Exploring child temperament and parenting influences on children's internalising and externalising difficulties

Natalie Jane Brunsden

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School of Health and Social Care

University of Essex

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From an attachment theory perspective, it is thought that after the death of a loved one we develop a representational model of that person. This representation can offer comfort even when the person is no longer around as it reminds us that someone was responsive and helpful and that we were valued by that person. With this in mind I would like to thank my nan, who although no longer with me, is a voice that I have held on to throughout my Clinical Psychology journey and has given me a sense of solace, comfort and strength during the most difficult challenges of training. Thank you.

Contents

Abstract

Background: Children's psychological difficulties are frequently differentiated into internalising and externalising problems. Research has shown that there are reciprocal influences between parents and children in the development of these difficulties including parenting and child temperament.

Aims: This study aimed to explore the individual and interactive contribution of child temperament (negative affect, delayed gratification, risk aversion and patience) and positive parenting on both internalising and externalising problems.

Methods: The sample included 3140 boys and girls recruited as part of data collection for Understanding Society, the UK Household Longitudinal Study (UKHLS). A series of multiple linear regressions were estimated and slope tests were conducted to probe significant interaction terms.

Results: Higher scores of risk aversion and negative affect predicted more internalising and externalising problems for boys and girls. Increased patience predicted fewer externalising problems. For boys only increased delayed gratification predicted fewer externalising problems. Several significant interaction terms between parenting and child temperament were found. When mother's positive parenting was low and risk aversion was low, children displayed more externalising problems. Boys who had low ability to delay gratification had more externalising problems and this effect was heightened at lower levels of maternal positive parenting. Girls who were more willing to take risks (i.e. had low risk aversion) had fewer internalising problems when fathers were rated as being more positive in their parenting. However, when girls were highly risk averse more positive parenting by fathers contributed to more internalising problems. When girls had low levels of risk aversion more positive parenting by fathers reduced ratings of externalising problems.

Conclusions: The results highlight the importance of considering parent child influences in the context of gender and plausible explanations for different gender interactions are discussed. Links between the results and children's self-regulation are drawn and the potential benefit of parenting interventions to encourage child self-regulation are considered.

Chapter 1: Introduction

Literature pertaining to children's psychological difficulties often differentiates these into internalising and externalising problems. Research has found that these childhood difficulties can persevere into adulthood, and impact across social, psychological and physical health domains. Both parenting and child temperament have been linked in the aetiology of these difficulties, and it is widely accepted that parenting and child temperament interact with one another to influence child developmental outcomes. The focus of this study was to explore the interaction between child temperament and parenting on internalising and externalising problems. An introduction to the relevant research and literature on temperament and parenting, and their links with these difficulties is presented below.

Perspectives on Temperament

Shiner et al (2012, p.437) defines temperament traits as "early emerging basic dispositions in the domains of activity, affectivity, attention, and self-regulation, and these dispositions are the product of complex interactions among genetic, biological, and environmental factors across time". Concepts of temperament have an extensive history and can be traced as far back as 1500-1000 BC –and the Hindu concept of the gunas (Rothbart, 2012). Guna literally translates to mean quality or merit and it is thought the gunas determined the quality of all living things (Jayaram, 2019). In ancient Greece Hippocrates' theory of four humours, was one of the first to suggest links between physiology and temperament. He proposed different bodily fluids were linked to differences in emotion and behaviour (Javier, 2014). In the 1920's observations of children by child psychologists led to the proposition that traits of personality are evident from birth (Shirley, 1933 as cited in Rothbart, 2012). Despite an early recognition by scholars that humans differ in their basic dispositions, general consensus around definitions of temperament and its components (particularly its links with personality) is still debated (Goldsmith et al, 1987; Rettew & McKee, 2005). Research exploring temperament and different theoretical perspectives is extensive, the four models described below represent perspectives that have garnered particularly interest within temperament research.

Model 1: Thomas & Chess (1957)

The New York Longitudinal Study (NYLS) began in 1956 and followed children from ages 3 months up to 22 years (Thomas & Chess, 1957). The study developed from the

observations by the researchers of differences in their own children and was one of the first to propose internal factors of the child as a contributor to early differences in behaviour; a paradigmatic shift from previous work of psychoanalysts and behaviourists (Rothbart, 2012). Inductive content analysis of parental interviews regarding their infant children gave rise to the identification of 9 behavioural traits: activity level, adaptability, rhythmicity, approach-withdrawal, intensity, attention span/persistence, mood, intensity, threshold and distractibility. Factor analysis of these traits led to the identification of three patterns of temperament; easy, slow to warm up, and difficult. Easy temperament refers to infants that are adaptable, happy and calm. By contrast, difficult temperament reflects negative mood, emotionality and low adaptability. Infants with slow to warm temperament are generally calm but may need more time to adapt to novel situations or stimuli (Thomas & Chess, 1977).

Model 2: Buss & Plomin (1984)

In contrast to viewing temperament as a behavioural style, Buss and Plomin (1984) proposed temperament represents early emerging personality and subsequently should show relative stability across childhood and remain in adulthood. They initially proposed a dimensional model of four temperament traits: Emotionality, Activity, Sociability and Impulsivity. Impulsivity was later dropped as only modest support had been found for it in factor analysis and it was concluded it did not fit with their definition of temperament (Buss and Plomin, 1984). Emotionality denotes emotional arousal which may range from apathy to a more extreme propensity to distress. Activity referred to difference in activity level including speech and body movement. Sociability signifies a preference to seek out and maintain interactions with others. Later researchers have often split sociability into sociability and shyness to differentiate a tendency towards either approach or withdrawal from being in the presence of others (Mervielde & De Pauw, 2012). Research by Mathiesen and Tambs (1999) and Bould et al (2013) has found support for the four factor model (Emotionality, Activity, Sociability/Shyness) and for stability over time in early childhood.

Model 3: Derrberry & Rothbart (1997)

Derryberry and Rothbart's model (1997) emphasised the neuropsychological processes underpinning temperament and incorporated emotion, attention processes and motivation. They propose temperament is an adaptation to an individual's needs for safety and survival. Dependent on the environment certain patterns of responding emerge. From these patterns, neural networks responsible for regulation develop and overtime these neural structures form

central components of personality. Their initial research which focused on temperament within the first year of life was later extended to include early adolescence. The development of the Infant Behaviour Questionnaire (Rothbart, 1981) led to the identification of three dimensions of temperament; negative affect, surgency and effortful control. Negative affect is thought to link with the adult personality dimension of neuroticism. In infants and toddlers it reflects a difficulty in being soothed, and a propensity for fearfulness and sadness. Surgency in toddlers reflects tendencies towards pleasure-seeking, impulsivity, high levels of activity and low levels of shyness, it has conceptual overlaps with the adult personality traits of extraversion, positive emotionality and openness. Effortful control reflects aspects of being able to exert attentional control including focusing and shifting of attention, ability to inhibit impulsive behaviour and low levels of anger and frustration (Rothbart and Putnam, 2002).

