). It is notable that no articles included a UK sample.

Child Participants

The mean age of children, where reported, was 9.1 years, with ages of children in the samples ranging from 5 to 19 years. All but two studies included both male and female child participants, although samples were predominantly male (74.9% of child participants). One study used an all-female sample.

Parent Participants

The mean age of parents, where reported was 40.1 years. Four samples included both mothers and fathers, although a majority of studies (n = 19) included only mothers' as parent participants.

Sample sizes ranged from 7 to 579 participants, excluding the study by Class et al. (2014), which utilised national births, deaths and health registers to include a total sample of 738,144 participants.

1.3.3.3 Measures

ADHD

A range of measures were used to diagnose ADHD. Five studies used the Child Behaviour Checklist (Achenbach & Edelbrook, 1983) to measure child ADHD, including a version that had been translated into Portuguese (Pimentel, Vieira-Santos, Santos, & Vale, 2011).

Conners ratings scales were used by four studies (Baker & McCal, 1995; Gagliano et al., 2014; Graziano, McNamara, Geffken, & Reid, 2011; van Steijn, Oerlemans, van Aken, Buitelaar, & Rommelse, 2014) , three of which measured both parent and teacher ratings of child ADHD behaviour.

Three studies used the Diagnostic Interview Schedule – IV (DISC-IV; Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000). The DISC-IV is a structured psychiatric interview which is able to address more than thirty clinical diagnoses that occur in children. The SNAP-IV (Swanson et al., 2001), which measures externalising behaviour, was employed by one study.

Stress

Parental stress was measured using self-report questionnaires in all but one study, which presumed mothers' stress level based on life events recorded on a national register (Class et al., 2014). Of the studies that used self-reported stress, a version of the Parenting Stress Index (PSI; Abidin, 1995) was used by fifteen studies to measure parenting stress. Six of these studies used the short version (PSI-SF), three of which were translated from English to Dutch, Portuguese, or Italian. One study used an adapted version of the PSI long form (PSI-LF), which had been translated in Chinese.

Other measures of parental stress included the Kinney Medical and Gynaecological questionnaire (Kinney, Levy, Yurgelun-Todd, Tramer, & Holzman, 1998), the Perceived Stress Scale (PSS, Cohen & Williamson, 1988), the Disruptive Behavior Stress Inventory (DBSI; Johnson & Reader, 2002) and an eDiary (Whalen, Odgers, Reed, & Henker, 2011).

Parental depression

A variety of measures were used to assess parental depression, including the Beck Depression Inventory (BDI-II; , GHQ (General Health Questionnaire; (Goldberg et al., 1997), and the Symptom Checklist-Revised (SCL-90-R, Derogatis & Lazarus, 1994).

1.4 Results

For clarity, the current review will discuss the selected literature according to the main factor being studied, such as child ADHD and parental stress, including any factors that exert an influence on or relate to these, such as child age, intelligence and co-morbid disorders such as child ODD and/or conduct disorder and parent ADHD. Because some studies have investigated one or more of these factors, there may be some duplication of studies as they may appear in two or more categories.

For further clarity, results of the review will follow the structure of the objectives detailed in point 1.2.1. To avoid excessive duplication, objectives 1 and 2, namely to identify measures of parental stress and to explore the degree of stress experienced, will be detailed together.

As a majority of the studies used a version of the PSI, these studies will be grouped together within the review and explored first.

1.4.1 Parental Stress and Child ADHD

1.4.1.1 Parenting Stress

Harrison and Sofronoff (2002) investigated the degree of parenting stress experienced by one hundred mothers of children with an ADHD diagnosis, who were referred to a Psychology clinic in Australia. Mother's completed measures rating the severity of child ADHD (CBCL; Achenbach & Edelbrook, 1983), behavioural disturbance, knowledge of ADHD, attributions of cause and controllability of ADHD-related behaviours, parenting stress and depression. Child behaviour was categorised as externalising and internalising using the CBCL with mean t-scores of 70.4 and 65.1 respectively for the ADHD children. This demonstrates that externalising behaviour was in the clinical, elevated range for this ADHD sample. Parentings stress was measured using the PSI-LF (Loyd & Abidin, 1985) and the average score was 300.28, which is in the elevated range. Multiple regression analyses found that demographic data (i.e. age and gender of the child; marital status and socioeconomic status of the parent) for ADHD families did not predict parenting stress ($F = 1.68$, $p > .05$). However, the inclusion of child behavioural characteristics improved prediction ($F = 2.81$, $p < .01$), with total CBCL being uniquely significant ($\beta = .41$, $p < .01$) in predicting parenting stress.

The results and conclusions of Harrison and Sofronoff's (2002) study are limited by the cross-sectional methodology, which only allows correlational rather than cause and effect

analysis. The use of regression analyses indicates predictors of parenting stress and depression, but does not elucidate the pathways by which child ADHD, parentings stress and maternal depression influence each other, which could be useful in terms of targeting clinical interventions for these disorders. The study used a validated measure of child ADHD, which was a strength in terms of the validity of the existence and degree of child ADHD. However, by relying on self-report, which is prone to bias in terms of social desirability (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003), the validity could be less compared to more objective measures.

A similar study was performed by Anastopoulos, Guevremont, Shelton and DuPaul (1992), who explored child and parent predictors of parenting stress. Participants (n=104) were selected from a clinical sample of 200 children and their parents, who were referred to a University clinic specialising in ADHD. Child ADHD status and severity was assessed using either the ADHD Rating Scale (Dupaul, 1991), or the CBCL (Achenbach & Edelbrook, 1983) which are both based on DSM criteria. Alternatively, ADHD diagnosis was based on the CBCL, i.e. if t-scores on the hyperactive dimension were 65 or higher. Maternal mental health was assessed using the SCL-90-R (Symptom Check List –90-Revised, Derogatis & Lazarus, 1994) and stress using the PSI-LF (Loyd & Abidin, 1985). Using stepwise multiple regression analyses, it was found that child factors accounted for 43% of the variance and parent variables, including general health, accounted for 51% of the variance in parenting stress. Hierarchical regression analyses found that child aggression, as measured on the CBCL, predicted 37% of the variation in Parenting stress, with child ADHD accounting for a further 4% of the variance. Parenting stress was found to be significantly higher for children with a duel diagnosis of ADHD and Oppositional Defiant Disorder (ODD).

As with the study by Harrison and Sofronoff (2002), the cross-sectional design of this study does not allow inferences regarding causality between child characteristics and parenting stress, although the regressions suggest that child characteristics can predict parenting stress.

A similar study was conducted by Baker and McCal (1995), who investigated and compared the degree of parenting stress experienced by the mothers of children who had either ADHD (n=16), learning/intellectual disability (LD hereafter, n=16), or were non-clinical/typically developed (n=16). Child ADHD was partially assumed as children were recruited from a University based parent training programme, and ADHD status was validated using the Conners Parent Rating Scale-Revised (CPRS-R, Goyette, Conners, & Ulrich, 1978). Children's scores on the CPRS-R needed to be 1.5 standard deviations or more above the mean for children the same age and gender. For the ADHD group the mean standardised score was 72.8, which is within the elevated or 'atypical' range, which provided further validation of the child ADHD. The estimated mean

Intelligence Quotient (IQ) for the LD group was 107 and it is noteworthy that the mean standardised IQ is 100 (D Wechsler, 1974). The author's recruitment procedure for the control group was not detailed, other than stating that the mothers indicated that their child did not have an LD. Control group participants were screened for ADHD using the Child Behaviour Checklist (CBCL; Achenbach & Edelbrook, 1983). Parenting stress was measured using the PSI-LF (Loyd & Abidin, 1985) prior to attending a parenting intervention, to control for potential treatment effects and subscales of the PSI were analysed separately, in particular the child and parent domain. Baker and McCal (1995) found that mothers of children with ADHD reported significantly more parenting stress on the child domain than both the parents of children with an LD ($p < .01$) and the control children ($p < .01$). Parent domain factors, i.e. parent characteristics and family context, were not significantly different between groups. Further exploration of child domain factors found that children with ADHD were reported to be significantly different to LD and controls in that they were rated as more 'demanding', 'moody' and less 'adaptable'. Parents reported more parenting stress related to child Distractability/Hyperactivity in the ADHD group compared to the LD group. Parenting stress within the LD group was significantly greater than the degree of stress related to controls' 'Distractability/Hyperactivity'. The reliability of the child domain can be questioned in terms of representing a true measure of child characteristics as both the parent and child domains were completed by the mother and measure similar dimensions. Therefore, one must question the independence of these two domains in terms of analysis and implications. However, this does give a measure of the degree to which parents perceive their child's demandingness and adaptability. Baker and McCal's (1995) definition of LD was based on a discrepancy model, the validity of which was questioned at the time of the study (Fletcher, Francis, Rourke, Shaywitz, & Shaywitz, 1992) . In the decades since this study, the defining criteria of LD has been defined to be based around intellectual ability and functional impairment (American Psychiatric Association, 2013). The IQ of the LD group was 107, which is within the 'average range' and not 2 standard deviations below the standardised average IQ as is now the norm for an LD diagnosis. Therefore the validity of the LD sample as representing the LD population is questionable, limiting the generalisability of the findings to an LD population. Also, the sample size of each group (n=16) was small and only including mothers as parent participants, which further limits the generalisability of the findings to all parents.

Breen and Barkley (1988) also compared parenting stress between different clinical groups of children to explore the effect of child gender and clinical diagnoses on parenting stress and depression. The four groups each consisted of 13 children between 6-11 years of age. Comparisons between groups revealed that male and female children with ADHD did not differ on

measures of maternal depression or parenting stress. Parenting stress was significantly higher in ADHD and mixed clinical group compared to controls. Breen & Barkley (1988) found that child psychopathology severity correlated with higher levels of parenting stress and that elevated stress levels were not specific to child ADHD. The sample size overall was reasonable (n=52), however, the small sample size of each group within the study (n = 13) and the variation in disorders in the mixed clinical group, limits the conclusions that can be made about which disorders result in elevated stress. It is therefore not certain to which extent different disorders contribute to the degree of parenting stress. As with the previous studies, a cross-sectional design was used and therefore cannot state the extent to which clinical disorders cause parenting stress, only that they correlate.

Group comparisons were also conducted by Wells et al. (2000) who investigated the association between parenting practices, parenting stress, mental health and the parent-child relationship across four groups of participants (n = 579) who were receiving treatment as part of the MTA project (Multimodel Treatment of ADHD). Participants were randomly allocated to one of four groups; 1) An intensive multifaceted behaviour therapy program; 2) A medication management system; 3) An integrated version of interventions one and two; 4) A comparison group which was assessed and referred to local care services. Wells et al. (2000) found that between pre- and post-intervention, all treatment groups differed significantly from the comparison group on 'negative parenting', i.e. lower levels of ineffective discipline and stress. However, there were no significant differences found between the three treatment groups in terms of parenting stress, marital conflict and maternal depression or any child measures. This implies that the interventions under evaluation all had some impact on parental stress and mental health. However, the authors were not able to identify the mechanisms by which the interventions in groups 1, 2 and 3 reduced these factors.

Gagliano et al. (2014) also used a comparison group to investigate differences in parenting stress across ADHD and non-ADHD groups, using an adapted version of the PSI-SF for an Italian sample. Gagliano et al. (2014) measured parenting stress and child behaviour using the Conners Parent Rating Scale-Revised (Conners, 1997), and child self-esteem. Results were compared across three groups of children; a control group (n=23), a group diagnosed with epilepsy (n=20) and an ADHD group (n = 22). The parents in the ADHD group had significantly higher levels of stress than both the control and epilepsy groups. Gagliano et al. (2014) further explored potential sources of parenting stress and found that child oppositional symptoms/behaviours were significantly correlated with parenting stress. i.e. that higher ratings of child oppositional symptoms related to higher parenting stress. Child age also correlated to parenting stress in that

parents of older children had significantly higher stress compared to younger children across samples. Somewhat counterintuitively, parenting stress was found to be significantly higher for parents of children who were prescribed medication for ADHD. This could indicate that ADHD is not the main driver in terms of parenting stress, as it would be expected that medication would reduce ADHD-type behaviour and therefore result in lower levels of stress compared to ADHD children who were unmedicated. However, the authors argue that the higher rates of stress for those taking medication could be due to a cultural influence, in that medication for ADHD was relatively new and there were concerns over the impact of this on child health. This could indicate that parenting stress taps into more than parenting-specific stress and captures stress more generally. However, the lack of inclusion of any female children, the relatively small sample size and low variance in child age (9-12 years old) within the sample limits the generalisability of these findings. Although further investigations into the impact of medication on parenting stress over time in Italy could clarify understanding of the links to parenting stress in an Italian sample.

A similar study exploring the cross-cultural impact of child ADHD on parenting stress was conducted by (Pimentel et al., 2011) who investigated predictors of parenting stress for mothers of 52 clinically referred children with ADHD in Portugal. ADHD was diagnosed by a multidisciplinary team at a paediatric hospital in Lisbon using a clinical diagnostic interview based on DSM criteria. Child behavioural problems were measured using a translated version of the CBCL, separating behaviour into externalising and internalising subtypes. The adapted CBCL consists of 113 behaviour descriptions and participants were required to rate whether the item was “not true”, “sometimes true”, or “often true”. The PSI-LF was also translated into Portuguese (Abidin & Santos, 2003) and consisted of 108 items rated in the same manner as the original version. Finally, parental rearing practices were measured using the adapted EMBU-P (Castro, De Pablo, Gómez, Arrindell, & Toro, 1997) which is a 42 item self-report inventory which assesses adults’ perception of how they themselves were parented. Pimentel et al. (2011) found that the parents of ADHD children had significantly higher parenting stress than norms on child domain ($p < .01$) and total PSI score ($p < .01$), but not parent domain ($p = .60$). Within the child domain of the PSI, child hyperactivity ($p < .01$) and how demanding the child was ($p < .01$), were both significantly higher than cultural norms, however, parental rearing practices were not significantly different between the mothers of ADHD children and cultural norms. The total CBCL score was significantly higher than norms for both male ($p < .01$) and female ($p < .01$) children. Multiple regression analyses showed that child aggressive behaviour, as measured by the CBCL predicted parenting stress [$R = .60$, $R2 = .34$; $F(2, 49) = 13.84$, $p < .001$; $Beta = .52$, $t = 4.38$, $p < .01$]. Limitations include the ADHD sample, which included children who were on medication for ADHD

only, meaning that the findings cannot be generalised to non-medicated ADHD children. A further limitation was that the sample was from a single clinic in Lisbon, using adapted versions of the CBCL and PSI, which are less well validated than original versions, thus limiting the reliability of findings. However, the study does demonstrate the cross-cultural consensus that child ADHD and conduct disorder/aggression are associated with increased parenting stress.

Van der Oord, Prins, Oosterlaan and Emmelkamp (2006) also used an adapted version of the PSI-SF to investigate the relationship between parenting stress, depression and agreement between parent and teacher ratings of ADHD in a Dutch sample. Referrals were received from three child psychiatric outpatient services in the Netherlands and ADHD diagnosis was made using the DISC-IV (Shaffer et al., 2000). Van der Oord et al., (2006) found that agreement between parent and teacher ratings varied depending on child disorder, in that the hyperactivity/impulsivity subscale had no agreement ($r = -.04$), whereas ODD and CD had moderate and significant agreement between parents and teachers ($r = .33$ and $r = .32$ respectively). However, the lack of a third, professionally qualified observer and/or diagnosis, means that it is not possible to conclude whether parent or teacher ratings are more valid, only that they do not concur with eachother. Stepwise regression analyses found that parents reported higher scores on child inattention, hyperactivity/impulsivity, conduct disorder and ODD behaviours than teachers. However, again the lack of triangulation in the data gathering, limits any conclusions on why parent and teacher ratings on child hyperactivity/impulsivity did not generally concur.

Van Steijn et al. (2014) investigated the rates of parenting stress, depression and ADHD experienced by mothers and fathers of children with ADHD and/or Autism in a Dutch sample. Child participants were screened using the Conners' Rating Scale – Revised (CRS-R; Conners, 1997), and parental ADHD and ASD was assessed using the Conners' Adult ADHD Rating Scale-Revised (CAARS; Conners et al., 1999). These scores were compared to those of non-ADHD siblings who acted as a control group. The relatively large sample size ($n = 174$) was a strength of the study. Parents reported significantly more stress parenting children with ADHD, with mothers reporting significantly higher stress levels than fathers. It was also found that the stress of mothers with a child who has Autism or ADHD child was within the clinical range, but parenting stress levels were not elevated for non-Autistic or non-ADHD child siblings. This indicates that parenting stress may not tap into a general level of stress and is a specific measure of the degree of stress experienced in parenting a specific child. The inclusion of the probands' siblings as a comparison group was a strength of the study as this controlled for many of the possible confounding variables which could contribute to the more general parental stress experienced by

mothers and fathers of both ADHD, Autism and non-ADHD or Autism children. The use of self-report measures could present a bias in scores and not reflect the 'true' degree of stress experienced by mothers. There was a potential ceiling effect of PSI scores, which could explain lack of increased stress by mothers of a child who has both ADHD and Autism. However, as PSI scores were not reported, it is not possible to confirm this. The authors lack of any qualitative information regarding the factors that corresponds to elevated parenting stress levels for parents was a limitation of this study. The finding that the degree of parenting stress experienced by the parents of an ADHD child was signigicantly higher for mothers than fathers indicates that parent factors also warrant further investigation as they may account for some of the variance in parenting stress.

A similar study was conducted by Tzang, Chang and Liu (2009) who explored the relationship between parenting stress, using an adapted version of the PSI, and separate subtypes of ADHD within a Taiwanese sample. A total sample of 109 was used for comparisons between ADHD subtypes, parenting stress and mental health. ADHD was diagnosed by a psychiatrist and ADHD subtype was assessed using a translated version of the MINI Kid (Sheehan et al., 2010). Subtypes included ADHD Inattentive (n = 41) and ADHD combined subtype type (n = 68). Parenting stress was assessed using an adapted Chinese version of the PSI and parent mental health was assessed using the Symptom Checklist (SCL-90-R, Derogatis & Lazarus, 1994). Three global severity indices were used for comparison, namely Global Severity Index (GSI), which is the average score of all 90 items, Positive Symptom total (PST) and Positive Symptom Distress Index (PSDI). Combined ADHD subtype was highly related to parenting stress and maternal mental health. However, neither parental anxiety nor depression were significantly different between ADHD subtypes. Combined ADHD subtype was associated with increased risk of comorbid Oppositional Defiance Disorder and Conduct Disorder compared to Inattentive subtype. (Tzang et al., 2009) found that ODD was comorbid in 64.7% of the ADHD-combined subtype.

Tzang et al.'s (2009) study showed good validity in terms of ADHD diagnosis in that a qualified mental health professional assessed participants and validated measures of maternal mental health were also employed. However, there are several limitations for the generalisability of Tzang et al.'s (2009) study, such as the lack of a control group to compare stress levels, the sample being drawn from a single hospital, which reduces the generalisability of findings beyond Taiwan, and the cross-sectional design, means that the authors were not able to state that higher stress related to co-morbidity was the result of ADHD subtype.

Graziano et al. (2011) further investigated the extent to which factors additional to the presence of child ADHD influences parenting stress. The authors investigated perceived self-regulation deficits across behavioural, cognitive, and emotional domains for children with ADHD in an attempt to explain the association between the severity of ADHD symptoms and parenting stress. The sample contained 62 male and 18 female children, all of whom had a previous diagnosis of ADHD Inattentive type (n = 25), ADHD Hyperactive/Impulsive type (n = 1), ADHD Combined type (n = 51) and ADHD Not Otherwise Specified (n = 3), all of whom were recruited from a university hospital in the USA. ADHD diagnosis was validated by a licenced Psychologist using the Conners' Parenting Rating Scale (Conners, Sitarenios, Parker, & Epstein, 1998) and Parenting Stress was measured using the PSI-SF (Abidin, 1995). Perceived aggressiveness of children was measured using the Behavior Assessment System for Children (BASC-2; Kamphaus, Reynolds, Hatcher, & Kim, 2004), emotional functioning was measured using the Emotional Regulation Checklist (ER Checklist; Shields & Cicchetti, 1997) and executive functioning was assessed using the Behaviour Rating Inventory of Executive Functioning (Gioia, Isquith, Guy, & Kenworthy, 2000). Graziano et al. (2011) found that the severity of child hyperactivity/impulsivity and not inattention was associated with parenting stress. Several significant indirect effects between child hyperactivity/impulsivity on parenting stress were found, namely child aggressiveness symptoms, emotional lability/reactivity and executive functioning difficulties. However, none of these mediators had a significantly greater effect on parenting stress than the other. Also, the cross-sectional nature of this study and shared variance from relying solely on parent-report, means that assessment bias could be present. However, the validity of the ADHD diagnosis and subtype has good credibility in that the diagnosis was scruitinised by a mental health professional using a standardised and well validated measure.

Parental factors were investigated by Podolski and Nigg (2001) who explored the relationship between child ADHD and parental distress, which included both maternal and paternal stress. Parenting stress was investigated using two measures, namely the Satisfaction with Parenting Performance subscale of the Parenting Satisfaction Scale (PSS, Guidubaldi & Cleminshaw, 1985) and the PSI-SF (Abidin, 1995), Parent Distress subscale. Parent coping with problematic child behaviours was measured using the Family Crisis Oriented Personal Evaluation Scales (F-COPES; Lavee, McCubbin, & Olson, 1987) . Child ADHD was diagnosed using the parent and teacher CBCL (Achenbach & Edelbrook, 1983) and the Diagnostic Interview Schedule for Children (DISC-IV, Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000). The DISC-IV was used to further distinguish ADHD combined (ADHD-C) and attention deficit (ADD) and to identify children who met diagnostic criteria for ODD (30%) and CD (8%), which were combined for analyses. LD

was screened for using the Wechsler Individual Acheivement Scale (WIAT, Wechsler, 2005) whereby children with a standard score below 85 on a word recognition task were excluded from the study. Podolski and Nigg (2001) found that mothers of ADHD-C children reported significantly more distress than controls but not mothers of ADD children. Similarly, maternal PSI distress was not significantly different between ADHD, ADD and controls ($p = .76$). However, parent role-specific stress, as measured by the PSS, was significantly associated with child ADHD-C and ADD for both mothers and fathers. Parent distress on the PSI was significantly associated with hyperactivity and not ADD for fathers. PSI distress was not significantly associated with ADD or hyperactivity for mothers. However, child ODD and CD combined were significantly associated with maternal and paternal stress on the PSS and PSI. After controlling for ODD, PSS stress remained significantly associated with child ADD but not hyperactivity. Parental coping was also investigated, with findings that lower maternal parenting stress as measured on both the PSS and PSI was significantly associated with greater use of positive reframing ($p < .01$ and $p < .05$ respectively). Similar correlations were found for paternal parenting stress, which was correlated with higher levels of positive reframing on both the PSS ($p < .05$) and PSI ($p < .05$). A strength of the study by Podolski and Nigg (2001) is that two measures of parenting stress were used, which allowed for both triangulation of the data and validation of the PSS and PSI measures. The differences between some of the findings in terms of parenting stress and child ADHD implies that in this sample, the PSS was more sensitive to parenting stress than the parent distress subscale of the PSI-SF alone. The inclusion of only the parent distress subscale of the PSI-SF in analyses of parenting stress, reduces the generalisability of this finding as most studies in the domain of parenting stress use measures of the total parenting stress. Further limitations of this study include the cross-sectional design and the lack of independence of the control group who were selected from same source as clinical group, i.e. the same general hospital. The validity of the LD screening is also highly questionable in that the WIAT is a measure of attainment rather than intelligence. This means that children who had a non-LD but an attainment level below 85, would have been excluded from the sample. Conversley, children with an LD who had an attainment level above the cut-off would have been included in the sample, which could have confounded findings.

Several studies have used a repeated measures design to explore the factors that influence the degree of parenting stress experienced by parents of ADHD children. Anderson and Guthery (2015) investigated the effect of an 8 week mindfulness-based intervention for reducing mothers' parenting stress. Children ($n = 7$) were self-selected from a private clinic for children with ADHD or exhibited ADHD traits. The intervention involved reading a mindfulness book; Everyday Blessings:

Mindfulness for parents (Kabat-Zinn, 2009). The PSI-SF was completed before and after the 8 week period and a Wilcoxen Signed-rank test was performed, indicating a significant decrease in PSI-SF between pre- and post-intervention ($p = .018$), which the authors attributed to the mindful parenting intervention. The findings of Anderson and Guthery (2015) should be interpreted with caution given the low sample size and high attrition rate (65%). Also, the self-directed nature of the intervention has the inherent inability to establish whether or not parents read the book and therefore whether changes in parenting stress are attributable to the intervention. Finally, the lack of ADHD measure and small sample size limits the generalisability of the findings as it is not clear how many of the children had ADHD and the degree of disruptive and comorbid diagnoses. The relatively low level of parenting stress prior to the intervention is in contrast to the elevated levels often reported by parents of children with ADHD and/or ODD, ASD and LD, which implies that the children may not have met diagnostic criteria for ADHD. The findings of this study highlight the possibility of managing parenting stress using cognitive processes, irrespective of the presence of child developmental disorders. However, the lack of control over variables, the uncertainty regarding the reliability of the ADHD diagnoses and the small sample size following dropout, means that the validity of the conclusions drawn by Anderson and Guthery are low.