Model 4: Kagan (1997)

Kagan's research on temperament explored components of infant reactivity and its link to later behavioural inhibition. Reactivity refers to motor activity and levels of distress in response to novel stimuli (Kagan, 2018). As part of his research, he observed the reactions of four month old infants presented with novel stimuli such as brightly coloured toys and tape recordings of voices (Kagan, 1997). He reported 20% of these infants became distressed in response to the stimuli and subsequently categorised them as high reactive. He also identified low reactive infants who on presentation to the same stimuli presented as relaxed with no notable signs of distress. Follow up of these infants at 14 and 21 months found that one third of those who had been classified as high reactive presented as highly fearful and shy in response to unfamiliar situations. Similarly, one third of those classed as low reactive showed little to no fear. He classified these children as behaviourally inhibited and behaviourally uninhibited respectively. Follow up at age 18 showed that children classed as behaviourally inhibited presented as more cautious, less confident, more likely to avoid unfamiliar situations and also reported more worries than their behaviourally uninhibited peers (Kagan, 2018). Kagan's research also highlighted that children do not always maintain the extreme form of their temperament profile as they grow older, but that it is rare for children to go from one extreme profile to another (i.e. change from an inhibited profile to an uninhibited profile). Kagan hypothesised this transition from an extreme form of temperament trait to a more central profile is likely due to family factors.

The models described above represent four key theories that underpin much of the basis of current temperament literature. It is notable within temperament research the temperament profiles proposed by the researchers share many conceptual overlaps, for example negative affect and negative emotionality. Another example comes from behavioural inhibition and shyness, which are not generally distinguished as separate concepts within research and appear to share conceptual overlap. Rubin (2001) states "behavioural inhibition refers to shyness and trepidation in response to novel and unfamiliar situations and stimuli".

An additional complexity within the field of temperament research is the stability of temperament over time. Roberts and DelVecchio (2000) completed a meta-analysis using 152 longitudinal studies and reported modest to moderate temperament stability from infancy to early childhood. The Australian Temperament Project (Prior et al, 2001) found that infants who were at the extreme end of a particular temperament profile tended to remain that way up to age 8. However, children who were in the middle tended to change slightly across time. Rothbart and Bates (2006, as cited in Rothbart, 2012) argue that research indicates that individual differences in infancy are likely to continue across time, however the expression of these differences may change throughout development.

Differentiation between temperament and personality has previously been made. It is often distinguished from personality in that it represents biologically established individual differences evident from birth (Klein, et al, 2012). Whereas, personality is thought to incorporate individual differences that develop during socialisation and includes a broader range of qualities such as intellect and values (Prior et al, 2001). Shiner and Caspi (2012) propose that personality emerges and develops from temperament, "initial temperamental disposition is elaborated so that it increasingly organizes emotion, thought, and action over time…through these basic processes, temperament traits come to be elaborated into personality traits" (Shiner & Caspi, 2012, p. 500).

For the purpose of this research, I have considered temperament to represent many aspects of the literature discussed above and would view that different perspectives proposed by the authors are not inherently in conflict with one another. For example, I recognise that neuropsychological processes that evolve as adaptations to the environment (as suggested by Buss and Plomin, 1984) may underpin temperament but that these adaptations may result in distinct behavioural responses (Thomas and Chess, 1977). Further, I would view that infant reactivity (Kagan, 2018) may reflect a particular predisposition (shaped by both genetics and

in utero experiences) but may also evolve as a response to environmental influences. I think it is important to recognise that whilst temperament and personality are often considered distinct they are both social constructs that share commonality and conceptual overlap, and may be defined differently by different researchers at different times. For the purpose of this study temperament has been viewed akin to Shiner et al's (2012) definition, in that it represents individual differences that emerge early on in infant development, these differences may encapsulate affect, self-regulation and neurological processes such as attention. In this perspective, the underpinning of temperament is considered a complex interplay between environment and biology. Of relevance to the literature surrounding temperament are theories and research pertaining to parenting.

Parenting

Theories around parenting have a long history, John Locke a British philosopher in the 17th century proposed that people are born as 'tablula Rasa' a 'blank slate' and that an individual's experiences alone shape who they become. He proposed that children are sculpted through their experiences of parenting and behaviourist principles that developed during the 20th century can be seen to have roots with his ideas (Costley, 2006).

The work of John Bowlby and Mary Ainsworth has had a profound influence on the development of parenting literature. In 1944 Bowlby's work on 44 juvenile thieves proposed that prolonged maternal separation was a key component that explained juvenile delinquency (Bowlby, 1944). His later development of attachment theory has significantly contributed to parenting and psychological literature. Bowlby's perspective stemmed from evolutionary ideas, he proposed that attachment bonds develop between infants and their caregivers (typically within literature the mother) to maximise proximity to ensure survival. Reciprocal patterns of relating develop over time from the signals the child gives their caregiver (for example smiling or crying) and the responses they receive (Bowlby, 1958). Mary Ainsworth (1963) developed Bowlby's theory to describe the types and quality of the attachment bonds that can form. When children experience their caregivers as sensitive and attuned to their needs, a secure attachment will form. However if a parent is consistently unavailable, rejecting or inconsistent an insecure attachment will develop. Bowlby proposed the attachment bond develops within a critical period (within the first 2.5 years of life) and can mark a pattern of relating for future relationships, he argued insensitive caregiving or a disruption in this bond

(what he termed maternal deprivation) can have long term adverse consequences on the individual (Mcleod, 2024).

Bowlby recognised that attachment has both an element of stability and change throughout the lifespan (Gillath et al, 2016). A meta-analytic review of 27 longitudinal samples by Fraley (2002) indicated that there is evidence that early attachment experiences shape prototypes for relating to others in adult life, and whilst there is some change based on later experiences an underlying attachment stability remains. Baldwin and Fehr (1995; as cited in Gillath et al, 2016) argue that individuals may have multiple internal working models of different attachment figures (for example someone may have a secure attachment with one parent and an insecure attachment with another) and these different models are activated at different times. There is a wealth of research demonstrating the impact of attachment security on child development outcomes. For example, a review by Ranson and Urichuk (2008) found evidence that children with secure attachments demonstrate improved social-emotional competence during early and middle childhood, greater cognitive ability and academic performance into adolescence and better physical and mental wellbeing. Further, research also highlights how secure attachments can lead to better psychological and physical health outcomes in adulthood (Mikulincer & Shaver, 2012; Maunder & Hunter, 2008).

Attachment research indicates that early experiences of caregivers is key in the development of children's self-regulation. Infants are dependent on their caregivers to support them to regulate physiologically. For example, they are reliant on their caregivers for homeostatic functions such as regulation of body temperature and heart rate. As children develop they move from external sources of regulation to internal ones. Children's ability to self-regulate is considered to have developed from these early experiences (Pipp & Harmon, 1987). As regulation of emotion and arousal is considered a component of temperament (Shiner et al, 2012), it is possible to see how attachment experiences may shape individual differences in temperament. In fact, some theorists argue that the attachment relationship between infant and caregiver shapes the child's temperament (Goldsmith & Harman, 1994). An example comes from sociability or shyness. When children have secure attachments they may be more likely to approach new situations or experiences (display increased sociability), due to having more positive expectations regarding social interactions, having been modelled and experienced reciprocity in their relationships and also from this may have developed a sense of self-efficacy in relation to social experiences (Elicker et al, 1992).

In her seminal work Diane Baumrind (1966) proposed and described three categories of parenting styles; permissive, authoritative and authoritarian. This was expanded in the 1980's into a two dimensional framework of demandingness and responsiveness by Maccoby and Martin (1983) giving rise to a fourth typology; neglectful. Permissive (sometimes referred to as indulgent in literature) and neglectful parenting are characterised by low levels of parental control being exerted over the child. Whilst both are characterised by low control, permissive parents are highly responsive to the needs of their child in contrast to neglectful parents who display low levels of responsiveness. Authoritarian parenting comprises of high levels of control being exerted over the child but low levels of responsiveness. In this typology obedience is highly valued, the child's autonomy is restricted and there are low levels of parental warmth (responsiveness). Authoritative parenting also comprises of high control but with high levels of responsiveness, this results in parenting that has clear boundaries and expectations but with the child's autonomy still being encouraged. Research has generally found poorer outcomes for children of permissive, authoritarian and neglectful parents. For example, Baumrind (1966; 1989) found parents who displayed authoritarian and permissive traits had children who were more likely to show hostility and aggression, nervousness and withdrawal. This was in comparison to children of parents who were more authoritative who showed increased social competence and academic success (Baumrind, 1966; 1989).

Parenting has been conceptualised in various ways within the literature. Both general and domain specific parenting has been explored. General parenting refers to parenting behaviour, practice or attitudes across a range of settings, and domain specific refers to parenting within a specific situation or context. Literature has also explored both broader conceptualisations of parenting (such as that of parental styles discussed above) and also specific traits, attitudes and behaviours (for example parental warmth, control or discipline) (Power et al, 2013). Despite differences within conceptualisations of parenting there does appear to be a general consensus that sensitive parenting can lead to better child development outcomes in contrast to harsher discipline and corporal punishment which have been shown to have aversive impacts on children (Cooke et al, 2022; Wiggers & Paas, 2022).

There is a documented bias in parenting research towards exploring parenting in the context of mother-child interactions, and paternal perspectives are frequently missing. Reviews conducted from 1984 to 2015 have found an absence of paternal perspectives in literature and limited progress to include father participation has been made across this time (Phares & Compas, 1992; Phares et al, 2005; Parent et al, 2017). This is of interest, as different

associations between parenting and temperament have been found dependent on parent and child gender (Porter et al, 2005; Sanson & Rothbart, 1995). For example, Sanson & Rothbart (1995) reviewed gender differences in parenting and temperament. They found mixed results on the basis of gender across studies but suggested a general theme was that difficult temperament in boys was more readily accepted than in girls, but that mothers are generally more accepting of this than fathers. Further, Putnam et al (2002) state on the basis that some studies have not found significant findings between parenting and child temperament implies third factors that may be influencing and that one of these factors may be gender.

Prior to the 1960's theoretical perspectives on parenting emphasised the impact of the parent on the child with less consideration for the influence of the child on the parent. Transactional models of parenting propose that parenting influences and is influenced by child behaviour in a reciprocal manner. Bell's (1968) early research was one of the first to suggest that children are not simply 'objects' that are modified through their experiences of their parents but that parents are also influenced by the characteristics of their child. A wealth of literature supports bidirectional influences of child development and behaviour and it is widely accepted that children are not simply born 'blank slates' (Maccoby, 2000). Interactive effects have also been referred to within the literature; this refers to how parenting interacts with different aspects of temperament to influence child outcomes for example, the same parenting behaviour will influence child development outcomes in different ways depending on characteristics of the child (Kiff et al, 2011). In particular, both parenting and child temperament have been explored as important factors in the development of children's psychological and emotional wellbeing.

Internalising and externalising problems

According to the mental health of children and young people report released in 2023 (Newlove-Delgado, 2023) among 8-16 year olds, 20.3% had a probable mental health disorder. The 2020 state of the nation report (Department of Education, 2020) found evidence of a decrease in personal wellbeing in 10 to 17 year olds from 2013 to 2020. The most recent report highlighted that the rate of probable mental health disorders had stabilised but not returned to pre-pandemic levels. The report also highlighted that whilst behaviour and attentional problems had remained stable there was an increase in emotional difficulties between July 2021 and March 2022 (Department of Education, 2023). The good childhood report released in 2021 reported that children's self-reported wellbeing was at a ten year low, with ratings of overall

happiness with life having declined significantly between 2009-2019 (The Children's Society, 2021). The most recent report stated that 10% of children and young people surveyed had low wellbeing according to a satisfaction with life questionnaire, and wellbeing was lower than when the survey began in 2009. The report recommended that more attention needs to be given to preventing problems in the first instance (The Children's Society, 2023).

Literature pertaining to childhood mental health problems frequently delineates between internalising and externalising difficulties (Durbeej et al, 2019). Externalising difficulties can be understood as groups of problem behaviours by an individual that have a negative impact on the external environment; this may include hyperactivity, disruptive or aggressive behaviour or extreme non-compliance (Campbell et al, 2000). By contrast internalising problems reflect difficulties being turned towards the individual and present as disturbances in mood or emotional state for example low mood or anxiety (Liu et al, 2011).