Another intervention aimed at reducing parenting stress was studied by Treacy, Tripp and Baird (2005) who explored the impact of a 9 week course specifically designed to target parental stress in families with ADHD children in New Zealand. Children and their parents were recruited from an outpatient paediatric clinic ($n = 11$) and a University-based research clinic ($n = 31$). Child ADHD was assessed using the CBCL by a licensed Psychologist, incorporating child, parent and teacher behavioural rating. Parenting stress was measured using the PSI-LF and parents also completed the Parent Scale (Arnold, O'Leary, Wolff, & Acker, 1993), which is a 30-item questionnaire assessing parenting styles and disciplinary practices and consisting of three subscales; Laxness (permissive discipline), Over-reactivity (displays of anger, meanness, irritability), and Verbosity (reliance on lengthy verbal responses even when language is ineffective). The Parent Scale displays moderate to high internal consistency and high temporal stability are reported for the three scales (Arnold et al., 1993). Parenting Scale scores have been found to distinguish between mothers of clinically-referred and non-clinical children (Arnold et al., 1993) and parents of children with and without ADHD (Harvey, Danforth, Ulaszek, & Eberhardt, 2001). Parents completed measures pre- and post-intervention and scores were compared between and within participants. The parenting intervention consisted of two hour-long sessions, which ran for 9 consecutive weeks. Attrition rates were 15.9% to 16.7% between pre and post group measures. Between pre and post group, there was a significant reduction in Parent Domain

Parenting stress for 17.9% of mothers, 7.1% of whom had a clinically significant change (Jacobson & Truax, 1991) in Parent Domain PSI. Similar proportions of reductions in severity were found for Child domain PSI scores. Parenting style, significantly improved for 12.1 to 28.1% of participants across domains, with 6.1 to 9.4% of parents experiencing a clinically significant change over the time of the intervention. This contrasted to fathers' ratings of stress, in that although 35.3% to 47.1% had a reduction in parent and child distress respectively, only between 0 - 5.9% had a significant reduction and none had a clinically significant change in stress levels. The proportion of parents who experienced reductions in parenting stress and/or improvements in parenting style were very low, indicating that parenting style courses are not successful in creating significant changes in parenting stress. However, the lack of a control group, such as a waitlist control for the course, means that it is not possible to conclude that the reductions in parenting stress were due to course membership and/or parenting style.

In a similar study, (Heath, Curtis, Fan and McPherson (2014) investigated the effect of attending a behavioural parent group (n = 43) on measures of parenting stress and self-efficacy (PSE). It was found that child participants had reductions in ADHD symptoms and parents had both reductions in parenting stress and improvements in self-efficacy. However, there was a weak correlation between degree of severity change and improvements in parenting stress and PSE. Parents of children with ADHD whose symptoms decreased to the 'normal' range had a significant decrease in parenting stress. Limitations of the study by Heath et al. (2014) include several sampling issues, in that participants were from a single group, with no control group, such as a waitlist control. This omission means that it is not possible to state that the group attendance was uniquely responsible for changes in ADHD symptom severity, nor parenting stress and self-efficacy. Despite the limitations in terms of causation, the study was useful in demonstrating that irrespecitive of which factors were the agents for change, when child ADHD symptoms and parenting stress reduced, there remained a positive correlation between parenting stress and ADHD severity. The validity of the child ADHD status was strengthened by the researchers employing a healthcare professional to assess the child. However, the reliability of the degree of ADHD symptoms could be biased by the self-report method used. The ADHD children were also relatively young (M = 5.6 years old) compared to most studies investigating the stress levels of parents with ADHD children, which reduces the generalisability of findings to the wider literature on parenting stress and child ADHD. Finally, there was a possible selection bias in that all participants were seeking treatment, representing a more motivated subsample of parents with ADHD children and therefore not representative of the population as a whole.

1.4.1.2 Parental stress

Although parenting stress (PSI) was the most widely used stress measure within the review articles, there are several other measures that tap the degree of stress experienced by parents of children with ADHD. Johnson and Reader (2002) developed a similar measure of stress, the Disruptive Behavior Stress Inventory (DBSI), which is a 40-item measure that provides indices of the frequency and stressfulness of events experienced by parents in the previous six months. Johnson and Reader (2002) compared the rating by parents of ADHD (n=55) and non-ADHD children (n=38) and found that parents of children with combined-type ADHD experienced higher levels of stress than parents of inattentive-type ADHD ($p<.005$) and non-ADHD ($p<.001$).

The adequacy of the DBSI was further assessed in a follow-up study (Reader, Stewart, & Johnson, 2009), again comparing the stress levels of parents of children with ADHD (n=124) and without (n=118). Similar to the 2002 study, it was found that parents of ADHD children experienced higher stress levels ($p<.001$). Comparisons within the ADHD group found that parents of children taking ADHD medication, experienced both a higher number of stressor and a higher degree of stress. A limitation of both studies is the lack of control for comorbid disorders, which may confound findings.

The studies by Johnson and reader (2002) and Reader et al. (2009) demonstrated that parental stress is significantly higher for parents of ADHD children compared to controls. The inclusion of large control groups increases the credibility of these findings. However, the cross-sectional questionnaire method limits the conclusions around what causes the relatively higher parental stress for parents of ADHD children.

Whalen et al. (2011) investigated the dynamics of the relationship between child behaviour and parental stress at 30 minute intervals over a 7 day period. The sample consisted of two groups; an ADHD group (n = 51) who were diagnosed using the K-SADS (Kaufman et al., 1997) and who were on stimulant (n = 26) or non-stimulant (n = 25) medication for ADHD. The comparison group (n = 58) did not have a diagnosis of LD or behavioural problems and were not taking psychoactive medication. Participants answered questions on an electronic diary, which included items that tapped behaviours, moods, and contexts, with children reporting their own behaviours and mothers reporting on themselves and their children's behaviour. Child ADHD was measured in three dimensions; concentration, hyperactivity/impulsivity and opposionality (i.e. how oppositional children were). Maternal ADHD was assessed using the Assessment of Hyperactivity and Attention (AHA; Mehringer et al., 2002) and children also completed the CBCL (Achenbach & Edelbrook, 1983) or the SNAP-IV (Swanson et al., 2001) to rate the degree and presence of child

ADHD. Maternal depression was measured using the Brief Symptom Inventory (BSI; Derogatis & Savitz, 2000) which is an adapted, shorted version of the SCL-90-R. BSI strongly correlates with the SCL-90-R depression scale (r = .95). Maternal cognitions were obtained from scores on the DBSI (Reader et al., 2009), which asks the mother to rate whether any of 40 child-related stressors had been experienced in the previous 6 months. For each item that they had endorsed, they are asked to rate the intensity of stress caused by said behaviour on a four point scale ranging from "not at all stressful" to "very stressful". Subsequently, the DBSI provides two scores; the number of stressors and the average degree of stress parents experience related to chid behaviour. Maternal stress and child ADHD-type behaviours exhibited moderate to strong associations "in the moment", irrespective of whether child behaviour was reported by mothers or the child. This mother-child synchrony emerged for the comparison group as well as the ADHD group, although the associations were stronger for the child with ADHD group. There were significant interactions between diagnostic group and child behaviour interactions, indicating a stronger association between stress and child behaviour in the ADHD group. There were also significantly stronger associations between maternal parental stress and child behaviour when the child self-reported anger, impatience and restlessness.

Maternal risk, which was a combination of maternal ADHD and depression, moderated the effect between maternal parental stress and child behaviour problems. Specifically, mothers with a relatively higher risk of themselves having ADHD and or depression, had stronger associations between maternal stress and child behaviour. This association could be explained by the maternal sensitivity hypothesis, which states that mothers with higher risk may be more sensitive, reactive and/or vulnerable to variations in their child's behaviour problem level (Whalen et al., 2011). The fact that child-reported behaviour correlated with maternal stress indicates that stress was not caused solely by maternal perceptions of child behaviour being problematic and that child behaviours are the major contributor to parental stress.

Maternal risk also moderated maternal parental stress and child problematic behaviour in the comparison group, indicating that maternal ADHD and depression are important factors for parental stress generally, irrespective of whether they have a child with ADHD. Maternal parental stress remains elevated when children are receiving psychotropic medication to manage ADHD, indicating that pharmacological interventions alone are not sufficient to reduce stressing and/or disruptive child behaviour to the level of a non-ADHD child. The inclusion of a comparison group allowed conclusions on the differences and similarities in terms of parental stress experienced by mothers in both the ADHD and control group. However, the generalisability of the findings is limited by the sample demograpgics, specifically to American, middle-income, predominantly

white mothers and children. The use of repeated measures with triangulation of child behaviour represents a more valid rating than self-report alone. The addition of parents also rating their own parental stress "in the moment" allowed speculation of a causal relationship between child behaviors and parental stress, which is the within subjects design allowed.

In an attempt to investigate biological antecedents of child ADHD, several studies explored the relationship between maternal stress prior to the child's birth, using a range of measures.

Ronald, Pennell and Whitehouse (2011) investigated the effect of prenatal maternal stress (PNMS) on child development, namely neurodevelopmental disorders, such as Autism and ADHD. Maternal stress was measured at two points during pregnancy (18 and 34 weeks) using the Australian stress scale (Tennant & Andrews, 1976) somewhat based on the Social Readjustment Rating Scale (Holmes & Rahe, 1967). Mothers were asked to indicate whether they had experienced any common life stresses during pregnancy, including death of a close friend or relative, separation or divorce, and marital problems (Tennant & Andrews, 1976). When the child was two years old, mothers completed the CBCL (Achenbach, Edelbrock, & Howell, 1987), rating their child's behaviour on a three point Likert scale. Using multiple regression analyses, and after controlling for autistic traits, sociodemographic factors, smoking behaviour, alcohol intake, and autism traits, PNMS significantly predicted child ADHD at two years of age for male ($p = .003$) and female children ($p = .001$). A significant association between maternal smoking and child ADHD behaviours was found. However, the reliability of assessing ADHD for children aged 2-3 years old from only the mothers perspective, limits the validity of the CBCL scores in this study. Further limitations of Ronald et al.'s (2011) study include the presumed equivalence of stresses, which is in contrast to Holmes and Rahe's (1967) theory of life events existing on a scale in terms of stressfulness. Finally, the study does not include a subjective measure of distress. i.e. the degree of stress is not measured, only the presence of common stressors, which could give a false level of stress on which to compare to child ADHD.

Class et al. (2014) also explored associations between generally stressful events experienced by mothers during pregnancy and child ADHD. Class et al. (2014) investigated the relationship between pre-, peri- and post-pregnancy stress on child ADHD by integrating a number of national registers, including those for births and deaths to examine the health data of 738,144 children born between 1992 and 2000 in Sweden. Maternal stress was a dichotomous variable, namely whether mothers had experienced the death of a first degree relative during the 6 month period before conception, during pregnancy, or within the first two years following childbirth. Using hierarchical regression analyses, only prenatal stress in the third trimester

increased the risk of offspring developing ADHD ($p < .05$) and the association between postnatal stress and child ADHD was not significant. Although Class et al.'s (2014) study benefits from a very large sample and multiple temporal measures of stress during and after birth, there are several limitations. The measure of stress taps only one stressor, i.e. the death of a family member, in a dichotomous manner. As with the study by Ronald et al. (2011), the degree of stress incurred might not be equal for all mothers and therefore the sensitivity of this as a measure of stress is reduced. However, Class et al.'s (2014) study is helpful in terms of investigating whether the timing of known stressors increases the likelihood of child ADHD developing, which could offer insight into the aetiological mechanisms of this disorder.

A similar study exploring the association between pre-birth stress and child ADHD was conducted by Choudhry et al. (2012) who investigated the relationship between maternal parental stress during and after pregnancy and ADHD. Participants were recruited from an outpatient hospital clinic in Canada, with referrals from a range of clinical sources, including GPs, social workers and schools. Choudhry et al. (2012) attempted to control for possible confounding factors of parenting style, home environment, parental mood disorders and parental ADHD by matching participants with their non-ADHD siblings. ADHD diagnosis was administered using a clinical interview by a Psychiatrist for the ADHD participants and non-ADHD siblings were diagnosed using the DISC-IV and school observation. Children in both groups completed the Child Behavior Checklist (Achenbach & Edelbrook, 1983) and maternal parental stress was recorded for the pre-natal period using the Kinney Medical and Gynaecological questionnaire (Kinney et al., 1998) at clinical interview. Mothers' stress scores ranged from 1 (no stress), 2 (mild stress), 3 (moderate), 4 (severe) and 5 (extreme) and was rated retrospectively. Mothers reported high levels of stress more frequently for ADHD (29 high and 42 low) children compared to non-ADHD siblings (14 high and 57 low). Mothers' postnatal stress was not significantly different between groups, with only 5 from 71 ADHD children being rated as high stress and 4 from 71 non-ADHD children being rated as high stress. Smoking and alcohol consumption was measured and controlled between groups by the same mother reporting for each pair of siblings. This study implies that increased general stress pre-birth rather that post-birth increases the likelihood of a child developing ADHD. However, despite the attempt to measure both pre and post- birth stress, mothers' pre-birth ratings were reterospective and could have been biased by the level of post-birth parenting stress experienced by the mother. The use of self-rated, retrospective measures of parental stress is liable to recall bias and is therefore far less reliable than measuring current stress levels , or 'in the moment' parental stress.

Another longitudinal, repeated measures study investigating the effect of smoking and parental stress on childhood ADHD was conducted by Rodriguez and Bohlin (2005) who conducted a longitudinal study in Sweden. Expectant mothers (n=393), were followed up at several points during pregnancy and self-rated their stress level using the Perceived Stress Scale (PSS, Cohen & Williamson, 1988). The PSS measures appraisals of stress and consists of 10 items, each scored on a Likert scale from 1 (never) to 5 (experienced very often) over the previous 4 weeks. Rodriguez and Bohlin (2005) also measured the number of cigarettes mothers smoked at each time point using self-report.

Expectant mothers repeated smoking and stress questionnaires during pregnancy and all participants were followed up 7 years later, with 290 parents responding to follow-up, whereby the child was assessed for ADHD symptomology by the study's authors and a teacher. Only 7 children, all of whom were male, met diagnostic criteria for ADHD, which represented 3.37% of the sample.

Both maternal parental stress ($p < .05$) and smoking ($p < .01$) independently contributed to a multiple regression model and together explained 8.7% of the variance in child ADHD symptoms (adj. $R^2 = .0872$). Univariate logistic regression analyses indicated that only stress was statistically significant in predicting child ADHD symptoms ($p < .01$, Cohen's $d = 1.20$). Maternal stress during pregnancy was found to explain 22% of the variance in child ADHD symptoms and further analyses found that independently, smoking and stress in the first half of pregnancy were significantly associated with child ADHD at follow-up ($p < .01$). The authors attribute this to the neurophysiological development of the foetus being adversely affected in terms of dopamine receptor functioning and subsequent increased hyperactive behaviour. The legitimacy of the ADHD measure employed by the study is questionable as the authors do not state who assessed the frequency of ADHD symptoms using DSM-IV criteria. DSM-IV states that only clinicians are qualified to use the criteria for diagnostic purposes and neither of the authors appears to be appropriately qualified to use the DSM for diagnostic purposes. However, the inclusion of teacher report was a useful measure in terms of triangulating data and exploring the pervasiveness and consistency of ADHD-type symptoms. Nevertheless, teachers are also not listed as suitably qualified to interpret DSM-IV criteria, which again calls into question the validity of the child ADHD scores. The study also had a relatively high attrition rate, with 51.7% of the original sample not completing follow-up measures. However, this is understandable given the length of time between follow-up and the likely changes in the lives of participants, including contact details. The study may also have benefited from including measures of maternal parental stress and

smoking at follow-up to compare post-birth associations between stress, smoking and child ADHD, which are notable omissions.

1.4.2 Parental depression and child ADHD

Harrison and Sofronoff (2002) measured maternal depression using the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961), which is a 21 item multiple-choice inventory that is widely used in clinical and research settings, and has good internal consistency and test-retest reliability. It correlates significantly with clinicians' ratings of depression and has satisfactory discriminatory validity. The mean BDI score for mothers in the study by Harrison and Sofronoff (2002) was 10.32, which is below the recommended clinical cut-off (Beck et al., 1996); Lasa, Ayuso-Mateos, Vázquez-Barquero, Díez-Manrique, & Dowrick, 2000), which is indicative of clinical symptomatology. Harrison and Sofronoff (2002) performed a multiple regression analysis and found that child and parent demographic factors did not predict maternal depression ($F = 1.30$, $p > .05$), however, child ADHD behaviours, i.e. CBCL total score did predict maternal depression ($F = 2.81$, $p < .01$). This indicates that child ADHD and parental depression are related, but the correlational design and lack of control group means that it is not possible to infer causality.

The BDI was also used to measure depression in the study by Breen and Barkley (1988) who found that the non-ADHD clinical group were significantly more depressed than the female ADHD and control groups. Average level of depression was 5.35 for parents of ADHD groups, 3.00 for controls and 6.9 in the non-ADHD clinical group. Across the groups, parenting stress and depression were positively correlated. Although the inclusion of a control group allowed for comparisons between clinical and non-clinical groups, the small number of participants in each group ($n = 13$), limits the generalisability of these findings as the variance in depression and stress scores could be due to sampling error.

Van der Oord et al. (2006) found that the level of depression in a Dutch ADHD sample was in the non-clinical level. However, a separate Dutch study, van Steijn et al. (2014) measured parental depression using the General Health Questionnaire (GHQ-60) and found that depression partially mediated the relationship between child ADHD and maternal parenting stress as measured by the PSI-SF.

Tzang et al. (2009) assessed parental mental health using the three global severity indices of the Symptom Checklist (SCL-90-R, Derogatis & Lazarus, 1994), specifically the Global Severity Index (GSI), which is the average score of all 90 items, Positive Symptom total (PST) and Positive

Symptom Distress Index (PSDI). It was found that the combined ADHD subtype was highly related to parenting stress and maternal mental health. However, neither parental anxiety nor depression was significantly different between ADHD subtypes. The self-report method employed may have biased results, however, the large sample (n = 109) increases the reliability of the study.

The parenting intervention study by Treacy, Tripp and Baird (2005) found that there was a significant reduction in depression, as measured by the BDI, for 17.2% of mothers and 5.6% of fathers. For 10.3% of mothers this also equated to a clinically significant change (Jacobson & Truax, 1991). However, none of fathers had a clinically significant change in depression severity. The authors suggest that the intervention reduced parental arousal, i.e. Parenting Distress scale of the PSI-LF, which in-turn reduced depression scores. This could mean that interventions to reduce parenting stress, could improve both the depression and general mental health of parents. This study provides the most convincing evidence that parenting stress and maternal depression are not only correlated, but that parenting stress causes maternal depression. Although the generalisability of the findings are limited by the sample size being small (n = 42) and the control group being recruited from a different population than the ADHD group.

Maternal depression was also measured in studies investigating the relationship between PNMS and child ADHD (Class et al., 2014; Ronald et al., 2011) using the Blues Scale (Kennerley & Gath, 1989). Ronald et al. (2011) found that postpartum maternal depression was significantly and positively associated with child ADHD aged two years old.

1.4.3 Parental Anxiety and Child ADHD

From the reviewed studies, only the population-based study by Class et at. (2014) reported measuring parental anxiety specifically. Class et al. (2014), who investigated associations between parental stress, mental health and childhood disorders, including ADHD, found that parental anxiety was not associated with child ADHD. However, Class et al. (2014) reported neither which measure of anxiety was used nor the relative levels of anxiety for parents of children with or without ADHD. This means that it is not possible to critique the measures themselves. However, the general method employed involbed using data from national registers (i.e. the National Patient Register), meaning that parental anxiety was likely recorded as a static dictotomous variable. Employing such a simplistic and limited measure of anxiety is likely to lose the nauced anxiety presentations and as such do little to elucidate the relationship between parental anxiety and child ADHD.

1.4.4 Other factors related to child ADHD and parental stress

Smoking

Two studies reported a relationship between smoking and child ADHD (Rodriguez & Bohlin, 2005; Ronald et al., 2011), with smoking and stress in the first half of pregnancy in particular being significantly associated with child ADHD ($p < .01$).

Parental ADHD

Theule, Wiener, Rogers and Marton (2011) investigated predictors of parent domain parenting stress related to child ADHD in a sample of children with ADHD (n=50) and without (n=45). Child ADHD was measured using CRS-R (Conners, 1997) and parent ADHD was measured using the Conners' Adult ADHD Rating Scale (CAARS; Conners et al., 1999). It was found that parent ADHD was the strongest predictor of stress and that low perceived social support was related to higher parenting stress. How oppositional the child was perceived to be by parents also predicted stress.

The study by Theule et al. (2011) further highlights the importance of parent-level factors in terms of parenting stress.

The CAARS was also employed by Van Steijn et al. (2014) who assessed parental ADHD and ASD using the (CAARS) and found that maternal, but not paternal ADHD, was related to increased parenting stress.

Whalen et al. (2011) assessed maternal ADHD using the Assessment of Hyperactivity and Attention (AHA; Mehringer et al., 2002) and combined with mothers' depression scores to create a 'maternal risk' rating, which was found to moderate the effect between maternal parental stress and child behaviour problems. Specifically, mothers with a relatively higher risk of themselves having ADHD and or depression, had stronger associations between maternal stress and child behaviour in both the ADHD and control groups. This association was explained using the maternal sensitivity hypothesis, which was outlined earlier in the review.

Conduct disorder / Oppositional Defiant Disorder

ODD has been found co-occur with 64.7% of children with ADHD (Tzang et al., 2009). Higher parenting stress has been found to be associated with CD (Breen & Barkley, 1988) and children's ODD (Anastopoulos et al., 1992), although ODD has been found to predict parenting stress when rated by parents but not when rated by teachers (Theule et al., 2011).

Child Age

Of the studies that reported associations between child age and parenting stress, it was found that age was not related (van Steijn et al., 2014) and one found that parents of older children had significantly higher parenting stress levels (Gagliano et al., 2014). However, no studies reported a relationship between child age and ADHD symptoms or diagnosis.

1.5 Discussion

1.5.1 Main findings

Parental Stress

Across studies, parental stress is consistently elevated for parents of children with ADHD compared to the parents of healthy controls (Anastopoulos et al., 1992; Baker & McCal, 1995; Breen & Barkley, 1988; Gagliano et al., 2014; Harrison & Sofronoff, 2002; Pimentel et al., 2011; van Steijn et al., 2014). This relatively elevated level of stress has been found to be present prior to the child's birth (Choudhry et al., 2012; Class et al., 2014; Heath et al., 2014; Ronald et al., 2011) and following ADHD diagnosis in childhood across several different stress measures (Abidin, 1995; Achenbach & Edelbrook, 1983; Shaffer et al., 2000). Parental stress has been found to vary depending on several factors, such as the degree of ODD and CD in the sample (Tzang et al., 2009), the degree of child aggressiveness and executive functioning deficit (Graziano et al., 2011), parent cognitions (Podolski & Nigg, 2001), maternal mental health (Theule et al., 2011; Tzang et al., 2009; Whalen et al., 2011) and parental ADHD (Whalen et al., 2011).

Although the stress level of parents is relatively higher for parents of ADHD children, the level of stress is comparable to that of other clinical disorders, such as Autism Spectrum Condition (Ronald et al., 2011; van Steijn et al., 2014), ODD and CD (Podolski & Nigg, 2001).

Factors that have been found to reduce parental stress include mindfulness training (Anderson & Guthery, 2015) and a parenting style intervention (Treacy et al., 2005; Wells et al., 2000). However, in the study by Treacy et al. (2005), depression scores also reduced between pre- and post-intervention and it is possible that the reduction in depression symptoms resulted in reduced parental stress.

Parental mental health

Parental mental health has been studied as a general concept using the GHQ (van Steijn et al., 2014), and the SCL-90-R (Tzang et al., 2009), with parental mental health being positively associated with child ADHD (Tzang et al., 2009), although mostly parental mental health was within the non-clinical range (van Steijn et al., 2014).

Parental Depression

Several studies within the review investigated parental depression (Breen & Barkley, 1988; Harrison & Sofronoff, 2002; Ronald et al., 2011; Treacy et al., 2005; Tzang et al., 2009; van der Oord et al., 2006; van Steijn et al., 2014; Wells et al., 2000), with relatively consistent findings. Although parents of children with ADHD tend to have higher levels of depression than non-clinical controls (Breen & Barkley, 1988), the level tends to be within the non-clinical range (Harrison & Sofronoff, 2002; van der Oord et al., 2006) or lower than (Breen & Barkley, 1988) or equivalent to that of other clinical disorders (Tzang et al., 2009). However, despite this clinically low level, parental depression is predicted by child ADHD behaviours (Harrison & Sofronoff, 2002) and appears to play a role in the relationship between child behaviour and parent stress as it has been shown to be related to (Harrison & Sofronoff, 2002), mediate (van Steijn et al., 2014) and moderate (Whalen et al., 2011) the relationship between these factors.

Parental Anxiety

Only one review study reported measuring maternal anxiety (Class et al., 2014) and found that anxiety was not associated with parental stress. Although for the reasons discussed in the results section it is not possible to critique the anxiety-specific findings of Class et al. (2014), however, the method employed for data collection is open to critique. Class et al. (2014) gathered data

from national registers (i.e. the National Patient Register), which afforded a large sample for statistal analysis, but is limited in terms of the cross-sectional method, which does not allow causation to be inferred. Gathering data also involves coding data, which may have led to nauanced, scaled data, such as degree of anxiety or depression, being simplified to a basic yes or no category. The write-up of the study by Class et al. (2014) was not sufficiently detailed to inform the reader of which anxiety measures were used, if any, nor the level of this within ADHD subgroup. Therefore the review articles can be said to provide limited evidence that parental anxiety is associated with parental stress and child ADHD. However, in order to understand this relationship, further investigation into the presence and degree of anxiety experienced by parents of children with ADHD is necessary, using standardised measures or a qyalified mental health professional..

Parental ADHD

Few studies investigated parental ADHD and of those that did (Theule et al., 2011; van Steijn et al., 2014; Whalen et al., 2011), parental ADHD was elevated compared to norms (van Steijn et al., 2014) and presented a higher risk of increased stress and child ADHD.

1.6 Critical Appraisal

1.6.1 Limitations of previous research

The quality of the studies reviewed in this review was variable, which impacts on the conclusions that can be made about the relationship between parental stress and child ADHD. There were some common limitations which will be highlighted to aid further investigations into these factors.

ADHD symptoms and diagnosis

From the 24 studies reviewed, only five stated that a suitabily qualified healthcare professional assessed and confirmed the ADHD diagnosis. A majority of studies used a standardised validated assessment, such as the DISC-IV or CBCL. Although standardised assessments are likely to have relatively lower validity in terms of ADHD diagnosis, the assessments selected were generally reliable. In only one study (Rodriguez & Bohlin, 2005) was it

clear that the ADHD diagnosis was very likely to not be valid given the apparent lack of relevant experience and knowledge by the assessor.

Study Design

A majority of the studies used a cross-sectional design and therefore employed correlation analyses. This reduced the scope of these studies in that correlational analyses are inherently limited in terms of deducing the causal relationship for parental stress, child ADHD and associated factors.

The few reviewed studies that did measure parental stress and child ADHD symptoms at multiple time points were limited in other key areas in that they had either a small sample size (Anderson & Guthery, 2015) and were therefore limited in generalisability or the studies employed measures that were debatable in terms of validity of ADHD and other psychopathological diagnoses (Class et al., 2014) and parental stress (Ronald et al., 2011).

The only study that was able to infer causal links, due in part to using a quasi-experimental design, was Whalen et al. (2011) who investigated "in the moment" parental stress and related factors, such as childrens' behaviours, including ADHD symptoms. However, it is noteworthy that despite the variation in methodology, the association between parental stress and child ADHD was shown to have a positive correlation across studies.

Parental Stress measures

The vast majority of studies rated parental stress using measures that were reliant of self-report and clinic-based inventories. Therefore, there were no objective measures of parental stress or child ADHD. This is particularly concerning regarding the validity of these ratings in light of Van der Oord's study, which highlights the lack of reliability between different raters of child ADHD. However, it should be noted that neither of the raters in this study by Van der Oord were professionals, and therefore it is not possible to comment of the reliability of professionals in rating child ADHD.

Another limitation is the relatively low prevalence of parental stress in the reviewed studies. Only one study compared both mothers and fathers scores and the relatively higher parental stress found in mothers compared to fathers, may have biased the level of stress within review articles and limits the generalisability of the review findings.

A similar bias exists in the child sample, which was almost 75% male. However, this does approximately match the prevalence rate of ADHD in the general population so can be viewed as representative of the child ADHD population.

Across studies, there was a general lack of measurement of comorbid disorders for child participants. Few studies measured comorbid disorders, such as ODD and CD, which have been found to coexist with ADHD in 8 - 64.7% of all ADHD children (Podolski & Nigg, 2001; Tzang et al., 2009). Indeed, both ODD/CD and LD have been associated with higher parenting stress than ADHD alone (Breen & Barkley, 1988), which could present a confounding factor if not controlled for in studies. Especially given the high comorbidity with ADHD. Across all studies, LD has not been appropriately measured and could also confound findings, thus limiting the validity of findings.

1.6.2 Limitations of literature review

There are several limitations to the current review. Firstly the review only included published, peer-reviewed articles, which could have resulted in a publication bias in that only studies that found a significant difference between stress and ADHD levels were published, resulting in a skewed sample from which to select.

Also, the omission of qualitative studies in the review might have reduced the degree of understanding of the experiences of parenting a child with ADHD, rather than standardised measurements of these factors.

The review included studies from North America, Europe, Asia and Australasia, including numerous cultures therein. Although this cross-cultural inclusiveness could be regarded as a strength in terms of generalisability of the findings, it is also possible that the elevated stress levels within cultures could relate to different factors. For example the elevated distress attributed to medicalised ADHD children in Italy (Gagliano et al., 2014) might not be replicated in Canadian studies. Nevertheless, such cultural variations can be useful to elucidate cultural differences and similarities in terms of parental stressors.

1.7 Implications

The findings of this review indicate that parental stress is an important factor to consider for both increasing the likelihood of a child developing ADHD and also for mothers developing

depression. The relatively elevated levels of both patental stress and depression in parents of ADHD children indicates a mental health need which may develop in severity if not managed. The promising findings from the parent-focused interventions reviewed, indicate that reducing parental stress can result in a reduction of depression symptoms.

1.8 Conclusions

The literature review will conclude by returning to the objectives:

1.8.1 Objectives concluded

1. The Parenting Stress Index, short and long versions are the most widely used measures of stress experienced by parents of children with ADHD. However, several other measures of parental stress have been employed, such as recording stressful life events and 'in the moment' stress using eDiaries. No study compared the different measures of parental stress so it is not possible to state which are more valid or reliable.

2. Despite the variability in measures of parental stress, the levels of parental stress, including parenting stress, for parents of children with ADHD is significantly elevated compared to healthy controls. However, the parental stress level is equivalent to that of parents of children with other clinical disorders, such as ASC and in some instances lower.

3. The literature on parental stress and depression in parents of children with ADHD broadly shows that these variables are positively correlated and that both are elevated compared to controls or norms. However, only one study has investigated a causal relationship between parental stress and parental depression (Treacy et al., 2005), although the stress reduction intervention only produced a significant decrease a minority of participants on both parenting stress and depression scores..

Parental stress, depression and child ADHD symptoms have been shown to interact via mediation and moderation mechanisms, in conjunction with parental ADHD, to influence parenting stress as a result of child ADHD behaviours. However, greater understanding of the mechanisms by which these factors interact and influence one another would benefit from further study. There is also a lack of literature investigating these factors using a UK sample.

The level of anxiety experienced by parents of children with ADHD has received little attention, with only one study investigating this (Class et al., 2014). This single study found that

the degree of anxiety experienced by parents of children with ADHD was not elevated compared to parents of non-ADHD children. However, Class et al.'s study has methodological and reporting issues which undervalue their findings credibility.

Parental ADHD was investigated by several studies using self-report measures. Each of these studies found that parental ADHD was associated with higher levels of parental stress. However, self-report by the parent only may have biased the ADHD ratings. Although a more objective measure of parental ADHD would have higher validity, the standardised measures employed by these studies, i.e. the CAARS or AHA, provide some validity as the measures used are deemed as being reliable.

4. Parent-based interventions have been found to reduce parenting stress and depression levels by focussing on adapting parent cognitions around child behaviour rather than separate interventions for depression and stress.

1.9 Future Directions

A noticeable omission in the literature was studies investigating parental stress in the UK. This could help to add to the apparent cross-cultural ubiquity of elevated parental stress and ADHD as well as indicating any differences in terms of child or parent ADHD and mental health.

Future research could further investigate the impact of parental ADHD on parenting stress and child ADHD. In particular the mechanisms by which they relate and influence one another. Repeating measures at multiple time points could help to clarify the dynamics of these variables and could be combined with a controlled study at the child and/or parent level.

Finally, further research could benefit from investigating and controlling for comorbid neurodevelopmental disorders and conditions when assessing child ADHD and parental stress as this has not always been clearly accounted for within the reviewed literature.

Chapter 2: Empirical Paper

Exploration of the relationship between Parenting Stress and Psychopathology within the context of Childhood Attention Deficit and Hyperactivity

2.1 Introduction

2.1.1 Attention Deficit / Hyperactivity Disorder

Attention deficit hyperactivity disorder (ADHD, as per the DSM-5, American Psychiatric Association, 2013) is defined as a neurodevelopmental disorder with onset before 12 years of age. The DSM-5 lists 18 primary symptoms of ADHD and divides these into two domains; inattention; and hyperactivity/impulsivity. Symptoms are based on behavioural observations signifying abnormally high levels of maladaptive impulsivity, hyperactivity and inattention (NICE, 2008). At least 6 behaviours/symptoms in one domain are required for an ADHD diagnosis (DSM-5, American Psychiatric Association, 2013.

2.1.2 Aetiology of ADHD

Historically, ADHD was conceptualised as resulting from brain damage or minimal brain dysfunction (NICE, 2008). Modern neuroimaging and genetic associations have contributed to current aetiological models focusing largely on biological factors in terms of genetics and environmental influences, such as birth complications and mother's use of alcohol and/or tobacco (Linnet et al., 2003; Richards, 2012).

Psychosocial factors associated with ADHD, such as neglect and institutional rearing have been shown to significantly increase the risk of later ADHD symptomology (Kreppner, O'Connor, & Rutter, 2001; Roy, Rutter, & Pickles, 2000). However, related psychosocial factors, such as attachment and parenting style (Timimi & Taylor, 2004), parental stress (Briscoe-Smith & Hinshaw, 2006), parental hostility and criticism (NICE, 2008) are commonly regarded as arising as a consequence of the ADHD symptoms themselves (Richards, 2012). Richards (2012) used the example of the Minnesota Longitudinal Study, and found that changes in behaviour after a psychosocial and medication intervention (i.e. parenting group + medication) would result in changes in parental stress/wellbeing. This was subsequently attributed to a positive change in the medication having a positive impact on the child's behaviour, which subsequently had a positive

impact on the parent's stress/anxiety levels. i.e. psychosocial interventions were undervalued compared to medical-based interventions.

2.1.2.1 Conceptualisations of families and ADHD

There has been a vast amount of research over the last 30 years investigating 'the causes' of ADHD incorporating bio-medical, genetic and environmental risk factors (Sonuga-Barke & Halperin, 2010). Data suggests that ADHD has a complex causal structure with different facets interacting in additive, synergistic and possibly antagonistic ways (Nigg, 2006). The bio-medical model promotes aetiological explanations of ADHD as dependent on core, fixed deficits and is therefore deficient as a basis for ADHD research (Castellanos et al., 2005) as it fails to account for how causal processes seem to interact in dynamic and non-linear ways that can produce diverse patterns of persistence and remission (Halperin, Trampush, Miller, Marks, & Newcorn, 2008). However, more recently there has been a movement in the direction of a developmental psychopathology framework (Singh, 2008), informed by the bio-psycho-social model (Engel, 1977). Such a model formulates ADHD as resulting from the interplay of genetic and environmental influences that occur over development in underlying neurobiological systems. The construction of such a framework allows the possibility that, across children and time, various influences impact differently on the development of the disorder. At one extreme there may be children for whom ADHD is predominantly determined early on by biological risk factors (Johnston & Marsh, 2001). At the other extreme, a high risk family environment, including those affected by neglect, lack of attachment or high parental stress may interact with a low genetic/biological predisposition and similarly result in ADHD symptoms and behaviours.

A bio-psycho-social framework allows predictions of how ADHD characteristics develop over time and how multiple biological and environmental risk and protective factors interact to impact on this development (Johnston & Marsh, 2001; Rutter & Sroufe, 2000) and could help guide early interventions (Sonuga-Barke & Halperin, 2010). Furthermore, the heterogeneity of ADHD suggests multiple causal pathways that involve genes and the environment interacting in a multitude of ways to produce the behavioural profile characteristic of ADHD (Chen, Faraone, Biederman, & Tsuang, 1994; Johnston & Marsh, 2001; Rutter & Sroufe, 2000).

If such a framework was more widely accepted, then the lack of exploration into environmental and familial factors (Singh, 2008) in the ADHD developmental pathway presents a useful area for further exploration. This study accepts a developmental psychopathology framework to explore several factors relating to parental and environmental influences on ADHD symptomology. Thus attempting to broaden the conceptualisation of attentional and hyperactivity disorders away from a process within a child and towards thinking of ADHD behaviours as an interaction between the child, their caregivers and environment.

2.1.2.2 Parenting Stress

Parenting stress has been defined as ''the aversive psychological reaction to the demands of being a parent'' (Deater-Deckard, 1998). Although some degree of stress is expected in parenthood (Crnic & Greenberg, 1990), numerous studies have consistently reported elevated and clinical rates of parenting stress in the families of children with ADHD symptoms compared to non-clinical controls (Anastopoulos, Guevremont, Shelton, & DuPaul, 1992; Breen & Barkley, 1988; Harrison & Sofronoff, 2002; Podolski & Nigg, 2001; van Steijn, Oerlemans, van Aken, Buitelaar, & Rommelse, 2014).

One influential theory of parenting stress was proposed by Abidin (1976). Expressed in the PSI (Abidin, 1976, cited in Abidin, 1995) this model distinguished between child factors, parent factors and situations factors related to stress. When applied to the parents of children with ADHD, Abidin's (1976) theory has been useful in providing a framework for categorising parenting stress, in terms of child or parent factors. Numerous studies have found that due to the behavioural difficulties synonymous with childhood ADHD, the child factors on the PSI (the childs' adaptability, acceptability, demandingness, mood, hyperactivity and how reinforcing they are to the parent), are more severe and consequently contribute to significantly higher levels of parenting stress compared to parents of children with physical and or health disabilities and a control (Gupta, 2007). A common comorbid condition to child ADHD is child oppositional defiance disorder (ODD), which has been found to co-occur with ADHD in 65% of children (Tzang, Chang, & Liu, 2009) and is a child factor that results in increased parenting stress in its own right (Podolski & Nigg, 2001; Theule, Wiener, Rogers, & Marton, 2011). However, the potentially cofounding effect of child ODD when assessing the impact of child ADHD on parenting stress, represents a limitation of previous studies for not controlling for ODD.

Child factors, including ODD, which contribute to parenting stress have been the most extensively studied (Abidin, 1995; Ostberg & Hagekull, 2000), however, parent factors have received relatively little attention (Theule, Wiener, Tannock, & Jenkins, 2010). High levels of parental stress appear to be ubiquitous in the context of ADHD and is further associated with a range of negative consequences, such as poorer treatment outcome (Kazdin, 1997; Kazdin, 1995; Osborne, McHugh, Saunders, & Reed, 2008) negative impact on parent–child relationship and parenting practices (Abidin, 1990; Rogers & White, 1998), negative affect on child development (Anthony et al., 2005; K. A. Crnic, Gaze, & Hoffman, 2005), parental role dissatisfaction (Podolski & Nigg, 2001) and increased correlation with parental psychopathology (Chi & Hinshaw, 2002). Given this finding, the parental factors that contribute to parental stress are worthy of further investigation and, if applicable, clinical intervention specifically for the parents of children with ADHD (Kazdin & Whitley, 2003).

2.1.3 Parental ADHD

Given the highly familial nature of ADHD (Faraone et al., 2005; Levy, Hay, & Bennett, 2006; Theule et al., 2010) within families of children with ADHD, it is surprising that so few studies have investigated the relationship between parent and child ADHD within the context of parenting stress. Those studies that have included a measure of parental ADHD, found that parental ADHD was a strong predictor of parenting stress (Theule et al., 2011), in particular maternal ADHD (van Steijn et al., 2014), and that combined maternal ADHD and depression symptoms are associated with greater stress in both ADHD children and controls (Whalen, Odgers, Reed, & Henker, 2011). In light of previous findings, maternal ADHD in particular should be considered when investigating parental factors pertinent to parenting stress. ADHD often persists into adulthood and adults with ADHD are impaired in a range of functional domains, including parenting (Christiansen, Oades, Psychogiou, Hauffa, & Sonuga-Barke, 2010). Studies involving parents with ADHD have suggested an association with increased parenting negligence and intolerance (Arnold et al., 1997), lax parenting (Harvey, Danforth, Ulaszek, & Eberhardt, 2001) and a lack of effective monitoring (Murray & Johnston, 2006). Although ADHD mothers have been suggested to exhibit higher empathy for their ADHD child compared to ADHD fathers (Psychogiou, Daley, Thompson, & Sonuga-Barke, 2008; Christiansen et al., 2010), parenting interventions with ADHD parents of pre-school ADHD children have been less effective compared to non-ADHD parents (Sonuga-Barke, Daley, & Thompson, 2002).

Parents of children with ADHD exhibit more symptoms of depression (Breen & Barkley, 1988; Nigg & Hinshaw, 1998; Treacy, Tripp, & Baird, 2005; van Steijn et al., 2014) compared to non-ADHD children, which is in turn associated with higher ratings of ADHD behaviour (Chi & Hinshaw, 2002; Harrison & Sofronoff, 2002; van Steijn et al., 2014). The direction of causation in the relationship between parental depression and childhood behaviour problem severity is not clear, but has been explained partially by the depression-distortion hypothesis (Youngstrom, Izard, & Ackerman, 1999), which implies that depressed parents rate their children's behaviour more negatively than non-depressed parents, thus biasing ratings. An alternative theory is the biopsychosocial, diathesis-stress model, which posits that a combination of predisposed vulnerability coupled with environmental stress results in an increased likelihood of a range of disordered behaviours, including ADHD (Grizenko et al., 2012) and depression (Patten, 2013).

Parenting stress is proposed to negatively affect parenting behaviours (Abidin, 1995), which in turn affects child outcomes. Anastopoulos, Guevremont, Shelton, and DuPaul (1992) found that within a population of ADHD children, parenting stress was predicted by child characteristics (i.e. aggressive behaviour, severity of ADHD symptoms and higher incidence of

child health problems). Some parent characteristics were also found to be significant predictors of parental stress, namely parental mental health symptoms and job status (Anastopoulos et al., 1992). These findings indicate that parenting stress could be an important factor to consider in treatment planning, in terms of prioritising interventions with the parent, child or both.

In light of several areas of uncertainty with the literature, in terms of the 1. Cross-cultural comparisons, specifically UK comparisons, 2. Degree of comorbid parental mental health disorders within this population, and 3. Directions of influence between child ADHD behaviour, parenting stress, and parental mental health, the current study has the following aims:

2.2 Research aims

(i) To investigate the relationship between parenting stress and child ADHD in a UK sample.

(ii) To identify which parent and child factors are related to and predict parenting stress.

(iii) To explore the pathways through which child ADHD influences parenting stress and parental mental health, i.e. anxiety and depression

2.3 Method

2.3.1 Participants

The sample consisted of 105 children in total, 82 children with ADHD and 23 healthy controls (Figure 2). The ADHD group was recruited from the SHARe database. The control group was recruited from schools within the same geographical region as the ADHD group participants (Figure 2). Table 2 shows the key demographic information for the two samples. ADHD participants were recruited via the South Hampshire ADHD Register (SHARe) project. The SHARe database includes children aged 3 to 18 years of age. The children generally have had an ADHD diagnosis or elevated ADHD type symptoms. The SHARe project accepts referrals from Clinicians via local Child and Adolescent Mental Health teams and self-referral from parents. Children with suspected ADHD were either referred from a local Child and Adolescent Mental Health team or self-referred via the SHARe website ("South Hampshire ADHD Register", 2015). Data was collected by the SHARe team and the Researcher also conducted assessments as part of the SHARe project from July 2014 to January 2015.

A control sample was also recruited via their parent(s) and therefore with their parents' consent. Data was collected individually by the Researcher between November 2014 and June 2015. Participants were self-selected from advertisements of the study from either the school newsletter or via internal mail advertising at the University (appendix B), or via the study advertisement being posted on social networks (appendix B). Ten local schools were approached via the University of Southampton School Recruitment team (appendix C). However, no participants were recruited from this route. Four further schools were contacted via the Researcher. Only schools within an "SO" postcode were recruited so as to match with ADHD group participants. Figure 2 shows the recruitment pathway for participants in the study.

2.3.2. Inclusion and Exclusion Criteria

Recruitment Procedure

Participants with ADHD, both the child and their parents, were invited to attend an assessment in a private room at either the University or at an NHS Child and Adolescent facility in Hampshire. If the child gave assent and the parent also gave their consent, the child was invited to complete an assessment, which included a cognitive assessment with a SHARe team researcher. For controls the procedures were somewhat different. Once an expression of interest was shown, control participants (parents) were sent a recruitment pack, which included an invitation to participate letter (appendix D), parent information sheet (Appendix E), and an age appropriate child information sheet (appendices F and G). The researcher administered Intelligence testing for the child participants (n = 23) and sent out questionnaire packs to the parents of the children and the child's teacher (if consent was given).

Inclusion/Exclusion criteria

<u>ADHD cases: Participants (children):</u>

  - Were aged between 4 and 12 years of age;
  - Lived within an "SO" postcode and were therefore within the South Hampshire geographical region;
  - Had a diagnosis of ADHD.
- The parents of the participants agreed to be contacted by researchers other than SHARe.

Exclusion criteria:

- The participants (children):
    - Were diagnosed with a neurodevelopment disorder, such as a learning / intellectual disability.
    - Did not complete the intelligence testing and therefore did not have a valid full scale IQ score.
- The Parents of the participating children were excluded if they were:
    - Not proficient in reading written English.

Controls:

- The Participants (children):
    - Were aged between 4 and 12 years of age;
    - Lived within an "SO" postcode and were therefore within the South Hampshire geographical region;
    - Did not have a diagnosis of ADHD.

Exclusion criteria:

- The participants (children):
    - Were diagnosed with a neurodevelopment disorder, such as a learning / intellectual disability.
    - Did not complete the intelligence testing and do not have a full scale IQ score.
    - Were diagnosed with ADHD.
- The Parents of the participating children were excluded if they were:
    - Not proficient in reading written English.