Moffitt's (1993) developmental taxonomy proposes that children who have persisting high levels of externalising difficulties throughout early childhood and adolescence are at increased risk of poorer outcomes in adulthood. Most notably continued antisocial behaviour but also other psychological difficulties including drug and alcohol misuse, anxiety and depression. Further, support has been found from longitudinal studies that have linked early externalising problems with poorer mental and physical health in adulthood. Odgers et al (2008) found boys and girls who displayed high levels of externalising difficulties throughout childhood were significantly more likely as adults to commit violent acts, have poorer dental health, increased risk of sexually transmitted disease and poorer economic outcomes compared to peers who showed low levels of externalising difficulties or did not display externalising difficulties until adolescence. It is important to note that boys were more likely than girls to display early externalising difficulties. Similarly, Huesmann et al's (2009) study that spanned forty years, found children with high levels of aggression and antisocial behaviour were more likely as adults to have been arrested, experience depression, have poorer physical health and problem drinking as well as lower educational and occupational accomplishments compared to their peers. The study also found that being male, experiencing parents as more rejecting and being hit by parents increased the risk of children being in the trajectory of life-course persistent aggression. Both these studies indicate a role for gender, and consistent with this are findings that there is a higher prevalence of externalising difficulties in boys, and a higher prevalence of internalising problems in girls (Zahn-Waxler et al, 2008).

Research into the trajectory of internalising difficulties is less clear than that for externalising difficulties but there is evidence to suggest internalising problems do persist across time (for review, see Ollendick & King, 1994). There are also links with poorer physical health outcomes, for example higher reported internalising difficulties have been associated with higher incidence of febrile illness (Caserta et al, 2011), infectious disease, respiratory difficulties and weight related problems (Aarons et al, 2008). Essex et al (2009) found the presence of internalising problems at age 6 were predictive of both continued internalising problems and physical health problems at age 10. Further, high levels of internalising difficulties in childhood have been linked to poorer health outcomes and overeating in adolescents (Jamnik & DiLalla, 2019), and depressive symptoms in adulthood (Korhonen et al, 2018).

The above research highlights the need to better understand factors that may contribute to internalising and externalising difficulties; clarification around how these difficulties develop and are maintained could support the development of appropriate early interventions that may have the potential to have long lasting impacts across the life span. Research to date has proposed multiple contributions in the aetiology of these difficulties and amongst this literature contributions from both child temperament and parenting have been found.

Child temperament influences on internalising and externalising problems

Research has consistently found links between temperament and internalising and externalising difficulties. Research has found links between numerous temperament traits and internalising and externalising problems indicating that regardless of the theoretical model underpinning the conceptualisation of temperament there is evidence that individual child differences are associated with these difficulties. For example, surgency, effortful control and negative affect from Derryberry and Rothbart's (1997) model have all been linked to these difficulties. Berdan et al (2008) found children rated high in surgency display more externalising behaviours. By contrast children rated as low in effortful control have been found to be more likely to experience externalising difficulties compared to their peers (Eisenberg et al, 2009; Kochanska et al, 2008). Oldehinkel et al (2004) explored the temperament profiles of children with and without internalising and externalising difficulties, children who had one difficulty and children who displayed both problems. They found that the trait of surgency linked to which problems children would display; low surgency was associated with internalising difficulties and high surgency was linked with externalising problems. Negative

affect was associated with the severity of difficulties, with ratings of negative affect lowest in the group with no difficulties, higher in the internalising and externalising groups and highest in the co-occurring group. Effortful control was linked primarily to externalising problems; with effortful control being linked to both the severity (no problems, one problem or both difficulties) and direction of these problems (i.e. internalising or externalising).

Longitudinal research has found links between Buss and Plomins' (1984) infant negative emotionality (referring to a propensity to react negatively to experiences) and internalising and externalising difficulties (Eisenberg et al, 2009; Vitaro et al, 2006). Nelson et al (1999) found negative emotionality at age 5 predicted externalising difficulties 3 years later. Associations have also been found between shyness (sometimes referred to as sociability) and internalising difficulties (Karevold et al, 2012; Bekkhus et al, 2021).

Research has frequently found links between behavioural inhibition (Kagan's, 2018 theoretical model) and anxiety (Svihra & Katzman, 2004). A recent meta-analysis of 27 longitudinal studies by Sandstrom et al (2020) found a positive association between behavioural inhibition and the specific diagnoses of generalized anxiety disorder, specific phobia, social anxiety disorder and separation anxiety disorder.

The construct of difficult temperament has been widely explored and has gained specific interest in relation to later maladjustment. There have been various conceptualisations of this temperament profile since Thomas and Chess' (1957) original study but generally they have all unified in that infants displaying difficult temperament display more frequent distress in the form of crying and fussing (Bates, 1980). Longitudinal analysis has found that whilst the nine specific traits of temperament did not show high levels of stability over time, difficult temperament at age 3 was significantly negatively correlated with adjustment in early adulthood (Thomas and Chess, 1990 as cited in Hertzig, 2020). Further, a study by Guerin et al (1997) found children assessed as temperamentally difficult at 18 months showed increased risk for problem behaviour including aggression at age 12 years. Sidor et al (2017) found a difficult temperament at age 6 months predicted internalising problems at age 3.

Research exploring links between internalising and externalising problems and temperament has also explored other temperament constructs. Patience, risk aversion and impulsivity have been considered interconnected but distinct concepts (Woessmann et al, 2020; Nigg & Nagel, 2016) within literature and have been found to have differential associations with mental health outcomes. Buss and Plomin (1984) dropped impulsivity from their model

of temperament, despite this it has been widely explored within the literature particularly in how it may pertain to externalising problems. Impulsivity defined as "a self-defeating preference for immediate over long-term rewards that leads to a reduced rate of return" (Nigg & Nagel, 2016, p.2), has been associated with externalising problems (Castellanos-Ryan et al, 2011; Robbins et al, 2012; Castellanos-Ryan et al, 2014).

Risk taking (and conversely risk aversion) which is linked with impulsivity but recognised as distinct from (Nigg & Nagel, 2016) has been associated with both internalising and externalising difficulties. Risk aversion has been shown to be elevated in individuals with anxiety disorders (Maner et al, 2007). Interestingly, Bentivegna et al (2023) found that internalising difficulties at age 11 predicted less risk taking at age 14. Whereas conduct problems (which are considered to reflect externalising behaviour) were found to have a positive association with risk taking; 11 year olds who had more conduct problems at age 11 were more likely to take risks on a gambling task at age 14. Conversely, Smout et al (2020) found that the earlier initiation of risk taking behaviours predicted more internalising and externalising problems 2 years later in a sample of 2950 Australian Adolescents. Both males and females who were deemed to have initiated drug use early (prior to age 15) were twice as likely to score highly on a measure of internalising problems. For female participants early drug use increased the risk of externalising problems fourfold. Male adolescents were twice as likely to have high ratings of externalising problems if they initiated alcohol use prior to age 15.