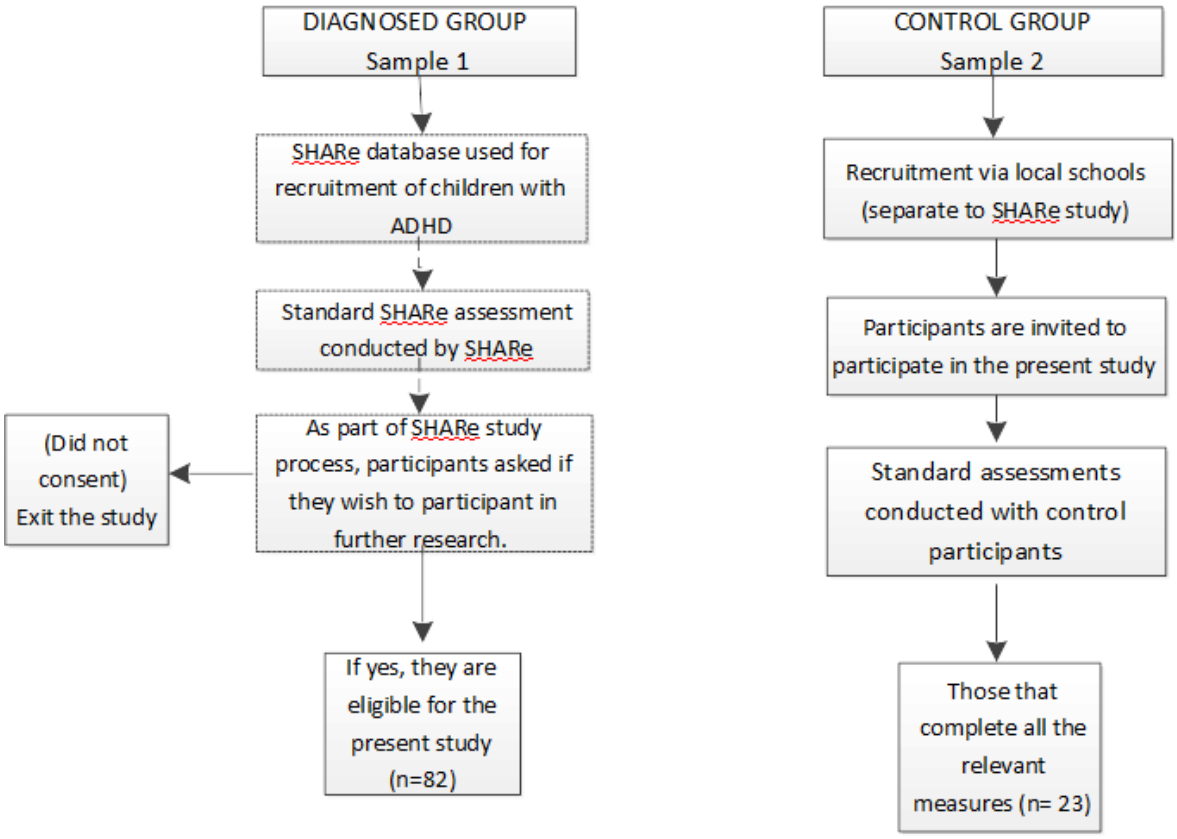


Figure 2. *Participant pathway through the study*

2.3.3 Measures

Participants completed different assessments depending on whether they were the child, the child's parent. Appendix H displays a summary of the assessments that each child and parent participant completed. All participants completed assessments once.

2.3.3.1 Intelligence Quotient (IQ)

The Wechsler Intelligence Scale for Children (Wechsler, 2003) and the Wechsler Preschool and Primary Scale of Intelligence (Wechsler, 2002) are standardized abbreviated measures of intelligence. The WPPSI-III is appropriate for children aged 2.5 years of age to 7 years of age. The WISC-IV and WPPSI-III consist of several subtests, which in turn compose the four composite indexes; *Verbal Comprehension (VCI), Perceptual Reasoning (PRI), Working Memory (WM) and Processing Speed (PSI).* The child's full scale IQ is calculated by combining their composite scores across the four indices, thus providing an estimate of cognitive functioning. Both the WISC-IV and the WPSII-III are commonly used measures of intelligence in children and possess well-documented reliability and validity across indices (Ryan, Glass, & Bartels, 2009; Watkins & Smith, 2013; David Wechsler, 2003).

Test-retest reliability coefficients for the subtests has been found to be acceptable, .89 for Verbal Comprehension Index (VCI); .85 for Perceptual Reasoning Index (PRI); .85 for Working Memory Index (WMI); .79 for Processing Speed Index (PSI), and .89 for the Full Scale IQ (FSIQ) (Wechsler, 2003). Follow-up studies have found lower test-retest scores of .72, .76, .65, .66 and .82 for Verbal Comprehension Index (VCI); for Perceptual Reasoning Index (PRI); Working Memory Index (WMI), Processing Speed Index (PSI), and Full Scale IQ (FSIQ) respectively (Watkins & Smith, 2013). The lower reliability for Watkins and Smith's scores could be accounted for by the short time delay between testing and retesting, which can confound the scores (Watkins & Smith, 2013, Wechsler, 2003).

The WISC-IV (Wechsler, 2003) or WPSII-III (Wechsler, 2002) was administered for screening purposes, and children with a full-scale IQ less than 70 were not eligible for participation. Administration time was between 90 and 120 minutes without breaks.

2.3.3.2 Childhood Attention Deficit / Hyperactivity

Child ADHD was diagnosed using the fourth edition of the Diagnostic Interview Schedule – (DISC-IV , Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000). The DISC-IV is a structured psychiatric interview which is able to address more than thirty clinical diagnoses that occur in children. The DISC-IV has good diagnostic reliability (kappa = .60, Shaffer et al., 2000) and moderate to good test-re-test reliability (kappa = .51-.64) up to 3 years (Lahey et al., 2014).

2.3.3.3 Other Child Disorders

Parent measure (CBRS-P)

The Conners CBRS parent form consists of 203 questions assessing parents' impression of their child's behaviours over the previous month, including behaviours consistent with attentional deficit and hyperactivity. Parents rate the frequency of behaviours as either; Never or seldom (0), occasionally (1), quite a bit (2) or very frequently (3). The CBRS-P can be completed regarding children aged 6-18 years of age. The internal consistency for the CBRS-T varies between specific disorders, ranging from α = .66 (Asperger's Disorder) to α = .93 for symptoms of ADHD (inattentive type, Conners, 2008). The CBRS measures Oppositional Defiant Disorder (ODD), which is defined as a pattern of angry/irritable mood, argumentative/defiant behaviour, or vindictiveness that last for at least six months (American Psychiatric Association, 2013) and has been found to overlap with ADHD in numerous studies (Maughan, Rowe, Messer, Goodman, & Meltzer, 2004) indicating high comorbidity between the disorders. The CBRS, which has acceptable validity and reliability in assessing ODD (Conners, 2008) and the level of ODD is rated

on a standardised scale as either Low (T-score = < 40), Average (T-score = 40 – 59), High Average (T-score = 60 – 64), Elevated (T-score = 65 – 69) or Very Elevated (T-score = 70 +).

2.3.3.4 Parent measures

2.3.3.4.1 Parenting Stress

The Parenting Stress Index/Short Form (PSI-SF, Abidin, 1995) is a 36-item self-report measure evaluating parenting stress. This commonly used measure has a 5-point Likert scale, ranging from Strongly Agree to Strongly Disagree for most items. The PSI-SF produces scores on three subscales (Parental Distress, Parent–Child Dysfunctional Interaction, and Difficult Child) in addition to a Defensive Responding Scale and a Total Score. The recommended clinical cut-off is 90 on the total stress (Abidin, 1995). The PSI-SF possesses strong psychometric properties, with test–retest reliability over 3 months for the total stress scale of .84 and internal reliability of .91 (Abidin, 1995).

2.3.3.4.2 Parental anxiety and depression

2.3.3.4.2.1 Hospital Anxiety and Depression Scale (HADS**,** Zigmond & Snaith, 1983) The HADS is a brief, yet reliable measure originally designed to assess wellbeing, anxiety and depression in hospitals (Snaith, 2003). The HADS comprises of 14 items, seven pertaining to symptoms of depression and seven concerning symptoms of anxiety (Zigmond & Snaith, 1983). The HADS has been validated for use in numerous populations within hospital settings , and also non- hospital settings, including primary care and community settings (Bjelland, Dahl, Haug, & Neckelmann, 2002; Cameron, Crawford, Lawton, & Reid, 2008; Snaith, 2003). The two-factor structure of the HADS, namely anxiety (HADS-A) and depression (HADS-D), has been supported by meta-analyses (Bjelland et al., 2002; Moorey et al., 1991). Despite its brevity, the HADS is a valid measure of both depression and anxiety (Mitchell, Meader, & Symonds, 2010; Smarr & Keefer, 2011; Spinhoven et al., 1997) found to positively correlate with disorder-specific and well validated measures, such as the GAD-7 (Smarr & Keefer, 2011) and specific depression measures, such as the GHQ-7 and Beck Depression Inventory (Mystakidou et al., 2007). The internal consistency for the HADS-A have been found to vary from .68 (Botega, Bio, Zomignani, Garcia, & Pereira, 1995) to .93 (Moorey et al., 1991), with an average .83 across meta-analyses (Bjelland et al., 2002).

2.3.3.4.3 Parental ADHD

The Current Symptoms Scale (Barkley & Murphy, 1998)**,** is an 18 item self-report measure that assesses the prevalence of ADHD symptoms in adults (aged 18 years and older) across different environments, such as home, work and leisure activities. The CSS has been validated in several studies (Taylor, Deb, & Unwin, 2011; Zucker, Morris, Ingram, Morris, & Bakeman, 2002) demonstrating adequate internal consistency, test-retest reliability and sensitivity (Taylor et al., 2011).

2.3.4 Data Preparation

The PSI-SF, HADS, CSS, CBRS-P and WISC assessments were completed by all participants. Subscales and total scores for the PSI-SF, HADS and CSS total were calculated by summing scores on the questionnaires. Attention deficit and hyperactivity scores on the CSS were combined to make a single category; Maternal ADHD. The CBRS required licenced computer software by Multi-Health Systems Incorporated to calculate composite scores for a range of mental health disorder. Similarly the WISC/WIPPSI was scored by a trained practitioner and cross-checked by another trained practitioner. Standard scores were calculated from raw data using the appropriate reference tables.

2.3.5 Ethical Considerations

This study was granted ethical approval from the University of Southampton, School of Psychology Ethics Committee and Research Governance (Appendix I). This study was subsequently sponsored and insured by the University of Southampton Research and Development Committee. This study was also granted ethical approval by the South Hampshire ADHD Register (Appendix J).

Due to the sensitive nature of some questions within measures of parental mental health, a risk plan was formed (Appendix K) and referred to throughout testing of adult participants. All participants were screened for clinical levels of depression as a precautionary action.

Participants were provided with information appropriate to their age (Appendices E and F) and children who assented to participate (Appendix L) were only recruited with parental consent (Appendix M). Only when informed assent and informed consent were obtained, were participants recruited for the study. All participants were informed in written and verbal forms that they had the right to withdraw their data prior to data being anonymised.

2.4 Hypotheses

Hypothesis 1a: Parents of children diagnosed with ADHD (ADHD group) will have higher Parenting Stress levels than parents of controls.

Hypothesis 1b: The association between ADHD and stress will be in part driven by associated oppositional defiant disorder symptoms.

Hypothesis 2a: Parents of children in the ADHD group will have higher rates of mental health problems, i.e. depression and anxiety

Hypothesis 2b: Parenting stress levels will be correlated with higher rates of maternal mental health problems.

Hypothesis 3: Parenting stress levels will mediate the relationship between child ADHD and depression.

Hypothesis 4: Maternal ADHD will moderate the effects of child ADHD on maternal stress.

2.5 Analysis Strategy

Data were analysed using Statistical Package for Social Sciences, Version 22 (SPSS). Missing data varied between the two samples and across measures. For the PSI, there was no missing data for the ADHD group and 8.7% missing for controls. For intelligence measures there was 19.5% and 8.7% missing for the ADHD and control groups respectively. The CBRS-P was missing 2.4% for the ADHD group and 4.3% for the controls. The parental ADHD measure (CSS) had no missing data for controls and 15.9% missing for the ADHD group. With the exception of intelligence measures, where some data was available, missing data was replaced by participants' mean score on the measures' subscale. For example, if a single response for a question on the HADS-A was missing, participants' average rating of anxiety on the HADS-A was calculated and included rather than a missing value in order to maintain the sample size (Tabachnick & Fidell, 2001). In analyses, cases were excluded pairwise in order to maintain the sample size and include participants' data. Pairwise exclusion has also been found to have minimal bias with the type of data and analyses employed in this study (Graham, 2009).

Data analysis:

Differences between groups were explored prior to hypotheses testing in order to identify covariates of ADHD behaviours. T-tests comparing the ADHD group and control group were performed to explore differences between groups, the results of which are displayed in table 2.

Pearson and Point-Biserial correlations in addition to a chi-square analysis were performed to explore relationships between dichotomous variables.

2.5.1 **Analyses for Hypothesis testing**

Hypothesis 1: In order to determine a statistically significant difference between child ADHD and child not ADHD, on the degree of Parenting stress, ODD will be controlled by conducting an ANCOVA and including ODD as a covariate.

Hypothesis 2a: Comparisons between the level of mental health difficulties, i.e. depression and anxiety for parents of children in the ADHD group and controls will be analysed using independent t-tests.

Hypothesis 2b: Correlation analyses will performed to explore the associations between parental mental health and parenting stress.

Hypothesis 3: Previous studies have established the correlational relationship and direct effect between ADHD behaviours in children and parenting stress (Graziano, McNamara, Geffken, & Reid, 2011; Grizenko et al., 2012; Podolski & Nigg, 2001; Prinstein, Boergers, & Vernberg, 2001; Theule, Wiener, Rogers, & Marton, 2011; Tzang, Chang, & Liu, 2009; van der Oord, Prins, Oosterlaan, & Emmelkamp, 2006; Wells et al., 2000). Mediation analysis, shown in figure 3 below, attempts to answer the question of how a causal agent (i.e. the *predictor* variable) transmits its effect on the *outcome* variable (Hayes, 2013). In other words, mediation analysis attempts to explain the mechanism by which the predictor variable effects the outcome variable.

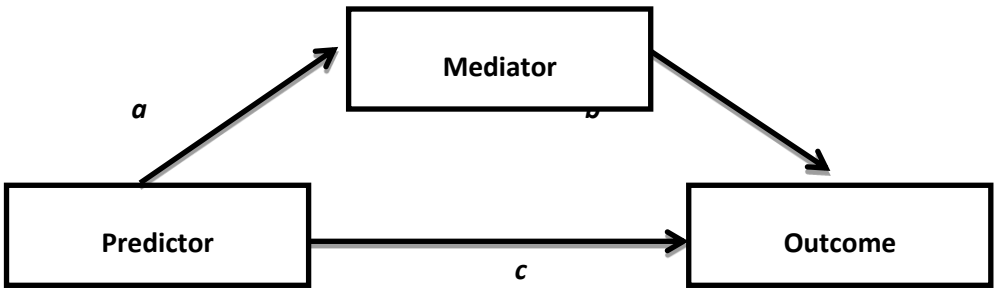


Figure 3. *Diagram of a simple mediation model*

In a simple mediation model, there are two consequent variables, i.e. the Mediator variable and Outcome variable, and two antecedent variables, i.e. the Predictor and Mediator variables. In this model, the Predictor variable causally influences the Mediator variable and the Mediator variable causally influences the Outcome variable (Hayes, 2013). This study will investigate mediation models to explore whether or not the strength of any relationships

between child ADHD symptomology and parenting stress (direct effect) is reduced by the inclusion of a mediator variable, namely maternal anxiety and depression. The four stages of mediation (Baron & Kenny, 1986) will be completed in turn and if the indirect effect is stronger than the direct effect then mediation will have occurred (Field, 2013).

Hypothesis 4 will be investigated using moderation analysis, which involves a moderator variable, in this case maternal ADHD, affecting the relationship between two other variables (Field, 2013), namely child ADHD and parenting stress.

2.6 Results

2.6.1 Preliminary Analysis

Distribution of data on all continuous measures were analysed for normality using boxplots, histograms, P-P plots and the Shapiro-Wilk test (Mendes & Pala, 2003; Öztuna, Elhan, & Tüccar, 2006). There was variability in the normality of data. Analysing the complete sample, only IQ was normally distributed ($W(87) = .977$, $p = .100$). Neither the PSI total ($W(103) = .964$, $p = .0021$), PSI - Mother distress ($W(103) = .957$, $p = .002$), PSI - Parent-Child Dysfunction ($W(103) = .975$, $p = .048$, PSI – Difficult Child ($W(103) = .943$, $p = .001$) the HADS-A ($W(91) = .942$, $p = .001$), nor the HADS-D ($W(91) = .907$, $p = .001$), Mother ADHD ($W(92) = .701$, $p = .012$) were normally distributed.

Bootstrapping was applied to address the non-normal distribution of the predictor variables. Bootstrapping is a method used to estimate the properties of the sample distribution by re-sampling the individual data within the sample (Efron & Tibshirani, 1986; Efron, 1994; Field, 2013). Bootstrapping is versatile and can be used for both parametric and non-parametric data samples to improve the robustness of the data (Erceg-Hurn & Mirosevich, 2008) and creates 95% confidence intervals from the re-sampled data. In mediation analyses, if the 95% confidence interval of the indirect effect, i.e. the effect via the mediator, does not include zero, then the indirect effect of the mediator is regarded as significant (Field, 2013; Hayes, 2013).

For each measure used, internal consistency was calculated using Chronbach's alpha coefficient (see Table 1). Internal consistency was found to be acceptable for all total and subscales with the exception of Parent-Child dysfunction ($\alpha=0.62$) on the PSI-SF. However, the Parenting Stress total score was found to have high internal consistency ($\alpha=0.87$) and was used as the outcome measure instead of subscale data. Due to the nature of the data collection for the

CBRS, internal consistency could not be calculated. Table 2 also includes the mean score for each scale for the sample.

Table 1: *Chronbach's alpha scores and Item ranges for study measures*

Measure and subscales	α	**Item range**
Parenting Stress Index –Short form (PSI)		
Parental Distress	0.840	1 – 5
Parent-Child Dysfunction	0.617	1 – 5
Difficult Child	0.796	1 – 5
Defensive Responding	0.797	1 – 5
Total Parenting Stress	0.873	1 – 5
Hospital Anxiety and Depression Scale (HADS)		
Anxiety (HADS-A)	0.789	0 – 3
Depression (HADS-D)	0.723	0 – 3
Current Symptoms Scale (CSS)		
Attention Deficit (CSS-AD)	0.878	0 – 3
Hyperactivity / Impulsivity (CSS-Hyp)	0.749	0 – 3

Table 2: *Descriptive statistics for maternal mental health measures and t-tests between ADHD and Control groups*

Psychometric	ADHD sample	Control Sample	t test *
Parenting Stress (PSI-Total)	*M = 110.54* *SD = 20.01* *Range = 56 - 158*	*M = 60.25* *SD = 10.82* *Range = 40 – 80*	*p < 0.003*
PSI – Distress	*M =33.58* *SD =11.21* *Range = 13 – 57*	*M = 18.30* *SD = 4.33* *Range = 12-28*	*p < 0.003*
PSI –Parent-Child Dysfunction	*M =34.43* *SD = 6.24* *Range =17 – 48*	*M = 20.80* *SD = 3.25* *Range = 15-27*	*p < 0.003*
PSI – Difficult Child	*M =42.52* *SD =8.39* *Range =18 – 58*	*M = 21.15* *SD = 6.21* *Range = 13-33*	*p < 0.003*
CBRS-Atten.	*M =82.37* *SD = 10.37* *Range = 52 – 90*	*M = 44.45* *SD = 7.33* *Range = 37-68*	*p < 0.003*
CBRS-Hyp	*M = 81.00* *SD = 13.28* *Range = 40 – 90*	*M = 48.35* *SD =8.47* *Range =37-66*	*p < 0.003*
CBRS-ODD	*M = 84.03* *SD = 10.93* *Range = 41 – 90*	*M =47.95* *SD = 7.53* *Range = 40-70*	*p < 0.003*
Anxiety (HADS-A)	*M =* 9.48 *SD = 4.9* *Range = 0 - 20*	*M =* 3.35 *SD = 2.08* *Range = 0 – 7*	*p < 0.003*
Depression (HADS-D)	*M =* 6.69 *SD = 4.50* *Range = 0 – 16*	*M =* 1.20 *SD = 1.15* *Range = 0 – 4*	*p < 0.003*
Maternal Attention Deficit (CSS-AD)	*M = 1.60* *SD = 2.43* *Range = 0 – 8*	*M = 0.15* *SD = 0.67* *Range = 0 – 3*	*p < 0.003*
Maternal Hyperactivity (CSS-Hyp)	*M = 1.73* *SD = 2.20* *Range = 0 – 9*	*M = 0.20* *SD = 0.41* *Range = 0 – 1*	*p < 0.003*
Maternal ADHD (CSS-combined)	*M = 3.33* *SD = 4.25* *Range = 0 – 17*	*M = 0.35* *SD = 0.75* *Range = 0 – 3*	*p < 0.003*
Age	*M = 8.89* *SD = 3.60* *Range = 3.5 – 17.3*	*M = 8.97* *SD = 2.19* *Range = 4.2 – 12.1*	*p = 0.758*
Gender (% Male)	*74.4%*	*65.2%*	*p = 0.373*
IQ	*M = 93.72* *SD = 11.54* *Range = 72 – 125*	*M = 112.5* *SD = 11.42* *Range = 91 – 129*	*p = .003*

** Bonferroni correction, p = .003*

2.6.1.1 Hypothesis 1a: Do parents of children diagnosed with ADHD (ADHD group) have higher Parenting Stress levels than parents of controls?

Parents of children in the ADHD group experienced higher stress levels than controls, $F(1,101) = 132.96$, $p<.001$. Table 2 shows the scores for both groups on each dimensions of the PSI. The ADHD group experienced significantly more stress than controls on all dimensions of the PSI.

2.6.1.2 Hypothesis 1b: Is elevated parental stress in the ADHD group driven by associated oppositional defiant disorder symptoms?

Parenting stress was correlated with child ODD ($r = .817$, $p=.001$). In the ANCOVA, child oppositional defiant disorder, was significantly related to parenting stress, $F(1,97) = 39.82$, $p<.001$ when introduced as a covariate. However, there remained a significant effect of child ADHD status on the degree of parenting stress $F(1,97) = 5.42$, $p<.05$, $\eta^2 = .053$.

2.6.2.1 Hypothesis 2a: Do parents of children with ADHD have higher rates of mental health problems?

Parents of children with ADHD had significantly higher levels of anxiety ($p < 0.003$) and depression ($p < 0.003$) compared to the parents of non-ADHD children.

2.6.2.2 Hypothesis 2b: Is parenting stress related to parental mental health?

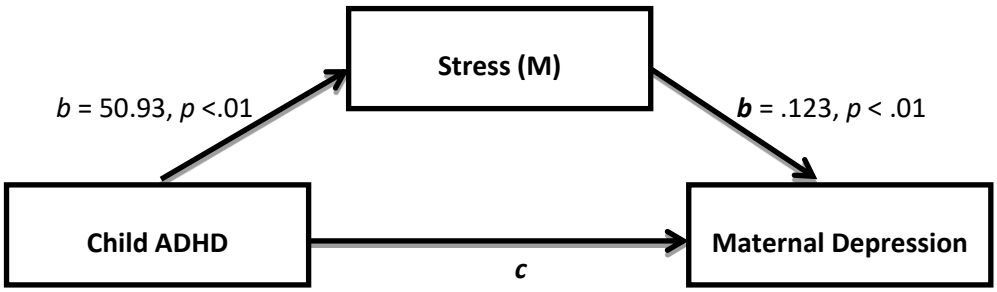
A significant large positive correlation was found between parenting stress and maternal depression, r = .721, 95% BCa CI [.62, .82], accounting for 52.0% of the variance.

Parenting stress and maternal anxiety had a significant positive correlation, r = .652, 95% BCa CI [.53, .75], with a large effect size, accounting for 42.5% of the variance.

2.6.3 Hypothesis 3: Does maternal stress mediate the relationship between child ADHD and maternal mental health?

Significant positive correlation coefficients were found between both parenting stress and maternal depression (r = .721, 95% BCa CI [.62, .82]) and between parenting stress and maternal anxiety (r = .652, 95% BCa CI [.53, .75]). To further explore the mechanism by which child ADHD, parenting stress and maternal depression and anxiety interact, two mediation models were conducted, shown in figures 4 and 5 respectively.

2.6.3.1 Maternal depression



Direct effect, *b* = -.91, *p* = .479

Indirect effect, *b* = 6.28,

Figure 4. *Mediation model of child ADHD as a predictor of maternal depression, mediated by parenting stress*

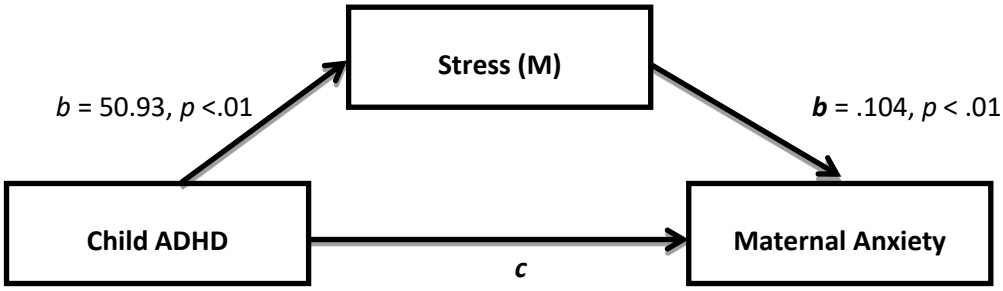
Mediator: *Parenting Stress*

Predictor: *Child ADHD*

Outcome: *Maternal Depression*

Parenting stress significantly mediated the relationship between Child ADHD (predictor variable) and maternal depression (outcome variable). A significant indirect (mediating) effect of child ADHD on depression through parenting stress was found, b = 6.280, BCa CI [4.41, 8.48]. This represents a large effect, k^2 = .45, 95% BCa CI [.329, .585]. The direct path between child ADHD status and maternal depression reduced from *b* = 5.37, *p* < .01 initially, to a non-significant effect *b* = -.91 , *p* = .479) with the inclusion of parenting stress. Therefore parenting stress partially mediated the relationship between child ADHD status and maternal depression.

2.6.3.2 Maternal Anxiety



Direct effect, *b* = .826 , *p* = .591

Indirect effect, *b* = 5.308

Figure 5. M*ediation model of child ADHD as a predictor of maternal anxiety, mediated by parenting stress*

Mediator: *Parenting Stress*

Predictor: *Child ADHD*

Outcome: *Maternal Anxiety*

Parenting stress significantly mediated the relationship between Child ADHD (predictor variable) and maternal anxiety (outcome variable). A significant indirect (mediating) effect of child ADHD on anxiety through parenting stress was found, b = 5.308, BCa CI [2.86, 7.62]. This represents a large effect, k^2 = .34, 95% BCa CI [.188, .460].

There was a reduction in significance of the direct path between child ADHD status and maternal anxiety, from *b* = 6.133, *p* < .01 initially, *b* = 826, *p* = .591 with the inclusion of parenting stress. Although the significance of the direct path has reduced to non-significance, the inclusion of parenting stress did not reduce the direct path to zero. Therefore, parenting stress partially mediated the relationship between child ADHD status and maternal anxiety.

2.6.4 Hypothesis 4: Does maternal ADHD Moderate the effects of child ADHD on maternal parenting stress?

Moderation analysis was conducted to investigate the moderating effect of maternal ADHD on parenting stress.

2.6.4.1 Moderation analysis:

Moderator: Maternal ADHD

Predictor: Child ADHD

Outcome: Parenting Stress

Results show there was not a significant interaction effect, $b = 4.766$, 95% CI [-9.730, 19.261], $t = .652$, $p = .516$, indicating that the relationship between child ADHD and parenting stress is not moderated by maternal ADHD (see figure 6).

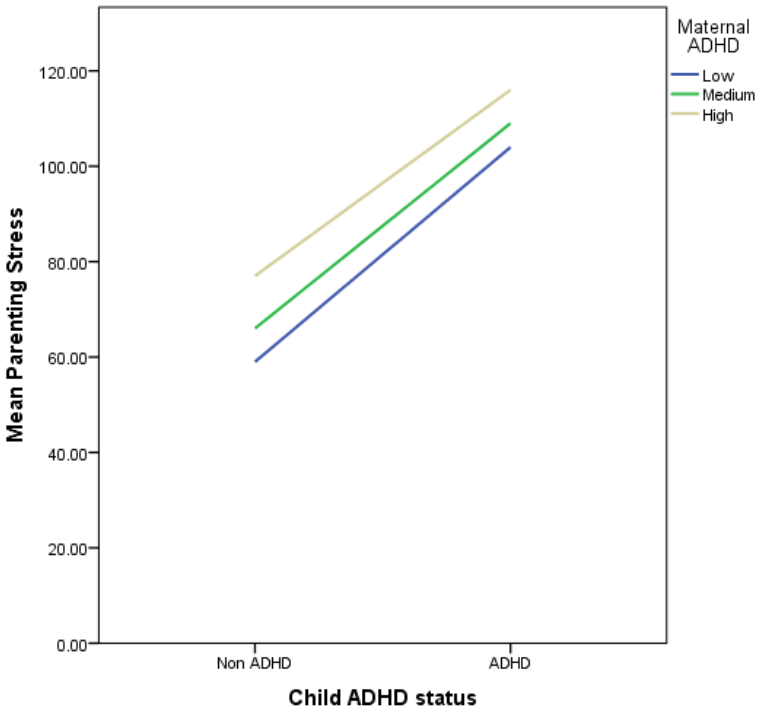


Figure 6. *Moderation interaction between child and maternal ADHD on Parenting Stress*

2.7 Discussion

2.7.1 Summary of study

The aim of this study was to investigate the relationship between child ADHD and parenting stress for a UK sample, incorporating the effect and interactions between parenting stress and maternal mental health. It was hoped that the this study would develop the literature exploring the pathways by which child ADHD leads to increased parenting stress and maternal mental health

difficulties. Increased understanding of these pathways could be used to develop interventions that may better suit the children and parents within this population.

2.7.2 Summary of key findings

2.7.2.1.1 Hypothesis 1a:

It was hypothesised that parenting stress would be higher in the ADHD group compared to a non-ADHD control group. Using analysis of variance, parenting stress was found to be significantly higher for the parents of children with ADHD. The mean stress score for parents within the ADHD group was within the elevated range, indicating that these parents have a high level of stress which is within a clinical level (Abidin, 1995). This very elevated level of parenting stress corresponds with previous studies findings (Anastopoulos et al., 1992; Breen & Barkley, 1988; Gagliano et al., 2014; Harrison & Sofronoff, 2002; Pimentel, Vieira-Santos, Santos, & Vale, 2011; Podolski & Nigg, 2001; van Steijn et al., 2014).

2.7.2.1.2 Hypothesis 1b:

The association between parenting stress and child ADHD was predicted to be, in part, driven by associated oppositional defiant disorder symptoms. Within the ADHD group, very elevated levels of ODD were also found, which was significantly different to the control group. Levels of ODD corresponds with previous studies, which found ODD and ADHD to co-occur.

ODD significantly predicted parenting stress, which supports the studies by Podolski and Nigg (2001) and Tzang et al. (2009). However, the finding that child ADHD significantly predicted parenting stress after controlling for ODD, means that hypothesis 1a and 1b were both accepted.

2.7.2.2 Hypotheses 2a and 2b

It was hypothesised that there would be a significant difference between the ADHD group and control on measures or depression and anxiety. It was also hypothesised that there would be associations between parenting stress and maternal mental health problems.

High positive correlations were found between parenting stress and both maternal depression and anxiety, with large effect sizes. However, neither correlations were high enough to suggest that they were measuring the same variable (Field, 2013). The positive correlations between increased stress, anxiety and depression symptoms provides some support for the diathesis-stress model (Youngstrom et al., 1999).

The levels of depression were below the clinical level for both the control and ADHD groups, although on the borderline of the mild clinical range for the ADHD group (Crawford, Henry, Crombie, & Taylor, 2001).

The level of maternal anxiety was within the mild clinical range for the ADHD group only. Although the correlations are not sufficient to infer causality, the positive associations between parenting stress and mental health implies that a reduction in parenting stress could result in an improvement in parental mental health and vice versa. The associations between anxiety and depression scores supports the normative study by Crawford et al. (2001) and the relatively elevated levels of depression in the ADHD group supports the studies by Breen and Barkley (1988); Harrison and Sofronoff (2002); Treacy et al., (2005) and van der Oord et al., (2006) but not the study by (Tzang et al., 2009) who found that levels of depression were not higher for parents of children with ADHD. The clinical levels of depression in the present study were comparable to those found by (Harrison & Sofronoff, 2002).

The elevated level of anxiety within the ADHD parent group presents a novel finding, which contrasts to the findings in Tzang et al.'s (2009), but is in line with comorbidity of anxiety and depression (Crawford et al., 2001). In light of these findings, hypotheses 2a and 2b were accepted.

2.7.2.3 Hypothesis 3

It was hypothesised that parenting stress would mediate the relationship between child ADHD and maternal depression. Parenting stress was found to partially mediate the effect of child ADHD on maternal depression, with a large effect size. Hypothesis 3 was therefore accepted and this finding is in line with van Steijn et al.'s (2014) study, although the present study found that parenting stress was the mediator between child ADHD and depression, whereas van Steijn et al. (2014) found that depression mediated the effect of child ADHD on parenting stress.

Further mediation analyses showed that parenting stress also partially mediated the effect of child ADHD on maternal anxiety, with a large effect size. These mediation models imply pathways by which the effect of child ADHD on maternal anxiety and depression is mediated by parenting stress. Although these mediation analyses cannot imply causality, it can be speculated that that interventions to prevent or reduce the degree of maternal anxiety and depression could benefit from targeting and reducing parenting stress rather than the subsequent mental health difficulties.

2.7.2.4 Hypothesis 4

The final hypothesis predicted that maternal ADHD would moderate the effect of child ADHD on parenting stress. However, it was found that combined maternal attention deficit and

hyperactivity levels did not significantly moderate this effect. This does not support the findings of Whalen et al. (2011) who found that maternal ADHD moderated the association between child ADHD behaviour and parental stress. Hypothesis 4 is therefore rejected.

2.7.3 Theoretical implications

This findings of the present study supports Abidin's theory of parenting stress, in that the parents of children with ADHD experienced significantly higher levels of parenting stress on both child and parent factors, compared to controls. The finding that parenting stress is elevated for a UK ADHD sample, adds further support to theory being ubiquitous in child ADHD and parent relationships.

The finding that parenting stress mediates the relationship between child ADHD and parental anxiety and depression provides some support for the stress-diathesis model (Youngstrom et al., 1999) of mental health. Specifically, the stress-diathesis model hypothesises that environmental factors, which in the present study is parenting stress, interacts with parents' predispostional vulnerability to result in anxiety and/or depression. However, the finding that maternal ADHD did not moderate the effect of child ADHD on parenting stress, implies that predisposing factors, in this case parental ADHD, have less of a bearing on depression and/or anxiety than environmental factors.

2.7.4 Clinical Implications

There are a number of clinical implications of these findings, at the parent, child and health service level. The relatively high level of stress experienced by mothers of children with ADHD indicates that the impact of child ADHD goes beyond the individual child and extends to within the family. Although the exact mechanisms by which parenting stress leads to maternal mental health difficulties is not fully understood, the mediating effect of stress on anxiety and depression implies that maternal mental health should be considered when child ADHD is indicated. In terms of the societal impact of excessive stress, the Department of Health indicated that on average 11.4 million working days in Britain are lost per year due to stress, anxiety and depression (Knapp, McDaid, & Parsonage, 2011). Knapp et al. (2011) posit an economic argument for preventative measures to reduce stress and mental health, which echoes the call by numerous mental health organisations such as Rethink and the British Psychological Society. This study is the first to identity highly elevated parenting stress within a UK sample and with an estimated 3% of children meeting diagnostic criteria for ADHD, the potentially elevated risk of stress, anxiety and depression for many thousands of parents within the UK.

2.7.4 Strengths and Limitations

A strength of this study was the use of a control group, which was matched to a clinical sample on age, gender, and geographical location. The control group limited confounding variables and allowed comparisons between the groups, which could be generalised to the region and possibly beyond. The use of standardised and validated measures was also a strength of this study, which allowed a degree of confidence that the constructs being measured were measuring what was intended to be measured.

Limitations of the study include the relatively small sample size and the difference in sample sizes for the control group (n = 23) and the ADHD group (n = 82). Only one of eleven schools approached agreed to participate, meaning that a majority of the control sample were from a single school. Although there were no significant differences between measures of interest based on school, this may limit the generalisability of the findings within the region. A further limitation of the sample was the significant difference between ADHD group and control on IQ. Although IQ did not correlate with any measures of interest within the study, there could be ways in which IQ affects parenting stress which was not detected in this study. Although location/region was controlled for between groups, socioeconimic status was not matched between the ADHD and control group, which may have confounded results.

A further limitation of the study is the cross-sectional design, which limits the ability to imply causal links between Child ADHD, parenting stress and mental health.

The use of self-report measures for parents' mental health and child behaviour is vulnerable to confounding results due to social desirability bias. Mental health is subject to stigma (Smith, 2013) and subsequently many people are reluctant to share their experiences of low mood and anxiety (Gould et al., 2010; Iversen et al., 2011). Questionnaires around parenting are equally vulnerable to social desirability bias and results could also have been confounded in terms of the frequency or degree of stress disclosed.

2.7.5 Directions for future research

Further research could investigate the dynamic factors, such as parental beliefs and cognitions, which influence parenting stress and mental health. This could help to gain a better understanding of the mechanisms by which child ADHD results in parenting stress and mental health i.e. does stress lead to anxiety which then leads to depression? Also, do interventions that reduce parenting stress also reduce parental anxiety and/or depression? And vice versa?

Further research could also investigate the impact of interventions for child ADHD on parental stress and mental health within the UK. This could involve investigating whether or not parenting interventions already administered in the UK reduce parenting stress as well as the

degree of ADHD type behaviour. This could also involve exploration of which dynamic factors are leading to reductions in parenting stress.

Finally, future research could explore why the degree of child ADHD influences the parenting stress using qualitative methods, which would allow researchers to investigate the discourse of parents of children with varying degrees of ADHD and ODD and indicate mechanisms by which parenting stress can be reduced within both ADHD and non-ADHD samples.

2.7.6 Conclusion

The findings of this study contribute to the literature investigating the associations between parenting stress and the mental health of parents. Levels of parenting stress and mental health are significantly higher for the parents of ADHD children compared to the general population, with parenting stress being an important factor in parental anxiety and depression. This finding provides an opportunity for health care providers in the UK to be proactive and regard parents of ADHD children as at elevated risk of stress and mental health difficulties, which could lead to earlier recognition and treatment.

Appendices

Appendix A Systematic Review Articles

Reference	Population	Design	Sample	Measures
Anderson and Guthery (2015)	USA	Pre- and post-intervention Self-report questionnaire	n = 7 (4 males)	PSI-SF
Anastopoulos, Guevremont, Shelton and DuPaul (1992)	USA	Cross-sectional Self-report questionnaire	n = 104 (87 males)	ADHD Rating scale PSI SCL-90-R WISC
Baker and McCal (1995)	USA	Cross-sectional Self-report questionnaire	Three groups (n = 48; 36 males): Group 1 – ADHD Group 2 – Learning Disability Group 3 - Control	CPRS-P PSI
Breen and Barkley (1988)	USA	Cross-sectional Self-report questionnaire and Observational	Four groups (n = 52; 13 males)	BDI CBCL PSI
Class et al. (2014)	Sweden	Cross-sectional	738144	National registers and records
Gagliano et al. (2014)	Italy	Cross-sectional, independent samples group comparison	ADHD group (n=22). Epilepsy group (n=20). Control group (n=23)	
Graziano, McNamara, Geffken and Reid (2011)	USA	Cross-sectional Self-report questionnaire	n = 80 (62 males)	CPRS-3 PSI-SF BASC-2 ER Checklist
Grizenko et al. (2012)	Canada	Matched pairs, case control Self-report questionnaire	n = 142 (99 males)	CBCL, DISC-IV, Psychiatric interview Kinney Gynecological questionnaire
Harrison and Sofronoff (2002)	Australia	Cross-sectional Self-report questionnaire	n = 100 (78 males)	CBCL PSI-LF BDI

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Heath, Curtis, Fan and McPherson (2014)	USA	Repeated measures; pre-post-intervention	n = 43 (34 males)	BASC-2 PSI-SF PSE
Johnson and Reader (2002)	USA	Cross-sectional Self-report questionnaire	ADHD group (n = 55) Control group (n = 38)	DBSI
Pimentel, Vieira-Santos, Santos and Vale (2011)	Portugal	Cross-sectional Self-report questionnaire	n = 52	CBCL PSI-SF
Podolski and Nigg (2001)	USA	Cross-sectional Self-report questionnaire	Two groups (n = 88) ADHD group (n = 66) Control group (n = 22)	CBCL DISC-IV F-COPES PSI-SF PSS WIAT
Reader, Stewart and Johnson (2009)	USA	Cross-sectional Self-report questionnaire	Two groups: ADHD group (n = 124) Control group (n = 118)	DBSI
Rodriguez and Bohlin (2005)	Sweden	Repeated measures Self-report questionnaire	n = 290	PSS Cigarette usage
Ronald, Pennell and Whitehouse (2011)	Australia	Prospective, self-report questionnaire study	n = 2900	Australian Stress Scale CBCL 'Blues' Questionnaire
Theule, Wiener, Rogers and Marton (2011)	Canada	Cross-sectional Self-report questionnaire	Two groups (n = 95) ADHD group (n = 50) Control group (n = 45)	CRS CAARS PSI-SF
Treacy, Tripp and Baird (2005)	New Zealand	Repeated measures, pre-, post-intervention Self-report questionnaire	n = 42 (37 males)	CBCL PSI-LF Parent Scale
Tzang, Chang and Liu (2009)	Taiwan	Cross-sectional Self-report questionnaire	n = 109	PSI, DSM-IV MINI-KID, SCL-90-R
van der Oord, Prins, Oosterlaan and Emmelkamp (2006)	Holland	Cross-sectional Self-report questionnaire	n = 65 (58 males)	CBCL CES-D DISC-IV

				PSI-SF
van Steijn, Oerlemans, van Aken, Buitelaar and Rommelse (2014)	Holland	Cross-sectional Self-report questionnaire	n = 174	CAARS CRS-R DSM-IV GHQ-60 PSI-SF
Whalen, Odgers, Reed and Henker (2011)	USA	Repeated measures Self-report questionnaire and observational	Two groups (n = 109) ADHD group (n = 51) Controls (n = 58)	CBCL K-SADS eDiary SNAP
Wells et al. (2000)	USA	Repeated measures (pre-, post-intervention. Group comparisons. Self-report questionnaire	Four groups (n = 579). Three treatment groups and one control group.	APQ PSI-SF BDI

Excluded Articles

Reference	**Reason for exclusion**
Isaksson, J., Nilsson, K. W., & Lindblad, F. (2015). The Pressure–Activation–Stress scale in relation to ADHD and cortisol. *European child & adolescent psychiatry*, *24*(2), 153-161.	No parental stress measure. Child stress measure only.
Whitney, R. V., & Smith, G. (2015). Emotional Disclosure Through Journal Writing: Telehealth Intervention for Maternal Stress and Mother–Child Relationships. *Journal of autism and developmental disorders*, *45*(11), 3735-3745.	No ADHD measure.

Appendix A

Christiansen, H., Oades, R. D., Psychogiou, L., Hauffa, B. P., & Sonuga-Barke, E. J. (2010). Does the cortisol response to stress mediate the link between expressed emotion and oppositional behavior in Attention-Deficit/Hyperactivity-Disorder (ADHD)?. *Behavioral and Brain Functions*, *6*(1), 1.	No parental stress measure, only child stress.
Hwang, S. Y. (2009). Regular class teacher's stress on ADHD student of elementary school. *J Spec Child Educ*, *11*(4), 77-100.	No parental stress measure. Teacher stress only.
Lu, A. T., Ogdie, M. N., Järvelin, M. R., Moilanen, I. K., Loo, S. K., McCracken, J. T., ... & Cantor, R. M. (2008). Association of the cannabinoid receptor gene (CNR1) with ADHD and post-traumatic stress disorder. *American Journal of Medical Genetics Part B: Neuropsychiatric Genetics*, *147*(8), 1488-1494.	No Parental stress measure.
Marshal, M. P., Molina, B. S., Pelham, W. E., & Cheong, J. (2007). Attention-Deficit Hyperactivity Disorder Moderates the Life Stress Pathway to Alcohol Problems in Children of Alcoholics. *Alcoholism: Clinical and Experimental Research*, *31*(4), 564-574.	No parental stress measure.
Seo, M., Chang, E., Jung, C., & Chei, S. (2003). The study of the parenting stress, depression and parenting efficacy on the mother of attention deficit hyperactivity disorder children. *Korean Journal of Woman Psychology*, *8*, 69-81.	No Parental stress measure.
Greene, R. W., Beszterczey, S. K., Katzenstein, T., Park, K., & Goring, J. (2002). Are students with ADHD more stressful to teach? Patterns of teacher stress in an elementary school sample. *Journal of Emotional and Behavioral Disorders*, *10*(2), 79-89.	Measured teacher stress but not parental stress.
Gonzalez, L. O., & Sellers, E. W. (2002). The effects of a stress-management program on self-concept, locus of control, and the	No parental stress measure.

acquisition of coping skills in school-age children diagnosed with attention deficit hyperactivity disorder. *Journal of Child and Adolescent Psychiatric Nursing*, *15*(1), 5.	
Pelham Jr, W. E., & Lang, A. R. (1999). Can your children drive you to drink. *Alcohol Res Health*, *23*, 292-298.	Review article
Theule, J., Wiener, J., Tannock, R., & Jenkins, J. M. (2013). Parenting stress in families of children with ADHD: A meta-analysis. Journal Of Emotional And Behavioral Disorders, 21(1), 3-17.	Review article.
Finzi-Dottan, R., Triwitz, Y. S., & Golubchik, P. (2011). Predictors of stress-related growth in parents of children with ADHD. Research In Developmental Disabilities, 32(2), 510-519. doi:10.1016/j.ridd.2010.12.032	No measure of Parental Stress.
Joyner, K. B., Silver, C. H., & Stavinoha, P. L. (2009). Relationship between parenting stress and ratings of executive functioning in children with ADHD. Journal Of Psychoeducational Assessment, 27(6), 452-464.	Investigated Executive function, but no ADHD measure.
Talge, N. M., Neal, C., & Glover, V. (2007). Antenatal maternal stress and long-term effects on child neurodevelopment: How and why?. Journal Of Child Psychology And Psychiatry,	Review article.
Fischer, M. (1990). Parenting stress and the child with attention deficit hyperactivity disorder. Journal Of Clinical Child Psychology, 19(4), 337-346.	Review article
Hong, Y. (2008). Teachers' perceptions of young children with ADHD in Korea. Early Child Development and Care, 178(4), 399-414.	No parental stress rating
Kashdan, T. B., Adams, L. M., Kleiman, E. M., Pelham, W. E., & Lang, A. R. (2013). Stress-induced drinking in parents of boys with attention-deficit-hyperactivity disorder: heterogeneous groups in an experimental	No parental stress measure.

study of adult-child interactions. Journal of abnormal child psychology, 41(6), 919-927.	
Harrington, K. M., Miller, M. W., Wolf, E. J., Reardon, A. F., Ryabchenko, K. A., & Ofrat, S. (2012). Attention-deficit/hyperactivity disorder comorbidity in a sample of veterans with posttraumatic stress disorder. Comprehensive psychiatry, 53(6), 679-690.	No parental stress measure.
Tamm, L., Holden, G. W., Nakonezny, P. A., Swart, S., & Hughes, C. W. (2012). Metaparenting: associations with parenting stress, child-rearing practices, and retention in parents of children at risk for ADHD. ADHD Attention Deficit and Hyperactivity Disorders, 4(1), 1-10.	Di not measure child ADHD.
Pelham, W. E., Lang, A. R., Atkeson, B., Murphy, D. A., Gnagy, E. M., Greiner, A. R., ... & Greenslade, K. E. (1998). Effects of Deviant Child Behavior on Parental Alcohol Consumption: Stress-Induced Drinking in Parents of ADHD Children. The American Journal on Addictions, 7(2), 103-114.	No parental stress measured.
Sánchez-Mora, C., Richarte, V., Garcia-Martínez, I., Pagerols, M., Corrales, M., Bosch, R., ... & Ramos-Quiroga, J. A. (2015). Dopamine receptor DRD4 gene and stressful life events in persistent attention deficit hyperactivity disorder. American Journal of Medical Genetics Part B: Neuropsychiatric Genetics, 168(6), 480-491.	No parental stress measure.
Chazan, Rodrigo, MD, MSc, Borowski, Carolina, Pianca, Thiago, Ludwig, Henrique, Rohde, Luis, et al. (2011). Do Phenotypic Characteristics, Parental Psychopathology, Family Functioning, and Environmental Stressors Have a Role in the Response to Methylphenidate in Children With Attention-Deficit/Hyperactivity Disorder?: A Naturalistic Study From a Developing Country. Journal of Clinical Psychopharmacology, 31, 309-317	No parental stress measure.
Weber-Boergmann, I., Burdach, S., Barchfeld, P., & Wurmser, H. (2014). [Associations with ADHD and parental distress with in play in early childhood]. Zeitschrift fur Kinder-und Jugendpsychiatrie und Psychotherapie, 42(3), 147-155.	Did not investigate the parental stress in context of ADHD.