Patience has been shown to have a high correlation with risk taking across countries (Falk et al, 2018; as cited in Woessman et al, 2020) but again is recognised as distinct from it. Stevens and Stephens (2008) state patience is akin to self-control, however others have reported a distinction between the two. For example, Khormaei et al (2017) reported that whilst self-control reflects an ability to inhibit an action in the absence of an immediate reward, patience constitutes a characteristic that has links with personality. They found significant correlations between measures of self-control and patience, ranging from weak to moderate, indicating that whilst they are linked, they are distinct. There is literature pertaining to the links between self-control and internalising and externalising problems (McDermott et al, 2017; White et al, 2013). However, of note is the paucity of literature exploring the links between patience and mental wellbeing. There is some emerging evidence surrounding patience and improved psychological wellbeing. Aghababaei and Tabik (2015) found that different dimensions of patience formed negative associations with anxiety, depression and general psychological

wellbeing in a non-clinical sample of University students. Indicating individuals who display more patience may be more likely to have more positive psychological outcomes.

Despite a plethora of research linking child temperament and internalising and externalising problems, these associations are typically found to be within the moderate to modest range indicating that there are other influences in the aetiology of these difficulties (Sentse et al, 2009). Research of the links between these difficulties and parenting is discussed below.

Parenting influences on internalising and externalising difficulties

As aforementioned the authoritative parenting style is often linked to better child development outcomes, and this is consistent in research on internalising and externalising problems where it is has been linked to reduced problems (Querido et al, 2002; Steinberg et al, 1994; Williams et al, 2009). Whilst authoritarian and permissive parenting styles have been found generally to result in poorer outcomes for their children it is important to note that literature pertaining to parenting styles does not always yield consistent findings. For example, Williams et al (2009) found that permissive parenting was associated with internalising difficulties and greater authoritarian parenting was associated with a greater decline in externalising problems over time. By contrast, Marcone et al (2020) found significant effects of authoritarian parenting on both internalising and externalising difficulties but found no effect for permissive parenting.

Unsurprisingly studies that have looked at specific parenting qualities and behaviours have also found links with children's internalising and externalising problems. Cooke et al (2022) conducted a meta-analytic review of studies exploring parental sensitivity and internalising and externalising problems. The review included 108 studies (cross-sectional and longitudinal) drawing on data from a total sample of 28,114. The researchers found significant negative associations between parental sensitivity and internalising and externalising problems, this association was stronger for externalising problems. Pinquart (2016; 2017) completed two meta-analyses both incorporating more than a 1000 studies each to explore links between parenting and internalising and externalising problems. He found that parental warmth had negative longitudinal associations with both internalising and externalising problems. In contrast, harsh control and psychological control were associated with more internalising and externalising problems.

Parent and child influences on internalising and externalising problems

Research has found evidence for bidirectional links between parent and child factors that are relevant in understanding the aetiology of internalising and externalising problems. Natsuaki et al (2013) found that higher social wariness in toddlers reduced the use of structured parenting practices and in turn, less structured practices increased toddlers social wariness. Dumas and LaFreniere (1993) found that parents of aggressive or anxious children were more negative towards their own children compared to unfamiliar children, comparatively mothers of children deemed to be more socially competent were more positive during interactions with both their own and unfamiliar children. Further, Anderson et al (1986) found boys who met diagnostic criteria for conduct disorder were less compliant with both their own mothers and unfamiliar mothers compared to controls and that their own mothers were more coercive in their parenting towards their child compared to an unfamiliar child. Eisenberg et al (1999) found that parents who reported responding more punitively to their child's distress when their child was aged 6-8, had children who displayed more negative emotion two years later (ages 8-10), in turn more negative emotion predicted more punitive responses from parents when the child was age 10-12. Similarly, Lengua and Kovacs (2005) found maternal negativity (i.e. negative tone and facial expression) predicted children's poorer executive control, and in turn executive control predicted maternal negativity.

A review by Kiff et al (2011) highlighted that there is evidence for both interactive and bidirectional effects in the relationship between parenting and child temperament. In regards to interactive effects, they found that the evidence indicated children who display more negative or difficult temperament traits were generally at increased risk of maladjustment when they had parents who were also less responsive or sensitive. However, studies that have explored interactions between parent and child factors have yielded some inconsistencies. For example, Reitz et al (2006) found evidence of a significant interaction between adolescents internalising behaviour with parental strictness and involvement on internalising problems assessed one year later, however no interaction effect was found for externalising problems. Further, Vitaro et al (2006) explored the interaction between harsh parenting and negative emotionality in aggression in toddlers, whilst they did find significant effects of parenting and temperament, the interaction model did not reach statistical significance. Of note is that they also found significant differences between boys and girls on the independent and dependent variables; boys had significantly higher ratings of aggression, harsh parenting and negative emotionality scores.

Aims of the Present Study

On the basis of the literature discussed above, three main aims of this current study were identified:

1) To explore the impact of child temperament on internalising and externalising problems
2) To explore the influence of parenting on children's internalising and externalising problems,
3) To explore how child temperament and parenting interact to influence internalising and externalising problems.

Despite a growing body of literature linking parenting and child temperament influences on internalising and externalising problems, it is notable the absence of a systematic review consolidating findings in this area. In response, a systematic review was conducted and is outlined in the next chapter. Three specific objectives were identified from this review and these are detailed subsequently.

Chapter 2: Systematic Literature Review

As discussed in the previous chapter there is evidence of links between parenting, child temperament and internalising and externalising difficulties. Despite findings that link both parenting and temperament in the aetiology of these difficulties, there is a lack of evidence regarding a systematic review that synthesises this research. To clarify research findings and to better understand how researchers have explored this topic area a systematic review was conducted.

Methods

Search Strategy

A systematic search of the literature was conducted on July 17th, 2023 using EBSCOhost. EBSCOhost is an online research platform that can search multiple e-journals, ebooks and databases (EBSCO, 2023; University College London, 2023). Databases searched via EBSCOhost included APA PsycArticles, APA PsycInfo, APA PsycTests, CINAHL Ultimate, eBook Collection, E-Journals and MEDLINE Ultimate. Unpublished research is not subject to the same rigorous review processes as published work (University of Exeter, 2023). Therefore, grey literature was not included within the search due to concerns around quality assurance.