Oerlemans, A. M., Burmanje, M. J., Franke, B., Buitelaar, J. K., Hartman, C. A., & Rommelse, N. N. (2015). Identifying Unique Versus Shared Pre- and Perinatal Risk Factors for ASD and ADHD Using a Simplex-Multiplex Stratification. Journal of abnormal child psychology, 1-13.	Did not use parental stress measure.
Battagliese, G., Caccetta, M., Luppino, O. I., Baglioni, C., Cardi, V., Mancini, F., & Buonanno, C. (2015). Cognitive-behavioral therapy for externalizing disorders: A meta-analysis of treatment effectiveness. *Behaviour research and therapy*, *75*, 60-71.	Review article.
Sullivan, E. L., Holton, K. F., Nousen, E. K., Barling, A. N., Sullivan, C. A., Propper, C. B., & Nigg, J. T. (2015). Early identification of ADHD risk via infant temperament and emotion regulation: a pilot study. Journal of child psychology and psychiatry, 56(9), 949-957.	Did not using parental stress measure
de Souza Costa, D., Rosa, D. V. F., Barros, A. G. A., Romano-Silva, M. A., Malloy-Diniz, L. F., Mattos, P., & de Miranda, D. M. (2015). Telomere length is highly inherited and associated with hyperactivity-impulsivity in children with attention deficit/hyperactivity disorder. Frontiers in molecular neuroscience, 8.	Did not measure parental stress.
Gordon, C. T., & Hinshaw, S. P. (2015). Parenting Stress as a Mediator Between Childhood ADHD and Early Adult Female Outcomes. Journal Of Clinical Child And Adolescent Psychology: The Official Journal For The Society Of Clinical Child And Adolescent Psychology, American Psychological Association, Division 53, 1-12.	Did not investigate child ADHD and parental stress.
Thompson, J. M., Waldie, K. E., Wall, C. R., Murphy, R., Mitchell, E. A., & ABC Study Group. (2014). Associations between acetaminophen use during pregnancy and ADHD symptoms measured at ages 7 and 11 years. PloS one, 9(9), e108210.	Did not measure parental stress.
DeMaso, D. R., Labella, M., Taylor, G. A., Forbes, P. W., Stopp, C., Bellinger, D. C., & ... Newburger, J. W. (2014). Psychiatric disorders and	Did not measure parental stress.

function in adolescents with d-transposition of the great arteries. The Journal Of Pediatrics, 165(4), 760-766. doi:10.1016/j.jpeds.2014.06.029	
Pfiffner, L. J., & Haack, L. M. (2014). Behavior management for school-aged children with ADHD. Child And Adolescent Psychiatric Clinics Of North America, 23(4), 731-746. doi:10.1016/j.chc.2014.05.014	Review article
Bronson, S. L., & Bale, T. L. (2014). Prenatal stress-induced increases in placental inflammation and offspring hyperactivity are male-specific and ameliorated by maternal antiinflammatory treatment. Endocrinology, 155(7), 2635-2646. doi:10.1210/en.2014-1040	Non-human participants
Holz, N. E., Boecker, R., Baumeister, S., Hohm, E., Zohsel, K., Buchmann, A. F., ... & Plichta, M. M. (2014). Effect of prenatal exposure to tobacco smoke on inhibitory control: neuroimaging results from a 25-year prospective study. JAMA psychiatry, 71(7), 786-796.	Parent stress level assessed qualitatively via interview.
O'Dwyer, L., Tanner, C., van Dongen, E. V., Greven, C. U., Bralten, J., Zwiers, M. P., & ... Buitelaar, J. K. (2014). Brain volumetric correlates of autism spectrum disorder symptoms in attention deficit/hyperactivity disorder. Plos One, 9(6), e101130.	No parental stress measure.
Efron, D., Lycett, K., & Sciberras, E. (2014). Use of sleep medication in children with ADHD. Sleep medicine, 15(4), 472-475.	No parental stress measure.
Brown, N. M., Green, J. C., Desai, M. M., Weitzman, C. C., & Rosenthal, M. S. (2014). Need and unmet need for care coordination among children with mental health conditions. Pediatrics, 133(3), e530-e537.	Qualitative measure of parental stress.
Biederman, J., Petty, C., Spencer, T. J., Woodworth, K. Y., Bhide, P., Zhu, J., & Faraone, S. V. (2014). Is ADHD a risk for posttraumatic stress disorder (PTSD)? Results from a large longitudinal study of referred children with and without ADHD. The World Journal Of Biological Psychiatry: The Official Journal Of The World Federation Of Societies Of Biological Psychiatry, 15(1), 49-55.	Measured parental Post-Traumatic Stress Disorder, but not parental stress.

Oquendo, M. A., Ellis, S. P., Chesin, M. S., Birmaher, B., Zelazny, J., Tin, A., & ... Brent, D. A. (2013). Familial transmission of parental mood disorders: unipolar and bipolar disorders in offspring. Bipolar Disorders, 15(7), 764-773	Measured parental Affective disorders, but not stress.
Sterley, T., Howells, F. M., & Russell, V. A. (2013). Maternal separation increases GABA(A) receptor-mediated modulation of norepinephrine release in the hippocampus of a rat model of ADHD, the spontaneously hypertensive rat. Brain Research, 149723-31. doi:10.1016/j.brainres.2012.12.029	Non-human participants.
Carlyle, B. C., Duque, A., Kitchen, R. R., Bordner, K. A., Coman, D., Doolittle, E., & ... Simen, A. A. (2012). Maternal separation with early weaning: a rodent model providing novel insights into neglect associated developmental deficits. Development And Psychopathology, 24(4), 1401-1416.	Non-human participants.
Latimer, K., Wilson, P., Kemp, J., Thompson, L., Sim, F., Gillberg, C., & ... Minnis, H. (2012). Disruptive behaviour disorders: a systematic review of environmental antenatal and early years risk factors. Child: Care, Health And Development, 38(5), 611-628.	Review article
Dhobale, M., Mehendale, S., Pisal, H., D'Souza, V., & Joshi, S. (2012). Association of brain-derived neurotrophic factor and tyrosine kinase B receptor in pregnancy. Neuroscience, 21631-37.	No parental stress measure.
Womersley, J. S., Hsieh, J. H., Kellaway, L. A., Gerhardt, G. A., & Russell, V. A. (2011). Maternal separation affects dopamine transporter function in the spontaneously hypertensive rat: an in vivo electrochemical study. Behavioral And Brain Functions: BBF, 749.	Non-human participants.
Sterley, T., Howells, F. M., & Russell, V. A. (2011). Effects of early life trauma are dependent on genetic predisposition: a rat study. Behavioral And Brain Functions: BBF, 711	Non-human participants.

Appendix A

Van Lieshout, R. J., & Boylan, K. (2010). Increased depressive symptoms in female but not male adolescents born at low birth weight in the offspring of a national cohort. *The Canadian Journal of Psychiatry*, *55*(7), 422-430.	No parental stress measure.
Colins, O., Vermeiren, R., Vreugdenhil, C., van den Brink, W., Doreleijers, T., & Broekaert, E. (2010). Psychiatric disorders in detained male adolescents: a systematic literature review. Canadian Journal Of Psychiatry. Revue Canadienne De Psychiatrie, 55(4), 255-263.	Review article
Deault, L. C. (2010). A systematic review of parenting in relation to the development of comorbidities and functional impairments in children with attention-deficit/hyperactivity disorder (ADHD). Child Psychiatry And Human Development, 41(2), 168-192.	Review.
Mabandla, M. V., Kellaway, L. A., Daniels, W. U., & Russell, V. A. (2009). Effect of exercise on dopamine neuron survival in prenatally stressed rats. Metabolic Brain Disease, 24(4), 525-539.	Non-human participants.
Brinkman, W. B., Sherman, S. N., Zmitrovich, A. R., Visscher, M. O., Crosby, L. E., Phelan, K. J., & Donovan, E. F. (2009). Parental angst making and revisiting decisions about treatment of attention-deficit/hyperactivity disorder. Pediatrics, 124(2), 580-589.	Qualitative stress measure.
Hastings, P. D., Fortier, I., Utendale, W. T., Simard, L. R., & Robaey, P. (2009). Adrenocortical functioning in boys with attention-deficit/hyperactivity disorder: examining subtypes of ADHD and associated comorbid conditions. Journal Of Abnormal Child Psychology, 37(4), 565-578.	No parental stress measure.
Roberts, R. E., Roberts, C. R., & Chan, W. (2009). One-year incidence of psychiatric disorders and associated risk factors among adolescents in the community. Journal Of Child Psychology And Psychiatry, And Allied Disciplines, 50(4), 405-415.	No parental stress measure.

Modesto-Lowe, V., Danforth, J. S., & Brooks, D. (2008). ADHD: does parenting style matter?. Clinical Pediatrics, 47(9), 865-872.	Review article
Beydoun, H., & Saftlas, A. F. (2008). Physical and mental health outcomes of prenatal maternal stress in human and animal studies: a review of recent evidence. MEDLINE Paediatric And Perinatal Epidemiology, 22(5), 438-466.	Review article
Diler, R. S., Daviss, W. B., Lopez, A., Axelson, D., Iyengar, S., & Birmaher, B. (2007). Differentiating major depressive disorder in youths with attention deficit hyperactivity disorder. Journal Of Affective Disorders, 102(1-3), 125-130.	No parental stress measure.
Paz, R., Barsness, B., Martenson, T., Tanner, D., & Allan, A. M. (2007). Behavioral teratogenicity induced by nonforced maternal nicotine consumption. Neuropsychopharmacology: Official Publication Of The American College Of Neuropsychopharmacology, 32(3), 693-699.	No parental stress measure.
Riley, A. W., Lyman, L. M., Spiel, G., Döpfner, M., Lorenzo, M. J., & Ralston, S. J. (2006). The Family Strain Index (FSI). Reliability, validity, and factor structure of a brief questionnaire for families of children with ADHD. European Child & Adolescent Psychiatry, 15 Suppl 1I72-I78.	No parental stress measure.
Biederman, J. (2005). Attention-deficit/hyperactivity disorder: a selective overview. Biological Psychiatry, 57(11), 1215-1220.	Review article
Foy, J. M., & Earls, M. F. (2005). A process for developing community consensus regarding the diagnosis and management of attention-deficit/hyperactivity disorder. Pediatrics, 115(1), e97-e104.	Review article.
Melnyk, B. M., Alpert-Gillis, L., Feinstein, N. F., Crean, H. F., Johnson, J., Fairbanks, E., & ... Corbo-Richert, B. (2004). Creating opportunities for parent empowerment: program effects on the mental health/coping outcomes of critically ill young children and their mothers. Pediatrics, 113(6), e597-e607.	No child ADHD measure.

Appendix A

Claycomb, C. D., Ryan, J. J., Miller, L. J., & Schnakenberg-Ott, S. D. (2004). Relationships among attention deficit hyperactivity disorder, induced labor, and selected physiological and demographic variables. Journal Of Clinical Psychology, 60(6), 689-693.	Parental stress not measured, only fetal and physiological stress.
Chronis, A. M., Chacko, A., Fabiano, G. A., Wymbs, B. T., & Pelham, W. J. (2004). Enhancements to the behavioral parent training paradigm for families of children with ADHD: review and future directions. Clinical Child And Family Psychology Review, 7(1), 1-27.	Review.
Linnet, K. M., Dalsgaard, S., Obel, C., Wisborg, K., Henriksen, T. B., Rodriguez, A., & ... Jarvelin, M. (2003). Maternal lifestyle factors in pregnancy risk of attention deficit hyperactivity disorder and associated behaviors: review of the current evidence. The American Journal Of Psychiatry, 160(6), 1028-1040.	Review.
Donnelly, C. L. (2003). Pharmacologic treatment approaches for children and adolescents with posttraumatic stress disorder. Child And Adolescent Psychiatric Clinics Of North America, 12(2), 251-269.	No measure of Parental stress.
Barkley, R. A., Shelton, T. L., Crosswait, C., Moorehouse, M., Fletcher, K., Barrett, S., ... & Metevia, L. (2002). Preschool children with disruptive behavior: Three-year outcome as a function of adaptive disability. Development and Psychopathology, 14(01), 45-67.	Did not measure ADHD specifically.
Smith, V. C., Leppert, K. A., Alfano, C. A., & Dougherty, L. R. (2014). Construct validity of the parent-child sleep interactions scale (PSIS): associations with parenting, family stress, and maternal and child psychopathology. Sleep Medicine, 15(8), 942-951.	Did not measure parental stress within context of child ADHD.
Franc, N., Maury, M., & Purper-Ouakil, D. (2009). ADHD and attachment processes: are they related?. L'Encéphale, 35(3), 256.	No parental stress measure.
Fossum, S., Mørch, W., Handegård, B. H., Drugli, M. B., & Larsson, B. (2009). Parent training for young Norwegian children with ODD and CD	Did not investigate parental stress.

problems: predictors and mediators of treatment outcome. Scandinavian Journal Of Psychology, 50(2), 173-181.	
Gerdes, A. C., Hoza, B., Arnold, L. E., Pelham, W. E., Swanson, J. M., Wigal, T., & Jensen, P. S. (2007). Maternal depressive symptomatology and parenting behavior: exploration of possible mediators. Journal Of Abnormal Child Psychology, 35(5), 705-714.	Did not investigate parental stress.
Milberger, S., Biederman, J., Faraone, S. V., Chen, L., & Jones, J. (1996). Is maternal smoking during pregnancy a risk factor for attention deficit hyperactivity disorder in children?. The American Journal Of Psychiatry, 153(9), 1138-1142.	No parental stress measure.

Appendix B Study Advertisement

SHARe

UNIVERSITY OF Southampton

South Hampshire ADHD Register

Would you like to know more about your child's strengths and weaknesses? Do you have time to participate in a research study?

Official intelligence testing for children would normally cost £400 - £800, but is free for participating in this study. In addition to giving a measure of your child's IQ, intelligence testing can highlight children's cognitive strengths and weaknesses. An awareness of these strengths, can be used to maximise your child's academic performance and potentially increase their wellbeing. The lead researcher, who is also an NHS Clinician, will carry out an intelligence test on your child, which involves your child playing some games and completing puzzles. Most children find testing to be fun and the assessment usually lasts between 1½ to 2 hours. The Clinician will then write a report detailing your child's cognitive profile, including strengths and weaknesses, which can be applied to school and home learning. The Clinician would also like to ask the parent some questions about their child's behaviour at home and at school. There will also be a payment of £10 for participating in the study.

This study is part of a national project investigating the psychological and social factors related to child behaviour, in particular attention deficit and hyperactivity, and we are recruiting **children who DO NOT** have a diagnosis of ADHD. This study is ethically approved by the University of Southampton (ERGO# 10827).

Please note that at this stage, we are only looking to recruit children aged between 4 and 12 years of age who live within the Southampton area (SO postcode). If you and your child are interested in being part of this study, or would like any further information, please contact the lead researcher, David Beattie via phone (07429 434 208) or by email at dmnb1g12@soton.ac.uk

Many thanks,

David.

University of Southampton

Appendix C School Recruitment Form

Project Title.

Exploring the relationship between severity of child and parent ADHD behaviours and the degree of parenting stress

Background.

This study is linked to the SHARe (South Hampshire ADHD Register). The SHARe study is a unique research project involving over 350 children to-date aged 3 - 18 years who have ADHD or show ADHD type symptoms.

SHARe works in collaboration with local NHS trusts to help gather a wide range of information about children with ADHD to help drive current and future research into this disorder. If you are interested in finding out more about the SHARe project, you can visit their website at http://www.southampton.ac.uk/share/index.page

This study is looking to recruit children that have not being diagnosed with having ADHD so that we can explore any differences between children with ADHD and those not diagnosed with ADHD. We will be investigating any individual differences, such as their behaviour and cognitive performance (via standardised neuropsychological assessment). We will also be investigating any contextual differences, such as their parents behaviour and mental health, and child's relationship with their parent(s).

Aims of the project.

To explore the relative strength of environmental factors on child behaviour. In particular, this study will investigate the relationship between child behaviour, mental health and environmental factors.

Who is conducting and supervising the project?

David Beattie (Final year Trainee Clinical Psychologist), Professor Edmund Sonuga-Barke and Andrew Sibley.

What is the proposed start date and time frame?

Start July 2014. Finish February 2015.

We aim to start the recruitment of the school sample in October/early November 2014.

What is the age group and gender?

In order to match the recruitment group to that of the SHARe study, we will be hoping to recruit both males and females, although 80-90% male participants would be ideal.

We will be hoping to recruit participants between 4-11 years, with an average age of 9 years old.

What will we ask the school to do?

One teacher per child will be asked to complete a questionnaire about each participating child's behaviour. The school will also be asked to link to the child's parents who will be asked to complete some questionnaires about their child's behaviour and mood. Parents will also be asked to complete questionnaires related to their own mood.

What will we ask the young person to do?

The young person will be offered the opportunity to complete an intelligence test (the Weschler Intelligence Scale for Children) which involves completing puzzles over approximately a 1½ hour period (with several breaks as necessary).

What are the benefits for the school and/or the young person?

1) IQ and ability testing will highlight the child's relative strengths and weaknesses that can be implemented by the parent and/or school to improve the child's academic performance. The testing will be performed by a final year Trainee Clinical Psychologist (on the University of Southampton Doctoral course) and would otherwise privately cost several hundred pounds per child.
2) The teacher and parent questionnaires can highlight a wide range of mental health disorders or difficulties that may not be known to the child, parent and/or school. Approximately 1 in 10 children experience mental health problems during childhood and adolescence. Generally, such problems only become apparent when the severity is at a level whereby it creates a significant impact on the child's social, academic and/or psychological functioning. By participating in this study, the child will benefit from a routine screening for numerous mental health conditions which may prevent the child and family experiencing prolonged and unnecessary distress caused by underlying disorders or difficulties not being picked up earlier.

How will the project help us to understand child and adolescent development?

Broadly speaking, this study will be investigating the nature/nurture debate regarding child and adolescent behavioural and mental health problems. In particular this study aims to investigate the relative strength of several environmental (nurture) factors associated with child developmental disorders. Clinically, this may help healthcare services to highlight and target key factors that maintain child behaviour problems before they become significantly disruptive to the child and their surrounding systems, such as families and schools.

Appendix D Invitation Letter to Parents

[parent name]

[address]

[date]

Project title: Exploring the relationship between severity of Child and Parent ADHD behaviours, the degree of parenting stress and attachment

Invitation Letter to Parents

Dear [parent name],

Having seen the poster at your child's school advertising this study, thank you for contacting the research team and agreeing to consider participating in this study. I am writing to pass on further written information about the study (please see the information sheets included). The date and time of your child's assessment will be confirmed once your consent form and questionnaires have been received. If you would prefer to meet in person to complete the questionnaires please contact me to arrange a convenient time and venue.

Date and time of appointment: To be determined.

Address of the appointment location: To be determined.

If you choose to meet in person, the appointment normally lasts up to 1 hour. Your child's cognitive assessment will be arranged via the school's research liaison person and will last approximately 1½ hours.

If you would like more information or to discuss your participation further please contact me on 07429434208 or by email at dmnb1g12@soton.ac.uk. I look forward to meeting you and [Child's name] at the appointment.

Yours sincerely,

David Beattie

Trainee Clinical Psychologist

University of Southampton

Appendix E Parent Information Sheet

Exploring the relationship between severity of Child and Parent ADHD behaviours, the degree of parenting stress and attachment

INFORMATION SHEET FOR PARENTS

What is this study about?

In our study, we are trying to find out:

1) How children and young people behave. We will be gathering information from children, their parents and teachers all over Hampshire to try and find out.

2) Whether there are things that are similar or different between children who have problems with their behavior and children who do not have these problems.

Why have I been asked to take part?

Research can help to increase children's wellbeing and academic performance. Your child's school has agreed to participate in research studies with the University of Southampton which could help your child's generation and those that follow.

What will happen if I take part?

If you want to take part in the study, a researcher called David from the University of Southampton will contact you and arrange to meet with you to complete some brief questionnaires. If you prefer, these questionnaires can be sent to you in the post with a pre-paid envelope for you to return them.

Your child will also be asked to complete a cognitive assessment, which will last approximately 1½ hours, the potential benefits of which are explained later on in the *"benefits of participating"* section.

If you give us permission, we will also contact your child's teacher and ask them to complete a questionnaire about your child's behavior.

In approximately 2 months from now, we will send you some more questionnaires for you to complete (which usually takes about 30 minutes) and will ask your child's teacher to complete one questionnaire.

Do I have to take part?

No, it's up to you and your child. But if you do want to take part, please give signed consent to show that you have agreed to take part (consent form attached).

You can stop taking part at any time, without giving a reason.

If you decide to stop, this will not affect any care you might receive.

What will happen to my information?

We will look at all the scores given by all the people who take part in this study and we will publish the findings on this study so other doctors and researchers can learn more about why some children find it easier to control how they behave more than other children. Some of your data will be used by other researchers at the University, and some who are from outside of the UK. We will never publish your name or any other information that can be traced back to you or let people know who you are.

What are the risks of taking part?

There is no more risk than someone registering with a GP as a patient. Your details will be kept in a secure place. No one will be able to identify you from your information on tasks.

Who is organising the research?

The research is organised through the National Health Service and Psychology Academic Unit in the University of Southampton.

Will anyone else know I am doing this?

We will keep all your information in confidence. This means that we will only tell those who have a need or a right to know.

You will have a research number and your name will not be used. All information collected will be stored in a special way to keep your identity a secret. The only people who will be able to know who you are will be members of the research team at the University of Southampton. When results of this study are published, your name will not be used.

What if I want to stop?

If you decide you want to stop that's OK. No one will be upset with you. All you have to say is that you want to stop and we'll stop straight away.

Who has reviewed the study?

The study has been reviewed by other people who work at the University of Southampton, this means that they think the project is safe, ethical and valid (Academic Unit of Psychology Research Ethics Committee, Tel: 02380593856, Email: fshs-rso@soton.ac.uk).

Benefits of participating

As part of this study your child will be given the opportunity to complete an intelligence test, administered by a Trainee Clinical Psychologist. Intelligence tests can be useful in understanding a child's relative strengths and weaknesses, which could be used to inform learning plans and strategies to improve academic performance. These tests can only be administered by qualified and suitably trained clinicians and would typically cost in the region of £300-800 each privately. The Trainee Clinical Psychologist will write a neuropsychological report detailing your child's profile and highlighting recommendations.

What should I do next?

If you wish to take part in the study, please sign the enclosed 'Consent form' and return to the University of Southampton using the pre-paid self-addressed envelope. Please provide contact details (such as a phone number) so that David can contact you to arrange to either (1) Send you the questionnaires which you can completed and return to the University using the freepost envelope provided, or (2) Meet in person to complete questionnaires.

Need to know more?

Please feel free to contact me to ask any questions you have about the study.
My name is David Beattie and I am based at the Clinical Psychology department, Building 44a, University of Southampton Highfield, SO17 1BJ. My email address is dmnb1g12@soton.ac.uk and my telephone number is 07429434208.

Appendix F Child Information sheet (Younger child)

Exploring the relationship between severity of Child and Parent ADHD behaviours, the degree of parenting stress and attachment.

UNIVERSITY OF Southampton

INFORMATION SHEET – CHILD

Would you like to play some thinking games?

The thinking games can be fun and we make sure you have lots of breaks to rest if you want them.

The thinking games will let us see how you can work out different problems, with words or pictures, or remembering.

It's OK if you want to stop playing the games, just let us know, but most children find them fun!

If you have any questions about the day, ask mum or dad and they can tell you a bit more.

If they want to they can phone our lead researcher David who can explain things more, his telephone number is on their letter from us.

Appendix G Child Information Sheet (Older Child)

Exploring the relationship between severity of Child and Parent ADHD behaviours, the degree of parenting stress and attachment.

INFORMATION SHEET FOR YOUNG PEOPLE

What is this study about?

In our study, we are trying to find out:

1) How many children and young people have problems with their behaviour. We will be talking to children all over Hampshire.

2) Whether there are things that are similar or different between children who have problems with their behavior and children who do not have these problems.

Why have I been asked to take part?

When finding out how many children have problems with their behavior, it is really important to make sure that we talk to people (parents, teachers and children) from lots of different areas. This means we will be talking to children and parents from different parts of Hampshire.

What will happen if I take part?

If you want to take part in the study, a researcher called David from the University will contact you and arrange to meet with you and your mum or dad. David will ask your Mum or Dad to fill in some questionnaires and David will spend about an hour with you, where you will be asked to solve some puzzles. This is not a test like you have at school because there is no pass or fail. You just have to try to answer as best you can and you will get a certificate to show that you did the test. Your mum and dad can be in the room with you and David if you want them to be, but they are not allowed to help you with the puzzles. **If you need glasses for reading or a hearing aid, please remember to bring these with you.** David will also ask your mum or dad to remember these for you if you need them.

We are interested to find out how things change over time. Therefore, if your mum or dad give us permission during your assessment, we will contact you two months after your assessment to invite you to complete some questionnaires about how things are going.