For identifying internalising and externalising problems, key terms were “Internalising” “Internalizing”, “Externalising”, and “Externalizing” which incorporates both American English and British English spellings. For identifying parenting key terms included “Parenting”, “Parent* attitude”, “Parent* style”, “Parent* Behaviour” and “Parent Practice”. Truncation is indicated by the asterisk, such that “Parent*” will yield results including parenting, parents and parental. Key terms for children were “Child” “Children”, “Girl”, “Boy”, “Young people”, and “Youth”. For temperament both “temperament” and “personality” were used as search terms. Full search terms and Boolean operators utilised in the search are provided in table 1. The search retrieved eight hundred and sixty eight results. Figure 1 details the search and screening process.

Screening

Exact duplicates are removed automatically by EBSCOhost, this resulted in a remaining four hundred and seventy-two search items. Studies were first screened via title and then

abstract by the review author. After this initial screening remaining studies were retrieved in full to establish if they met eligibility criteria.

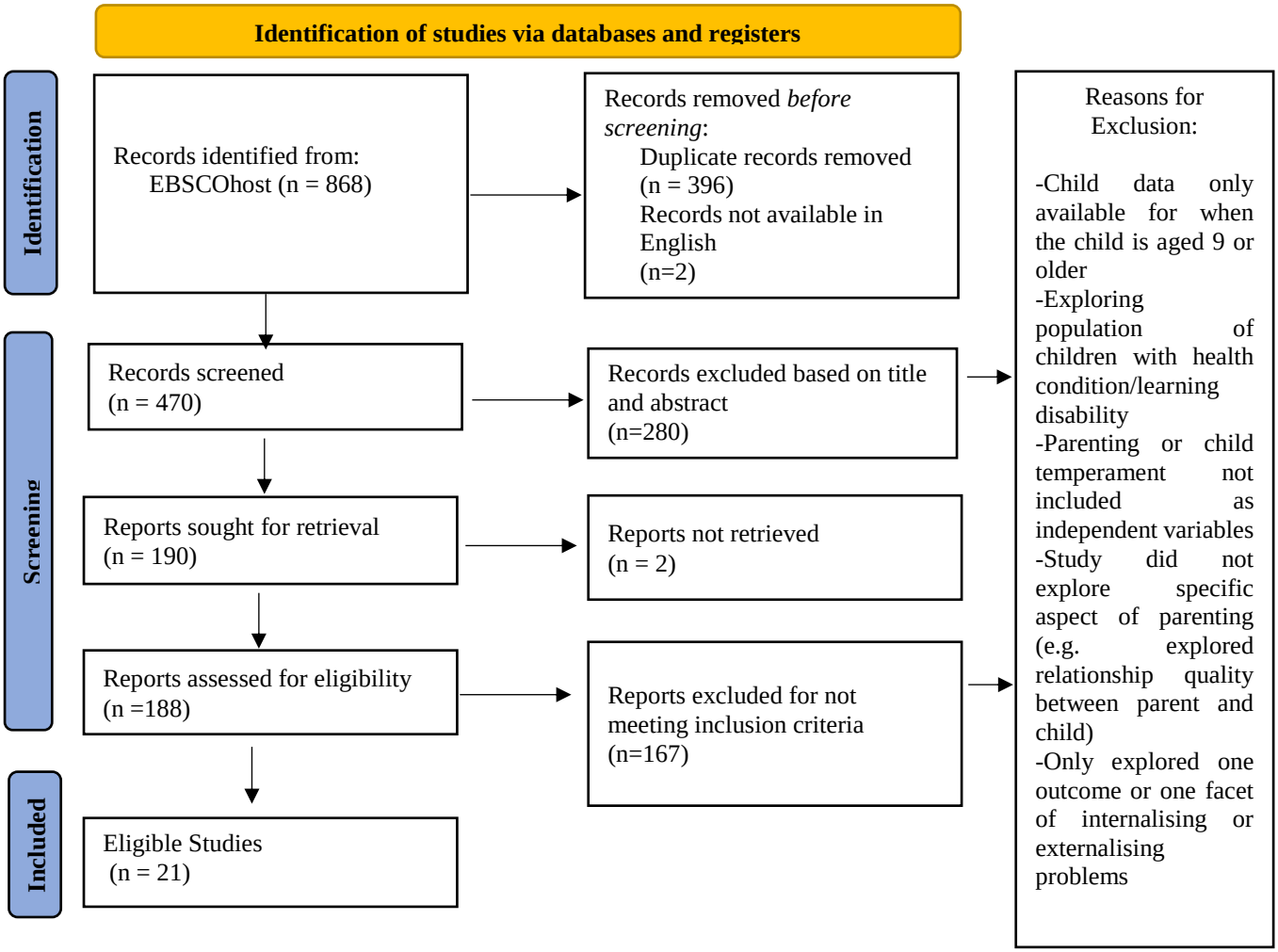
Table 1

Search strategy used in EBSCO host.

	Search Term	Field
	Temperament OR personality	Title & Abstract
AND	Externalising OR Externalizing OR Internalising OR Internalizing	Title & Abstract
AND	Child OR children OR girl OR boy OR 'young people' OR youth	Title & Abstract
AND	Parenting OR 'Parent* attitude' OR 'Parent* style' OR 'Parent* Behaviour' OR 'Parent Practice'	Title & Abstract

Figure 1

Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) flow diagram.



Note. Full exclusion/inclusion criteria is presented in table 2.

Eligibility Criteria

Studies were included if they explored parenting and child temperament influences on the outcomes of internalising and externalising difficulties. As the review author is monolinguist and reliable translation software was not available studies were only included if available in English. A summary of the inclusion and exclusion criteria is presented in table 2.