Appendix G

Do I have to take part?

No, it's up to you. But if you think you might want to take part, you and a parent need to give signed assent/consent to show that you have agreed to take part.

You can stop taking part at any time, without giving a reason.

If you decide to stop, this will not affect any care you might receive.

What will happen to my information?

We will look at all the scores given by all the people who take part in this study and we will publish the findings on this study so other doctors and researchers can learn more about why some children find it easier to control how they behave more than other children. Some of your data will be used by other researchers at the University, and some who are from outside of the UK. We will never publish your name or any other information that can be traced back to you or let people know who you are.

What are the risks of taking part?

There is no more risk than someone registering with a GP as a patient. Your details will be kept in a secure place. No one will be able to identify you from your information on tasks.

Who is organising the research?

The research is organised through the National Health Service and Psychology Academic Unit in the University of Southampton.

Does taking part cost anything?

There are no costs to you for taking part. Your parents will be sent a report to let them know how you got on and you will be given a certificate for taking part.

Appendix G

Will anyone else know I am doing this?

We will keep all your information in confidence. This means that we will only tell those who have a need or a right to know.

You will have a research number and your name will not be used. All information collected will be stored in a special way to keep your identity a secret. The only people who will be able to know who you are will be members of the research team at the University of Southampton. When results of this study are published, your name will not be used.

Who has reviewed the study?

The study has been reviewed by other people who work at the University of Southampton, this means that they think the project is safe, ethical and valid (Academic Unit of Psychology Research Ethics Committee, Tel: 02380593856, Email: fshs-rso@soton.ac.uk).

What if I want to stop?

If you decide you want to stop that's OK. No one will be upset with you. All you have to say is that you want to stop and we'll stop straight away.

Appendix G

PARTICIPATION IS VOLUNTARY

You do not have to take part in this register. Signing the consent form does not commit you or any other member of your family to take part in this research.

You will not lose any benefits or access to treatment that you are otherwise entitles to if you do not want to be on the register.

What should I do next?

If you wish to take part in the study, please bring the consent form with you to your appointment. After having an opportunity to discuss the project further, please sign the consent form at the appointment. You will also need to ask a parent to sign your consent form. This is to confirm that a parent is happy for you to take part.

Need to know more?

You can talk to me and ask any questions you have about the study.
My name is David Beattie and I am based at the Clinical Psychology department, Building 44a, University of Southampton Highfield, SO17 1BJ. My email address is dmnb1g12@soton.ac.uk and my telephone number is 07429434208.

University of Southampton

Solent NHS Trust

Appendix H Summary of Child and Parent Assessments

SAMPLE 1: SHARE-RECRUITED GROUP		**SAMPLE 2: CONTROL GROUP**	
Child	**Parent**	**Child**	**Parent**
WISC-IV (>7yrs); or WPSII <7yrs	1. Parenting Stress Inventory-Short Form 2. HADS 3. CBRS 4. DISC-IV 5. Parent demographic Questionnaire 6. Relationship Problems Questionnaire 7. Child-Parent Relationship Scale 8. Current Symptoms Scale	WISC-IV (>7yrs); or WPSII <7yrs	1. Parenting Stress Inventory-Short Form 2. HADS 3. CBRS 4. Parent demographic Questionnaire 5. Relationship Problems Questionnaire 6. Child-Parent Relationship Scale 7. Current Symptoms Scale

Appendix I UoS Ethics Approval Letter

Your Ethics Submission (Ethics ID:10827) has been reviewed and approved

ERGO [ergo@soton.ac.uk]
Sent:09 October 2014 13:01
To: Beattie D.M.N.

Submission Number: 10827
Submission Name: Exploring the relationship between child ADHD, parenting stress, attachment and parental ADHD
This is email is to let you know your submission was approved by the Ethics Committee.

You can begin your research unless you are still awaiting specific Health and Safety approval (e.g. for a Genetic or Biological Materials Risk Assessment)

Comments
None
Click here to view your submission

ERGO : Ethics and Research Governance Online
http://www.ergo.soton.ac.uk

DO NOT REPLY TO THIS EMAIL

Appendix J SHARe Ethical Approval

David Beattie steering group approval letter

Sibley A.M.
Sent: 27 June 2014 14:48
To: Bradley S.E.
Cc: Beattie D.M.N.

Dear Sarah,

David Beattie's study has been given SHARe steering group approval. Please can you draft the standard letter to acknowledge this and email it to him and I?

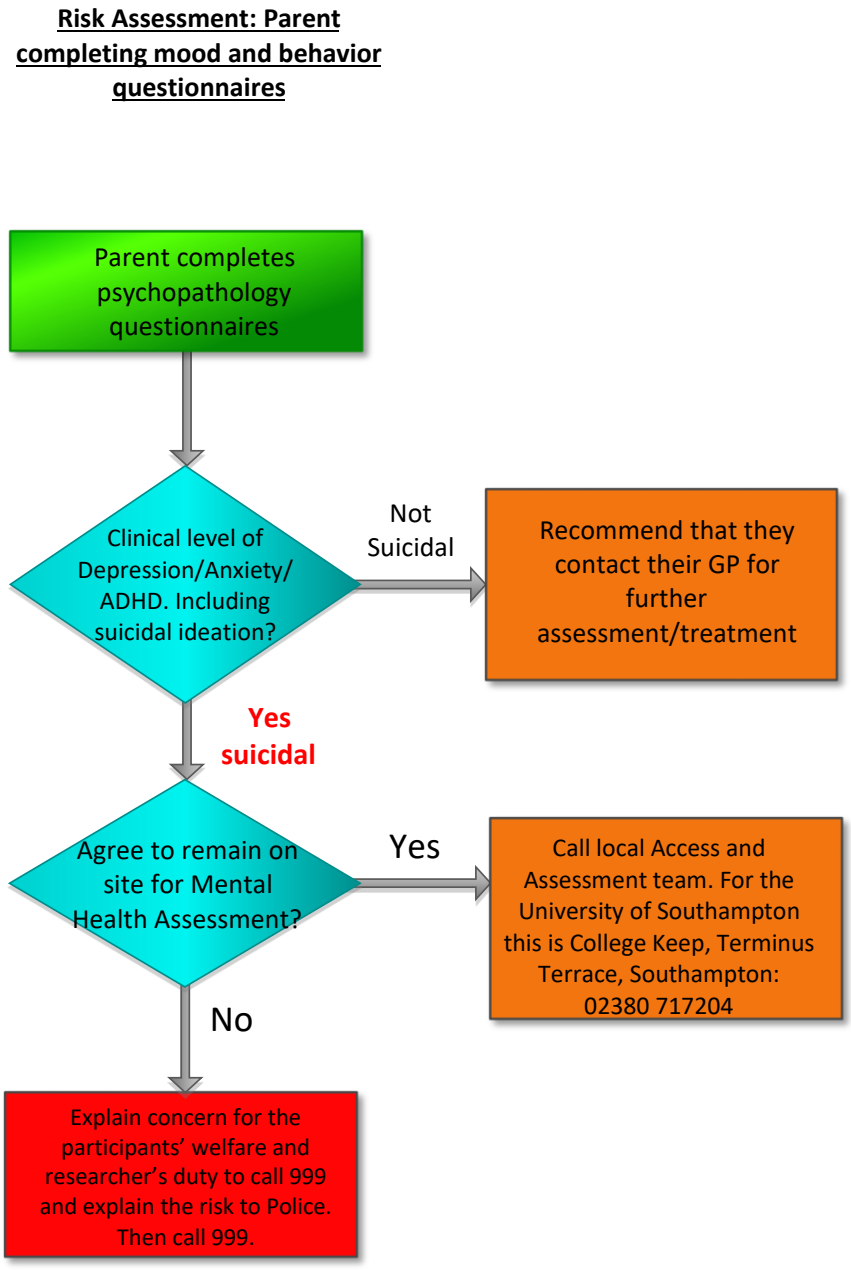
David needs this quickly for his ERGO ethics application submission.

Many thanks,

Best wishes,
Andrew

Senior Research Fellow
South Hampshire Register (SHARe) Project Coordinator
School of Psychology
Room 3085, Building 44
Highfield Campus
University of Southampton
SO17 1BJ
SHARe office telephone: 02380598941
Mobile: 07940973593

Appendix K Risk Management Flow Chart



Appendix L Child Assent Form

SHARe

Solent NHS Trust

UNIVERSITY OF Southampton

Participant ID Number:

STATEMENT OF ASSENT FOR YOUNG PERSON

Title of Project: Exploring the relationship between severity of Child and Parent ADHD behaviours, the degree of parenting stress and attachment.

Please initial the boxes below and sign the assent form:

You read (or had read to you) information about this project	
Somebody else explained this project to you in a way you understand	
You asked all the questions you want and had them answered in a way you understand	
You understand it's OK to stop taking part at any time	
Are you happy for your parent to fill in a questionnaire about your behaviour?	
I agree to have my answers anonymised, meaning that my name and other personal details will be removed so that people won't know that the answers I gave were mine.	
I agree for my anonymised data to be kept at the University and used in future research.	

Your name	Date	Signed
Name of Parent	Date	Signed
Name of researcher taking consent		

Appendix M Parent Consent Form

SHARe

UNIVERSITY OF Southampton

Solent NHS Trust

Participant ID Number:

STATEMENT OF CONSENT FOR PARENT

Title of Project: Exploring the relationship between severity of Child and Parent ADHD behaviours, the degree of parenting stress and attachment.

Please initial the boxes below and sign the consent form:

I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	
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.	
I give consent for my child's teacher to be contacted and invited to complete a questionnaire about my child's behaviour at school and to provide copies of the last two years' school reports.	
I give consent to be contacted 2 months after the assessment to complete some short questionnaires about if and how my own or my child's circumstances have changed. I understand that in order to receive my child's cognitive assessment report it is necessary for me to complete both the initial and follow-up questionnaires.	Please circle Yes N
The study has been described to my child by myself and/or the researchers, and I am satisfied that at this time my child appears enthusiastic about taking part. I understand however that I may withdraw them from the study at any time if I believe they are unhappy.	
I consent to participate in this study.	

Name of Parent	Date	Signed
Name of researcher taking consent		

List of References

Abidin, R. R. (1990). *Parenting Stress Index (PSI).* Pediatric Psychology Press Charlottesville, VA.

Abidin, R. (1995). *Parenting Stress Index*. *Psychological Assessment Resources Inc*.

Abidin, R. R. (1997). Parenting Stress Index: A measure of the parent–child system. In *Evaluating stress: A book of resources* (pp. 277–291).

Achenbach, T. M., Edelbrock, C., & Howell, C. T. (1987). Empirically based assessment of the behavioral/emotional problems of 2- and 3- year-old children. *Journal of Abnormal Child Psychology*, *15*(4), 629–50. http://doi.org/10.1007/BF00917246

American Psychiatric Association. (2013). Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5). *Diagnostic and Statistical Manual of Mental Disorders 4th Edition TR.*, 280. http://doi.org/10.1176/appi.books.9780890425596.744053

Anastopoulos, a D., Guevremont, D. C., Shelton, T. L., & DuPaul, G. J. (1992). Parenting stress among families of children with attention deficit hyperactivity disorder. *Journal of Abnormal Child Psychology*, *20*(5), 503–520.

Anderson, S. B., & Guthery, A. M. (2015). Mindfulness-based psychoeducation for parents of children with attention-deficit/hyperactivity disorder: An applied clinical project. *Journal of Child and Adolescent Psychiatric Nursing*, *28*(1), 43–49. http://doi.org/10.1111/jcap.12103

Anthony, L. G., Anthony, B. J., Glanville, D. N., Naiman, D. Q., Waanders, C., & Shatter, S. (2005). The relationships between parenting stress, parenting behaviour and preschoolers' social competence and behaviour problems in the classroom. *Infant and Child Development*. http://doi.org/10.1002/icd.385

Arnold, D. S., O'Leary, S. G., Wolff, L. S., & Acker, M. M. (1993). The Parenting Scale: A measure of dysfunctional parenting in discipline situations. *Psychological Assessment*, *5*(2), 137–144. http://doi.org/10.1037/1040-3590.5.2.137

Baker, D. B., & McCal, K. (1995). Parenting stress in parents of children with attention-deficit hyperactivity disorder and parents of chiidren with learning disabilities. *Journal of Child and Family Studies*, *4*(1), 57–68.

Barkley, R. A., & Murphy, K. R. (1998). Attention-deficit hyperactivity disorder: A clinical workbook (2nd ed.). *(1998) Attention-Deficit Hyperactivity Disorder: A Clinical Workbook (2nd Ed) Viii,*

133 Pp New York, NY, US: Guilford Press; US. Retrieved from http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=psyc3&AN=1998-06090-000\nhttp://lib.exeter.ac.uk:4556/resserv?sid=OVID:psycdb&id=pmid:&id=doi:&issn=&isbn=1572303018&volume=&issue=&spage=&pages=&date=1998&title=Attention-deficit+hypera

Baron, R. M., & Kenny, D. a. (1986). Baron & Kenny, 1986. *Journal of Personality and Social Psychology*. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/3806354

Beck, A. T., Steer, R. A., & Brown, G. K. (1996). Beck Depression Inventory-II (BDI-II). San Antonio, TX: Psychological Corporation.

Beck, A. T., Ward, C. H., Mendelson, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry*, *4*(6), 561–571. http://doi.org/10.1001/archpsyc.1961.01710120031004

Bjelland, I., Dahl, A. A., Haug, T. T., & Neckelmann, D. (2002). The validity of the Hospital Anxiety and Depression Scale: An updated literature review. *Journal of Psychosomatic Research*, *52*(2), 69–77. http://doi.org/10.1016/S0022-3999(01)00296-3

Botega, N. J., Pereira, W. A. B., Bio, M. R., Garcia Jr, C., & Zomignani, M. A. (1995). Psychiatric morbidity among medical in-patients: a standardized assessment (GHQ-12 and CIS-R) using 'lay'interviewers in a Brazilian hospital. Social psychiatry and psychiatric epidemiology, 30(3), 127-131.

Breen, M. J., & Barkley, R. (1988). Child Psycho pathology and Parenting Stress in Girls and Boys Having Attention Deficit Disorder With Hyperactivity, *13*(2), 265–280.

Briscoe-Smith, A. M., & Hinshaw, S. P. (2006). Linkages between child abuse and attention-deficit/hyperactivity disorder in girls: Behavioral and social correlates. *Child Abuse and Neglect*, *30*(11), 1239–1255. http://doi.org/10.1016/j.chiabu.2006.04.008

Cameron, I. M., Crawford, J. R., Lawton, K., & Reid, I. C. (2008). Psychometric comparison of PHQ-9 and HADS for measuring depression severity in primary care. *British Journal of General Practice*, *58*(546), 32–36. http://doi.org/10.3399/bjgp08X263794

Carstens, E., & Moberg, G. P. (2000). Recognizing pain and distress in laboratory animals. *ILAR Journal / National Research Council, Institute of Laboratory Animal Resources*, *41*(2), 62–71. http://doi.org/10.1093/ilar.41.2.62

Castellanos, F. X., Sonuga-Barke, E. J. S., Scheres, A., Di Martino, A., Hyde, C., & Walters, J. R.

(2005). Varieties of attention-deficit/hyperactivity disorder-related intra-individual variability. *Biological Psychiatry*. http://doi.org/10.1016/j.biopsych.2004.12.005

Castro, J., De Pablo, J., Gómez, J., Arrindell, W. A., & Toro, J. (1997). Assessing rearing behaviour from the perspective of the parents: A new form of the EMBU. *Social Psychiatry and Psychiatric Epidemiology*, *32*(4), 230–235. http://doi.org/10.1007/BF00788243

Chen, W. J., Faraone, S. V, Biederman, J., & Tsuang, M. T. (1994). Diagnostic accuracy of the Child Behavior Checklist scales for attention-deficit hyperactivity disorder: a receiver-operating characteristic analysis. *Journal of Consulting and Clinical Psychology*, *62*(5), 1017–25. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/7806710

Chi, T. C., & Hinshaw, S. P. (2002). Mother-child relationships of children with ADHD: The role of maternal depressive symptoms and depression-related distortions. *Journal of Abnormal Child Psychology*, *30*(4), 387–400. http://doi.org/10.1023/A:1015770025043

Choudhry, Z., Sengupta, S. M., Grizenko, N., Fortier, M. E., Thakur, G. a., Bellingham, J., & Joober, R. (2012). LPHN3 and attention-deficit/hyperactivity disorder: Interaction with maternal stress during pregnancy. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *53*(8), 892–902. http://doi.org/10.1111/j.1469-7610.2012.02551.x

Christiansen, H., Oades, R. D., Psychogiou, L., Hauffa, B. P., & Sonuga-Barke, E. J. (2010). Does the cortisol response to stress mediate the link between expressed emotion and oppositional behavior in Attention-Deficit/Hyperactivity-Disorder (ADHD)? *Behavioral and Brain Functions : BBF*, *6*, 45. http://doi.org/10.1186/1744-9081-6-45

Class, Q. a, Abel, K. M., Khashan, a S., Rickert, M. E., Dalman, C., Larsson, H., … D'Onofrio, B. M. (2014). Offspring psychopathology following preconception, prenatal and postnatal maternal bereavement stress. *Psychological Medicine*, *44*(1), 71–84. http://doi.org/10.1017/S0033291713000780

Cohen, S., & Williamson, G. M. (1988). Perceived stress in a probability sample of the United States. In *The Social Psychology of Health* (Vol. 13, pp. 31–67). http://doi.org/10.1111/j.1559-1816.1983.tb02325.x

Conners, C. K. (1997). *Conners' Parent Rating Scale--Revised (L)*. BOOK, Multi-Health Systems North Tonawanda, NY.

Conners, C. K. (2008). *Conners 3rd Edition (Conners 3)*. *Journal of Psychoeducational Assessment* (Vol. 28). http://doi.org/10.1177/0734282909360011

List of References

Conners, C. K., Erhardt, D., Epstein, J. N., Parker, J. D. A., Sitarenios, G., & Sparrow, E. (1999). Self-ratings of ADHD symptoms in adults I: Factor structure and normative data. *Journal of Attention Disorders*, *3*(3), 141–151. http://doi.org/10.1177/108705479900300303

Conners, C., Sitarenios, G., Parker, J. D. A., & Epstein, J. N. (1998). The revised Conners' Parent Rating Scale (CPRS-R): Factor structure, reliability, and criterion validity. Journal of Abnormal Child Psychology, 26(4), 257–268. http://doi.org/10.1023/A:1022602400621

Crawford, J. R., Henry, J. D., Crombie, C., & Taylor, E. P. (2001). Normative data for the HADS from a large non-clinical sample. *The British Journal of Clinical Psychology / the British Psychological Society*, *40*(Pt 4), 429–434. http://doi.org/10.1348/014466501163904

Crnic, K. A., & Acevedo, M. (1995). Everyday stresses and parenting. In *Bornstein, Marc H. (Ed). (1995). Handbook of parenting, Vol. 4: Applied and practical parenting. (pp. 277 297). Hillsdale, NJ, US: Lawrence Erlbaum Associates, Inc; Hillsdale, NJ, US: Lawrence Erlbaum Associates, Inc.*

Crnic, K. A., Gaze, C., & Hoffman, C. (2005). Cumulative parenting stress across the preschool period: Relations to maternal parenting and child behaviour at age 5. *Infant and Child Development*, *14*(2), 117–132. http://doi.org/10.1002/icd.384

Crnic, K. a, & Greenberg, M. T. (1990). Minor parenting stresses with young children. *Child Development*, *61*(5), 1628–1637. http://doi.org/10.1111/j.1467-8624.1990.tb02889.x

Deater-Deckard, K. (1998). Parenting Stress and Child Adjustment: Some Old Hypotheses and New Questions. *Clinical Psychology: Science and Practice*, *5*(3), 314–332. http://doi.org/10.1111/j.1468-2850.1998.tb00152.x

Derogatis, L.R & Savitz, K. L. (2000). The SCL-90-R and the Brief Symptom Inventory (BSI) in Primary Care. In *Handbook of psychological assessment in primary care settings* (Vol. 30, pp. 297–334). http://doi.org/10.1037/024099

Derogatis, L. R., & Lazarus, L. (1994). SCL-90—R, Brief Symptom Inventory, and matching clinical rating scales. In *The use of psychological testing for treatment planning and outcome assessment* (pp. 217–248). http://doi.org/10.1037/t01210-000

Dupaul, G. J. (1991). Parent and Teacher Ratings of ADHD Symptoms: Psychometric Properties in a Community-Based Sample. *Journal of Clinical Child Psychology*, *20*(3), 245–253. http://doi.org/10.1207/s15374424jccp2003

Efron, B. (1994). Missing Data, Imputation, and the Bootstrap. *Journal of the American Statistical*

Association, *89*(426), 463–475. http://doi.org/10.2307/2290846

Efron, B., & Tibshirani, R. (1986). [Bootstrap Methods for Standard Errors, Confidence Intervals, and Other Measures of Statistical Accuracy]: Rejoinder. *Statistical Science*, *1*(1), 54–75. http://doi.org/10.1214/ss/1177013817

Engel, G. (1977). The need for a new medical model: a challenge for biomedicine. *Science*, *196*(4286), 129–136. http://doi.org/10.1126/science.847460

Erceg-Hurn, D. M., & Mirosevich, V. M. (2008). Modern robust statistical methods: an easy way to maximize the accuracy and power of your research. *The American Psychologist*, *63*(7), 591–601. http://doi.org/10.1037/0003-066X.63.7.591

Faraone, S. V., Perlis, R. H., Doyle, A. E., Smoller, J. W., Goralnick, J. J., Holmgren, M. A., & Sklar, P. (2005). Molecular genetics of attention-deficit/hyperactivity disorder. *Biological Psychiatry*. http://doi.org/10.1016/j.biopsych.2004.11.024

Field, A. P. (2013). *Discovering statistics using SPSS (and sex, drugs and rock'n'roll)*. *Book* (Vol. 2nd ed). http://doi.org/10.5860/CHOICE.50-2114

Finzi-Dottan, R., Triwitz, Y. S., & Golubchik, P. (2011). Predictors of stress-related growth in parents of children with ADHD. *Research in Developmental Disabilities*, *32*(2), 510–519. http://doi.org/10.1016/j.ridd.2010.12.032

Fletcher, J. M., Francis, D. J., Rourke, B. P., Shaywitz, S. E., & Shaywitz, B. A. (1992). The validity of discrepancy-based definitions of reading disabilities. *Journal of Learning Disabilities*, *25*(9), 555–561,573. http://doi.org/10.1177/002221949202500903

Gagliano, A., Lamberti, M., Siracusano, R., Ciuffo, M., Boncoddo, M., Maggio, R., … Germanò, E. (2014). A Comparison between Children with ADHD and Children with Epilepsy in Self-Esteem and Parental Stress Level, 176–183.

Gioia, G. a, Isquith, P. K., Guy, S. C., & Kenworthy, L. (2000). Behavior rating inventory of executive function. *Child Neuropsychology : A Journal on Normal and Abnormal Development in Childhood and Adolescence*, *6*(3), 235–238. http://doi.org/10.1076/chin.6.3.235.3152

Goldberg, D. P., Gater, R., Sartorius, N., Ustun, T. B., Piccinelli, M., Gureje, O., & Rutter, C. (1997). The validity of two versions of the GHQ in the WHO study of mental illness in general health care. *Psychological Medicine*, *27*(1), 191–197. http://doi.org/10.1017/S0033291796004242

Goldstein, D. S. (2010). Adrenal responses to stress. In *Cellular and Molecular Neurobiology* (Vol.

30, pp. 1433–1440). http://doi.org/10.1007/s10571-010-9606-9

Gould, M., Adler, A., Zamorski, M., Castro, C., Hanily, N., Steele, N., … Greenberg, N. (2010). Do stigma and other perceived barriers to mental health care differ across Armed Forces? *Journal of the Royal Society of Medicine*, *103*(4), 148–56. http://doi.org/10.1258/jrsm.2010.090426

Goyette, C. H., Conners, C. K., & Ulrich, R. F. (1978). Normative data on Revised Conners Parent and Teacher Rating Scales. *Journal of Abnormal Child Psychology*, *6*(2), 221–236. http://doi.org/10.1007/BF00919127

Graham, J. W. (2009). Missing Data Analysis: Making It Work in the Real World. *Annual Review of Psychology*, *60*(1), 549–576. http://doi.org/10.1146/annurev.psych.58.110405.085530

Graziano, P. A., McNamara, J. P., Geffken, G. R., & Reid, A. (2011). Severity of children's ADHD symptoms and parenting stress: A multiple mediation model of self-regulation. *Journal of Abnormal Child Psychology*, *39*(7), 1073–1083. http://doi.org/10.1007/s10802-011-9528-0

Grizenko, N., Fortier, M. E., Zadorozny, C., Thakur, G., Schmitz, N., Duval, R., & Joober, R. (2012). Maternal stress during pregnancy, ADHD symptomatology in children and genotype: Gene-environment interaction. *Journal of the Canadian Academy of Child and Adolescent Psychiatry*, *21*(1), 9–15.