Wachs (1991; as cited in Kiff et al, 2011) has suggested that stage of child development is likely to have an impact on interaction effects between temperament and parenting. He proposes that exploring interactive effects in early childhood may be more effective at revealing possible interactions between temperament and parenting. Adolescence is a period of marked biological, psychological and social change (Steinberg & Morris, 2001) and both internalising and externalising problems are reported to be highly prevalent during adolescence (Kessler et al, 2012). There is evidence that prevalence of internalising difficulties increases during adolescence (Durbeej et al, 2019). Research suggests problem behaviour associated with externalising difficulties also attenuates during adolescence (Kandel, 1980; Loeber & Farrington, 2014). Moffitt (1993) proposes that for some individuals the onset of externalising difficulties begins around adolescence and recommends that to better understand the aetiology and trajectory of externalising problems (particularly anti-social behaviour) exploration of infancy and early childhood is needed. Further, expression of difficulties may change in accordance with expected developmental changes across the life course (Olson et al, 2013). Reviews exploring parenting and internalising and externalising problems have already been conducted, however these have predominately focused on late childhood/preadolescence and adolescence (for example Gorostiaga et al, 2019; Manuele et al, 2023). As research suggests changes in prevalence and presentation of internalising and externalising difficulties during adolescence and that interactions effects may be more notable at an early developmental stage it was decided that this review would focus specifically on research conducted in early and middle childhood. Pre-adolescence is generally considered to begin around ages 9-12 (Hatfield, 2013; Wolman, 2012) as such only studies that included children aged 8 years and under were included.

Research findings indicate children with learning disabilities, autism spectrum disorder or chronic health conditions are more likely to experience psychological problems (Prior et al, 1999; de Bruin et al, 2007; Jones et al, 2017). Consequently, studies were ineligible if they explored populations of children with specific health conditions/illnesses, for examples studies

exploring internalising and externalising problems in children with learning disabilities were excluded.

Parenting. All aspects of parenting were of interest to this review including parenting behaviour and parenting styles, as well as components of parenting such as parental sensitivity. Variables that explored parent-child relationship quality (for example measures of attachment security) were not included as this reflects the nature of the relationship between the parent and child opposed to specific ways of parenting.

Table 2

Summary of inclusion and exclusion criteria for systematic review

Inclusion	Exclusion
Child data including outcomes captured when the child is aged 8 years or younger	Children have a specific health condition or learning disability
Some assessment or measure of an aspect of parenting, including behaviour, style, practice, attitude or attribute (e.g. parental warmth).	Study not available in English
Assessment or measure of child personality or temperament	Study explored parent-child relationship e.g. attachment security
Assessment or measure of child internalising problems AND externalising problems	Only one outcome assessed (i.e. only externalising difficulties).
Internalising and externalising problems are assessed as outcome variables not as independent variables or predictors	Components of internalising or externalising problems assessed with no overall indicator (e.g. only assessing anxiety or aggression)
Parenting and child temperament variables are assessed as independent variables	

Child Temperament. Links between personality and temperament are debated, with some authors proposing they are synonymous with each other and can be used interchangeably (Strelau, 1987). Others, suggest that at the very least temperament represents early emerging personality traits (Buss & Plomin, 1984). Regardless, very few argue no links between personality and temperament, and Strelau (1987) suggests they are complementary phenomena. Therefore, both temperament and personality were included in the search terms, and no studies were excluded on the basis of how these terms were operationalised.

Internalising and Externalising Difficulties. Studies were only eligible for inclusion if they explored both internalising and externalising difficulties as outcome variables as both outcomes were relevant to this review. Studies that operationalised internalising or externalising difficulties as consisting of only components parts were not included. For example, anxiety is a component of internalising difficulties, but studies that only assessed for a specific anxiety condition (e.g. Generalised Anxiety Disorder) opposed to internalising difficulties as a whole would not have met eligibility criteria.

Data extraction & synthesis

The Critical Skills Appraisal Programme (CASP) provides checklists that can support critical appraisal of research. Two CASP checklists were used for this review. The cohort study checklist was used for longitudinal studies and the case control study checklist was used for cross sectional studies (CASP UK, 2024). As these checklists are more suited towards healthcare research some questions were not appropriate for the studies included and were therefore excluded. Appendix a and b details the full checklists. The results from the checklists are shown in table 3 and 4.

A meta-analysis was not appropriate for this review based on heterogeneity in the conceptualisations of both parenting and child temperament within the included studies. Therefore a narrative synthesis of the results is provided. To further support a narrative synthesis of the studies a modified version of a quality appraisal form developed by Radkte (n.d.) was used alongside the CASP checklists. The form was modified to include additional prompt questions for the review author to consider within the quality assessment. A copy of this can be found in appendix C.

Results

The search and screening process yielded 21 eligible studies for review. Characteristics of the included studies and main findings have been separated into three areas:

-Findings for links between parenting and the outcome variables of internalising and externalising problems (n=20)

-Findings for links between temperament and internalising and externalising problems (n=21)
-Findings from studies that explored the interaction between temperament and parenting (n=16) on internalising and externalising difficulties.

These findings are displayed in tables 5, 6, and 7 respectively.

Characteristics of the studies included in the narrative synthesis

The design of the studies was either cross-sectional (n=9) or longitudinal (n=12). The majority of studies relied only on parent report for assessing parenting (n=14), child temperament (n=17) and internalising and externalising difficulties (n=16). Other methods of assessing the study variables included child report, teacher report and observation.

Sampling

Information pertaining to recruitment was at times lacking in sufficient detail for the sampling method used to be established with certainty. Exceptions to this were Acar et al (2021) who stated they used opportunistic sampling methods, Galitto (2015) who reported using stratified cluster probability sampling and Gulenc et al (2018) who stated there sample was self-selected from another study conducting a randomised control trial. It appeared many studies used data gathered as part of separate research projects (n=9). Several studies utilised a voluntary response sampling method using advertisement and distributing letters (n=4) or data taken as part of national household surveys (n=4).

Table 3

Results from the CASP checklist for cross-sectional studies

	Acar et al, 2021	Ato et al, 2020	Gulenc et al, 2018	Karreman et al, 2010	Loginova & Slobodskaya, 2021	Morris et al, 2002	Paterson & Sanson, 1999	Paulussen-Hoogeboom et al 2008	Ren & Zhang, 2017
Did the study address a clearly focused issue?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Did the authors use an appropriate method to answer their question?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Were the cases recruited in an acceptable way?	Opportunistic	Yes	Self-Selected	Can't tell	Can't tell	Can't tell	Can't tell	Yes	Can't tell
Have the authors taken account of the potential confounding factors in the design/analysis?	Yes	Only child age & gender	Yes	No	Only child age & Sex	No	No	Only Gender & birth order	Yes
Do you believe the results?	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Can the results be applied to the local population?	No	Can't tell	Can't tell	No	Can't tell	No	No	Yes	Can't tell
Do the results of this study fit with other available evidence?	Yes	Yes	Some	Yes	Yes	Yes	Yes	Yes	Yes