Guidubaldi, J., & Cleminshaw, H. K. (1985). The Development of the Cleminshaw--Guidubaldi Parent Satisfaction Scale. *Journal of Clinical Child Psychology*, *14*(4), 293–298. JOUR.

Gupta, V. B. (2007). Comparison of parenting stress in different developmental disabilities. *Journal of Developmental and Physical Disabilities*, *19*(4), 417–425. http://doi.org/10.1007/s10882-007-9060-x

Halperin, J. M., Trampush, J. W., Miller, C. J., Marks, D. J., & Newcorn, J. H. (2008). Neuropsychological outcome in adolescents/young adults with childhood ADHD: Profiles of persisters, remitters and controls. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *49*(9), 958–966. http://doi.org/10.1111/j.1469-7610.2008.01926.x

Harrison, C., & Sofronoff, K. (2002). ADHD and parental psychological distress: role of demographics, child behavioral characteristics, and parental cognitions. *Journal of the American Academy of Child and Adolescent Psychiatry*, *41*(6), 703–711. http://doi.org/10.1097/00004583-200206000-00010

Harvey, E., Danforth, J. S., Ulaszek, W. R., & Eberhardt, T. L. (2001). Validity of the parenting scale

for parents of children with attention-deficit/hyperactivity disorder. *Behaviour Research and Therapy*, *39*(6), 731–743. http://doi.org/10.1016/S0005-7967(00)00052-8

Hayes, A. (2013). Introduction to mediation, moderation, and conditional process analysis. *New York, NY: Guilford*, 3–4. http://doi.org/978-1-60918-230-4

Heath, C. L., Curtis, D. F., Fan, W., & McPherson, R. (2014). The Association Between Parenting Stress, Parenting Self-Efficacy, and the Clinical Significance of Child ADHD Symptom Change Following Behavior Therapy. *Child Psychiatry & Human Development*, 118–129. http://doi.org/10.1007/s10578-014-0458-2

Holmes, H. H., & Rahe, R. H. (1967). The Social Reajustment Scale. *Journal Os Psychosomatic Research*, *11*, 213–218.

Iversen, A. C., van Staden, L., Hughes, J. H., Greenberg, N., Hotopf, M., Rona, R. J., … Fear, N. T. (2011). The stigma of mental health problems and other barriers to care in the UK Armed Forces. *BMC Health Services Research*, *11*(1), 31. http://doi.org/10.1186/1472-6963-11-31

Jacobson, N. S., & Truax, P. (1991). Clinical significance: A statistical approach to defining meaningful change in psychotherapy research. *Journal of Consulting and Clinical Psychology*, *59*(1), 12–19. http://doi.org/10.1037/0022-006X.59.1.12

Johnson, A. C. (2015). Clinical Psychology Review Developmental pathways to attention-de fi cit / hyperactivity disorder and disruptive behavior disorders : Investigating the impact of the stress response on executive functioning. *Clinical Psychology Review*, *36*, 1–12. http://doi.org/10.1016/j.cpr.2014.12.001

Johnson, J. H., & Reader, S. K. (2002). Assessing stress in families of children with ADHD: Preliminary development of the disruptive behavior stress inventory (DBSI). *Journal of Clinical Psychology in Medical Settings*, *9*(1), 51–62. http://doi.org/10.1023/A:1014136029697

Kabat-Zinn, M. (2009). *Everyday blessings: The inner work of mindful parenting*. BOOK, Hachette UK.

Kamphaus, R., Reynolds, C. R., Hatcher, N. M., & Kim, S. (2004). Treatment planning and evaluation with the Behavior Assessment System for Children (BASC). *Maruish, Mark E [Ed] (2004) The Use of Psychological Testing for Treatment Planning and Outcomes Assessment: Volume 2: Instruments for Children and Adolescents (3rd Ed) (Pp 331-354) Xviii, 648 Pp Mahwah, NJ, US: Lawrence Erlbaum Associates Publishers; US*, 331–354. Retrieved from

http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=psyc4&AN=2004-14949-012\nhttp://lib.exeter.ac.uk:4556/resserv?sid=OVID:psycdb&id=pmid:&id=doi:&issn=&isbn=0805843302&volume=&issue=&spage=331&pages=331-354&date=2004&title=The+use+of+psy

Kaufman, J., Birmaher, B., Brent, D., Rao, U., Flynn, C., Moreci, P., … Ryan, N. (1997). Schedule for Affective Disorders and Schizophrenia for School-Age Children Present and Lifetime version (K-SADS-PL): Initial reliability and validity data. *Journal of the American Academy of Child and Adolescent Psychiatry*, *36*, 980–988. http://doi.org/10.1097/00004583-199707000-00021

Kazdin, A. E. (1995). Child, parent and family dysfunction as predictors of outcome in cognitive-behavioral treatment of antisocial children. *Behaviour Research and Therapy*, *33*(3), 271–281. http://doi.org/10.1016/0005-7967(94)00053-M

Kazdin, A. E. (1997). Parent management training: evidence, outcomes, and issues. *Journal of the American Academy of Child and Adolescent Psychiatry*, *36*(10), 1349–56. http://doi.org/10.1097/00004583-199710000-00016

Kazdin, A. E., & Whitley, M. K. (2003). Treatment of parental stress to enhance therapeutic change among children referred for aggressive and antisocial behavior. *Journal of Consulting and Clinical Psychology*, *71*(3), 504–515. http://doi.org/10.1037/0022-006X.71.3.504

Kinney, D. K., Levy, D. L., Yurgelun-Todd, D. A., Tramer, S. J., & Holzman, P. S. (1998). Inverse relationship of perinatal complications and eye tracking dysfunction in relatives of patients with schizophrenia: evidence for a two-factor model. *The American Journal of Psychiatry*, *155*(7), 976–978. Retrieved from http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=med4&NEWS=N&AN=9659870

Knapp, M., McDaid, D., & Parsonage, M. (2011). Mental health promotion and mental illness prevention: the economic case. *Political Science*, (January), 48. Retrieved from http://www2.lse.ac.uk/LSEHealthAndSocialCare/PSSRU/Home.aspx

Kreppner, J. M., O'Connor, T. G., & Rutter, M. (2001). Can inattention/overactivity be an institutional deprivation syndrome? *Journal of Abnormal Child Psychology*, *29*(6), 513–528. http://doi.org/10.1023/A:1012229209190

Lahey, B. B., Ph, D., Pelham, W. E., Loney, J., Kipp, H., Ed, M., … Massetti, G. (2014). in Children Diagnosed at 4 – 6 Years of Age, (November 2004), 2014–2020.

Lasa, L., Ayuso-Mateos, J. ., Vázquez-Barquero, J. ., Díez-Manrique, F. ., & Dowrick, C. . (2000). The use of the Beck Depression Inventory to screen for depression in the general population: a preliminary analysis. *Journal of Affective Disorders*, *57*(1–3), 261–265. http://doi.org/10.1016/S0165-0327(99)00088-9

Lavee, Y., McCubbin, H. I., & Olson, D. H. (1987). The Effect of Stressful Life Events and Transitions on Family Functioning and Well-Being. *Journal of Marriage and Family*, *49*(4), 857–873. http://doi.org/10.2307/351979

Levy, F., Hay, D. A., & Bennett, K. S. (2006). Genetics of Attention Deficit Hyperactivity Disorder: A current review and future prospects. *International Journal of Disability, Development & Education*, *53*(1), 5–20.

Linnet, K. M., Dalsgaard, S., Dalsgaard, S., Obel, C., Thomsen, P. H., Wisborg, K., … Olsen, J. (2003). Maternal lifestyle factors in pregnancy risk of attention deficit hyperactivity disorder and associated behaviors: review of the current evidence. *The American Journal of Psychiatry*, *160*(6), 1028–1040. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/12777257

Loyd, B. H., & Abidin, R. R. (1985). Revision of the Parenting Stress Index. *Journal of Pediatric Psychology*, *10*(2), 169–177. http://doi.org/10.1093/jpepsy/10.2.169

Mash, E. J., & Johnston, C. (1983). Parental perceptions of child behavior problems, parenting self-esteem, and mothers' reported stress in younger and older hyperactive and normal children. *Journal of Consulting and Clinical Psychology*, *51*(1), 86–99. http://doi.org/10.1037/0022-006X.51.1.86

Maughan, B., Rowe, R., Messer, J., Goodman, R., & Meltzer, H. (2004). Conduct Disorder and Oppositional Defiant Disorder in a national sample: Developmental epidemiology. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *45*(3), 609–621. http://doi.org/10.1111/j.1469-7610.2004.00250.x

McEwen, B. S., & Wingfield, J. C. (2003). The concept of allostasis in biology and biomedicine. *Hormones and Behavior*. http://doi.org/10.1016/S0018-506X(02)00024-7

Mehringer, A. M., Downey, K. K., Schuh, L. M., Pomerleau, C. S., Snedecor, S. M., & Schbiner, H. (2002). The Assessment of Hyperactivity and Attention (AHA): Development and preliminary validation of a brief self-assessment of adult ADHD. *Journal of Attention Disorders*, *5*(4), 223–31. http://doi.org/10.1177/108705470100500404

Mendes, M., & Pala, A. (2003). Type I Error Rate and Power of Three Normality Tests. *Information*

Technology Journal, *2*(2), 135–139. http://doi.org/10.3923/itj.2003.135.139

Mitchell, A. J., Meader, N., & Symonds, P. (2010). Diagnostic validity of the Hospital Anxiety and Depression Scale (HADS) in cancer and palliative settings: A meta-analysis. *Journal of Affective Disorders*, *126*(3), 335–348. http://doi.org/10.1016/j.jad.2010.01.067

Moorey, S., Greer, S., Watson, M., Gorman, C., Rowden, L., Tunmore, R., … Bliss, J. (1991). The factor structure and factor stability of the hospital anxiety and depression scale in patients with cancer. *The British Journal of Psychiatry*. http://doi.org/10.1192/bjp.158.2.255

Murray, C., & Johnston, C. (2006). Parenting in mothers with and without attention-deficit/hyperactivity disorder. *Journal of Abnormal Psychology*, *115*(1), 52–61. http://doi.org/10.1037/0021-843X.115.1.52

Mystakidou, K., Tsilika, E., Parpa, E., Smyrniotis, V., Galanos, a, & Vlahos, L. (2007). Beck Depression Inventory: exploring its psychometric properties in a palliative care population of advanced cancer patients. *European Journal of Cancer Care*, *16*(3), 244–50. http://doi.org/10.1111/j.1365-2354.2006.00728.x

NICE. (2008). Attention deficit hyperactivity disorder (ADHD). Retrieved from http://www.nice.org.uk/usingguidance/donotdorecommendations/detail.jsp?action=details&dndid=303

Nigg, J. T., & Hinshaw, S. P. (1998). Parent personality traits and psychopathology associated with antisocial behaviors in childhood attention-deficit hyperactivity disorder. *Journal of Child Psychology and Psychiatry*, *39*(2), 145–159. http://doi.org/10.1017/S0021963097001984

Office for National Statistics. (2015). Families and Households. *Families and Households:2013*, (October 2013). Retrieved from http://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/families/bulletins/familiesandhouseholds/2015-11-05

Osborne, L. A., McHugh, L., Saunders, J., & Reed, P. (2008). Parenting stress reduces the effectiveness of early teaching interventions for autistic spectrum disorders. *Journal of Autism and Developmental Disorders*, *38*(6), 1092–1103. http://doi.org/10.1007/s10803-007-0497-7

Ostberg, M., & Hagekull, B. (2000). A structural modeling approach to the understanding of parenting stress. *Journal of Clinical Child Psychology*, *29*(4), 615–25. http://doi.org/10.1207/S15374424JCCP2904_13

Öztuna, D., Elhan, A. H., & Tüccar, E. (2006). Investigation of four different normality tests in terms of type 1 error rate and power under different distributions. *Turkish Journal of Medical Sciences*, *36*(3), 171–176.

Patten, S. B. (2013). Major depression epidemiology from a diathesis-stress conceptualization. *BMC Psychiatry*, *13*(1), 19. http://doi.org/10.1186/1471-244X-13-19

Pimentel, M. J., Vieira-Santos, S., Santos, V., & Vale, M. C. (2011). Mothers of children with attention deficit/hyperactivity disorder: Relationship among parenting stress, parental practices and child behaviour. *ADHD Attention Deficit and Hyperactivity Disorders*, *3*(1), 61–68. http://doi.org/10.1007/s12402-011-0053-3

Podolski, C. L., & Nigg, J. T. (2001). Parent stress and coping in relation to child ADHD severity and associated child disruptive behavior problems. *Journal of Clinical Child Psychology*, *30*(4), 503–513. http://doi.org/10.1207/S15374424JCCP3004_07

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *The Journal of Applied Psychology*, *88*(5), 879–903. http://doi.org/10.1037/0021-9010.88.5.879

Prinstein, M. J., Boergers, J., & Vernberg, E. M. (2001). Overt and Relational Aggression in Adolescents : Social- Psychological Adjustment of Aggressors and Victims Overt and Relational Aggression in Adolescents : Social – Psychological Adjustment of Aggressors and Victims. *Journal of Clinical Child Psychology*, *30*(4), 479–491. http://doi.org/10.1207/S15374424JCCP3004

Psychogiou, L., Daley, D. M., Thompson, M. J., & Sonuga-Barke, E. J. S. (2008). Do maternal attention-deficit/hyperactivity disorder symptoms exacerbate or ameliorate the negative effect of child attention-deficit/hyperactivity disorder symptoms on parenting? *Development and Psychopathology*, *20*(1), 121–137. JOUR.

Reader, S. K., Stewart, L. M., & Johnson, J. H. (2009). Assessing ADHD-related family stressors with the Disruptive Behavior Stress Inventory (DBSI): A replication and extension. *Journal of Clinical Psychology in Medical Settings*, *16*(2), 148–160. http://doi.org/10.1007/s10880-008-9140-9

Richards, L. M.-E. (2012). It is time for a more integrated bio-psycho-social approach to ADHD. *Clinical Child Psychology and Psychiatry*. http://doi.org/10.1177/1359104512458228

Rodriguez, A., & Bohlin, G. (2005). Are maternal smoking and stress during pregnancy related to

ADHD symptoms in children? *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *46*(3), 246–254. http://doi.org/10.1111/j.1469-7610.2004.00359.x

Rogers, S. J., & White, L. K. (1998). Satisfaction with parenting: The role of marital happiness, family structure, and parents' gender. *Journal of Marriage and the Family*, 293–308. JOUR.

Ronald, A., Pennell, C. E., & Whitehouse, A. J. O. (2011). Prenatal maternal stress associated with ADHD and autistic traits in early childhood. *Frontiers in Psychology*, *1*(JAN), 1–8. http://doi.org/10.3389/fpsyg.2010.00223

Roy, P., Rutter, M., & Pickles, a. (2000). Institutional care: risk from family background or pattern of rearing? *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *41*(2), 139–149. http://doi.org/10.1111/1469-7610.00555

Rutter, M., & Sroufe, L. a. (2000). Developmental psychopathology: concepts and challenges. *Development and Psychopathology*, *12*(3), 265–296. http://doi.org/10.1017/S0954579400003023

Ryan, J. J., Glass, L. A., & Bartels, J. M. (2009). Internal consistency reliability of the WISC-IV among primary school students'. *Psychological Reports*, *104*(3), 874–878.

Schlander, M. (2008). The NICE ADHD health technology assessment: a review and critique. *Child and Adolescent Psychiatry and Mental Health*, *2*(1), 1. http://doi.org/10.1186/1753-2000-2-1

Shaffer, D., Fisher, P., Lucas, C. P., Dulcan, M. K., & Schwab-Stone, M. E. (2000). NIMH Diagnostic Interview Schedule for Children Version IV (NIMH DISC-IV): description, differences from previous versions, and reliability of some common diagnoses. *Journal of the American Academy of Child and Adolescent Psychiatry*, *39*(1), 28–38. http://doi.org/10.1097/00004583-200001000-00014

Sheehan, D. V., Sheehan, K. H., Shytle, R. D., Janavs, J., Bannon, Y., Rogers, J. E., … Wilkinson, B. (2010). Reliability and validity of the mini international neuropsychiatric interview for children and adolescents (MINI-KID). *Journal of Clinical Psychiatry*, *71*(3), 313–326. http://doi.org/10.4088/JCP.09m05305whi

Shields, A., & Cicchetti, D. (1997). Emotion regulation among school-age children: the development and validation of a new criterion Q-sort scale. *Developmental Psychology*, *33*(6), 906–16. http://doi.org/10.1037/0012-1649.33.6.906

Smarr, K. L., & Keefer, A. L. (2011). Measures of depression and depressive symptoms: Beck Depression Inventory-II, Center for Epidemiologic Studies Depression Scale, Geriatric

Depression Scale, Hospital Anxiety and Depression Scale, and Patient Health Questionnaire-9. *Arthritis Care and Research*, *63(Suppl)*, 454–466. http://doi.org/10.1002/acr.20556

Smith, M. (2013). Anti-stigma campaigns: Time to change. *British Journal of Psychiatry*. http://doi.org/10.1192/bjp.bp.113.126813

Snaith, R. P. (2003). Health and Quality of Life Outcomes. *Health and Quality of Life Outcomes*, *1*(1), 6–9.

Sonuga-Barke, E. J. S., Daley, D., & Thompson, M. (2002). *Does maternal ADHD reduce the effectiveness of parent training for preschool children's ADHD? Journal of the American Academy of Child and Adolescent Psychiatry* (Vol. 41).

Sonuga-Barke, E. J. S., & Halperin, J. M. (2010). Developmental phenotypes and causal pathways in attention deficit/hyperactivity disorder: potential targets for early intervention? *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *51*(4), 368–389. http://doi.org/10.1111/j.1469-7610.2009.02195.x

Spinhoven, P., Ormel, J., Sloekers, P. P., Kempen, G. I., Speckens, a E., & Van Hemert, a M. (1997). A validation study of the Hospital Anxiety and Depression Scale (HADS) in different groups of Dutch subjects. *Psychological Medicine*, *27*(2), 363–370. http://doi.org/10.1017/S0033291796004382

Swanson, J. M., Kraemer, H. C., Hinshaw, S. P., Arnold, L. E., Conners, C. K., Abikoff, H. B., … Greenhill, L. L. (2001). Clinical relevance of the primary findings of the MTA: success rates based on severity of ADHD and ODD symptoms at the end of treatment. *Journal of the American Academy of Child & Adolescent Psychiatry*, *40*(2), 168–179. JOUR.

Tabachnick, B. G., & Fidell, L. S. (2001). Tabachnick, Fidell_2001.pdf. In *Using Multivariate Statistics* (p. 1008). Retrieved from http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:Cleaning+up+your+act:+Screening+Data+Prior+to+Analysis#0

T M Achenbach, & Edelbrook, C. (1983). Child Behavior Checklist (CBCL). *University Associates in Psychiatry*, *53*(1), 418–435.

Taylor, A., Deb, S., & Unwin, G. (2011). Scales for the identification of adults with attention deficit hyperactivity disorder (ADHD): A systematic review. *Research in Developmental Disabilities*, *32*(3), 924–938. http://doi.org/10.1016/j.ridd.2010.12.036

Tennant, C., & Andrews, G. (1976). A scale to measure the stress of life events. *The Australian and*

New Zealand Journal of Psychiatry, *10*(1), 27–32. http://doi.org/10.3109/00048677609159482

Test, W. D. W. I. A. (2005). (WIAT II). *The Psychological Corp: London*. JOUR.

Theule, J., Wiener, J., Rogers, M. a., & Marton, I. (2011). Predicting Parenting Stress in Families of Children with ADHD: Parent and Contextual Factors. *Journal of Child and Family Studies*, *20*(5), 640–647. http://doi.org/10.1007/s10826-010-9439-7

Theule, J., Wiener, J., Tannock, R., & Jenkins, J. M. (2010). Parenting Stress in Families of Children With ADHD: A Meta-Analysis. *Journal of Emotional and Behavioral Disorders*. http://doi.org/10.1177/1063426610387433

Timimi, S., & Taylor, E. (2004). ADHD is best understood as a cultural construct. *British Journal of Psychiatry*. http://doi.org/10.1192/bjp.184.1.8

Treacy, L., Tripp, G., & Baird, A. (2005). Parent Stress Management Training for Attention-Deficit/Hyperactivity Disorder. *Behavior Therapy; v36 n3 p223-233 Sum 2005*, 233.

Tzang, R.-F., Chang, Y.-C., & Liu, S.-I. (2009). The association between children's ADHD subtype and parenting stress and parental symptoms. *International Journal of Psychiatry in Clinical Practice*, *13*(4), 318–325. http://doi.org/10.3109/13651500903094567

van der Oord, S., Prins, P. J. M., Oosterlaan, J., & Emmelkamp, P. M. G. (2006). The association between parenting stress, depressed mood and informant agreement in ADHD and ODD. *Behaviour Research and Therapy*, *44*(11), 1585–1595. http://doi.org/10.1016/j.brat.2005.11.011

van Steijn, D. J., Oerlemans, A. M., van Aken, M. a G., Buitelaar, J. K., & Rommelse, N. N. J. (2014). The reciprocal relationship of ASD, ADHD, depressive symptoms and stress in parents of children with ASD and/or ADHD. *Journal of Autism and Developmental Disorders*, *44*(5), 1064–76. http://doi.org/10.1007/s10803-013-1958-9

Watkins, M. W., & Smith, L. G. (2013). Long-term stability of the Wechsler Intelligence Scale for Children--Third Edition. *Psychological Assessment*, *25*(2), 477–483. http://doi.org/10.1037/1040-3590.10.3.285

Wechsler, D. (1974). *Wechsler Intelligence Scale for Children-Revised (WISC-R),*. *TEA Ediciones*.

Wechsler, D. (2002). Wechsler Preschool and Primary Scale of Intelligence. *Wechsler Preschool and Primary Scale of Intelligence*, 120–130. http://doi.org/10.1007/978-1-4419-1698-3_866

Wechsler, D. (2003). Wechsler intelligence scale for children–Fourth Edition (WISC-IV). *San Antonio, TX: The Psychological Corporation*. Retrieved from https://www.pearsonassessments.com/HAIWEB/Cultures/en-us/Productdetail.htm?Pid=015-8979-044&Mode=resource\nhttp://www.pearsonclinical.com/psychology/products/100000310/wechsler-intelligence-scale-for-children-fourth-edition-wisciv.html?Pid=015-8979-044&Mo

Wells, K. C., Epstein, J. N., Hinshaw, S. P., Conners, C. K., Klaric, J., Abikoff, H. B., … Wigal, T. (2000). Parenting and family stress treatment outcomes in Attention Deficit Hyperactivity Disorder (ADHD): An empirical analysis in the MTA study. *Journal of Abnormal Child Psychology*, *28*(6), 543–553. http://doi.org/10.1023/A:1005131131159

Whalen, C. K., Odgers, C. L., Reed, P. L., & Henker, B. (2011). Dissecting daily distress in mothers of children with ADHD: an electronic diary study. *Journal of Family Psychology : JFP : Journal of the Division of Family Psychology of the American Psychological Association (Division 43)*, *25*(3), 402–411. http://doi.org/10.1037/a0023473

World Health Organization. (1992). *The ICD-10 classification of mental and behavioural disorders: clinical descriptions and diagnostic guidelines*. BOOK, Geneva: World Health Organization.

Youngstrom, E., Izard, C., & Ackerman, B. (1999). Dysphoria-related bias in maternal ratings of children. *Journal of Consulting and Clinical Psychology*, *67*(6), 905–916. http://doi.org/10.1037/0022-006X.67.6.905

Zigmond, a S., & Snaith, R. P. (1983). The hospital anxiety and depression scale (HADS). *Acta Psychiatrica Scandinavica*, *67*(361–370), 361–370. http://doi.org/10.1016/S0016-5085(01)83173-5

Zucker, M., Morris, M. K., Ingram, S. M., Morris, R. D., & Bakeman, R. (2002). Concordance of self- and informant ratings of adults' current and childhood attention-deficit/hyperactivity disorder symptoms. *Psychological Assessment*, *14*(4), 379–389. http://doi.org/10.1037/1040-3590.14.4.379