Table 4

Results from the CASP checklist for longitudinal studies

	Edwards & Hans, 2015	Engle & McElwain, 2011	Galitto, 2015	Hentges et al, 2019	Liang et al, 2019	Padilla et al, 2020	Sirois et al, 2020	Sturge-Apple et al, 2021	Wittig & Rodriguez, 2019	Wu & Cui, 2023	Yu et al, 2018	Zupancic & Podlesek, 2010
Did the study address a clearly focused issue?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Was the cohort recruited in an acceptable way?	Yes	Volunteer	Yes	Volunteer	Volunteer	Can't tell	Can't tell	Can't tell	Yes	Can't tell	Can't tell	Yes
Was the outcome accurately measured to minimise bias?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Have the authors identified all important confounding factors?	Yes	Yes	Yes	Gender not included	Yes	Yes	Only Child sex & SES	Yes	Only Parental age & SES	Yes	No	Yes
Have they taken account of the confounding factors in the design and/or analysis?	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes
Was the follow up of Subjects complete enough?	Can't tell	Yes	Yes	Yes	Can't tell	Yes	Yes	Yes	Yes	Yes	Yes	Can't tell
Was the follow up of Subjects long enough?	Yes	Can't tell	Yes	Yes	Can't tell	Yes	Yes	Yes	Yes	Yes	Can't tell	Yes
Do you believe the results?	Yes	Can't tell	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Can't tell	Yes
Can the results be applied to the local population?	Yes	No	Yes	Can't tell	No	Yes	Can't tell	No	No	No	Can't tell	Yes
Do the results of this study fit with other available evidence?	Yes	Yes	Yes	Yes	Yes	No interactive effect found	Yes	Yes	Yes	Yes	Yes	Yes
Are the implications for clinical practice discussed?	Yes	Briefly	Yes	Yes	Yes	Yes	Briefly	No	Yes	Briefly	Yes	Briefly

Table 5

Characteristics of included studies exploring parenting and internalising and externalising difficulties

Author, Year	Study Design & Country	Participants N, Age,	Parenting Variables	Main findings
Acar et al, 2021	Cross-Sectional Turkey	118 16-36 months (M=27.91)	Power Assertive Discipline	A positive association between externalising problems and power assertive discipline was found (r=.25, p≤.01). No significant associations were found with internalising problems.
Ato et al, 2020	Cross-Sectional Spain	474 6-8 years	Involvement, Limit Setting	Externalising problems were negatively associated with parental involvement (r=-.30, p≤.01**) and limit setting (r=-.51, p≤.01). Internalising problems were also negatively associated with parental involvement (r=-.22, p≤.01) and limit setting (r-.12, p≤.05).
Edwards & Hans, 2015	Longitudinal USA	412 5months M=5.1 months	Hostile Parenting	Hostile parenting increased the likelihood of children later developing internalising problems (OR=2.72, p≤.01, CI [1.12,6.61]). No significant effect was found for parenting on externalising problems.
Engle & McElwain, 2011	Longitudinal USA	107 M=32.7 months	Punitive & Minimising reactions	A positive association between internalising problems and maternal punitive reactions(r=.29, p≤.01) was found. However follow up regression analysis did not find any parenting variables were significant predictors.
Galitto, 2015	Longitudinal Canada	2631 2-3 years M= 2.57 years	Positive, Hostile/ineffective	Structural equation modelling indicated a significant direct effect of hostile parenting on internalising (β=.25, p≤.001) and externalising problems (β=.10, p≤.001).
Gulenc et al, 2018	Cross-sectional Australia	669 3 years	Harsh Discipline, Warmth & Nurturing, Unreasonable expectations, Overinvolved/Protective	There was a positive association between paternal harsh discipline and both externalising (β =.20, p≤.001, adjusted) and internalising problems (β =.12, p≤.001, adjusted). Paternal overinvolved parenting also had a positive relationship with internalising problems (β =1.76, p≤.01, adjusted).
Hentges et al, 2019	Longitudinal Canada	1992 Birth-5 years	Hostile-Reactive Parenting	Structural equation modelling indicated a direct effect of hostile reactive parenting to externalising problems (β=.12, p≤.01).

Author, Year	Study Design & Country	Participants N, Age,	Parenting Variables	Main findings
Karreman et al, 2010	Cross-sectional Netherlands	89 36 months	Warmth, Control	Regression analysis did not find any parenting variables were significant predictors within the model.
Liang et al, 2019	Longitudinal China	84 6 months M=194 days	Maternal Sensitivity	Regression models did not find parenting to be a significant predictor.
Loginova & Slobodskaya, 2021	Cross-Sectional Russia	370 2-7years M=5.1	Positive, inconsistent, punitive parenting Corporal punishment	Regression analysis found no significant effects of parenting on internalising problems. Externalising problems were predicted by inconsistent parenting (β=.12, p≤.01) and corporal punishment (β=.10, p≤.05).
Morris et al, 2002	Cross-Sectional USA	40 M= 7 years 7 months	Hostility, Psychological Control	Parental hostility was a significant predictor in regression analysis of externalising problems (β=.33, p≤.05), but only in the model that did not include parenting and child temperament interaction terms.
Paterson & Sanson, 1999	Cross-Sectional, Australia	74 5-6 years	Warmth, punishment, Explanation, Obedience	No parenting variables were significant predictors of internalising or externalising problems.
Paulussen-Hoogeboom et al 2008	Cross-sectional Holland	196 3 years M=3.4	Authoritarian and authoritative	Mediation models found direct paths from authoritative parenting to internalising behaviour (β=-.17, p≤.01) and authoritative parenting to externalising behaviour (β=-.17, p≤.01). There were no significant direct paths from authoritarian parenting.
Ren & Zhang, 2017	Cross-sectional China	109 M= 38 months	Supportive & aversive	Regression analysis indicated increased paternal aversive parenting was associated with more externalising behaviours (β=.15, p≤.05).
Sirois et al, 2020	Longitudinal Canada	130 12 months M=12.60	Maternal sensitivity, Maternal autonomy support	Random linear growth trajectories indicated a negative relationship between maternal autonomy support and internalising problems (y=-.83, p≤.01) and maternal autonomy support and externalising problems (y=-1.29, p≤.001).Increased autonomy support resulted in less steep increases in internalising and externalising problems over time.
Sturge-Apple et al, 2021	Longitudinal USA	201 M=26 months	Maternal empathy, Maternal power assertive discipline (moral, prudential & conventional)	Structural equation modelling indicated conventional power assertive discipline predicted internalising problems (β=.22, p≤.05). Moral power assertive discipline predicted externalising problems (β=.21, p≤.05), as did prudential power assertive discipline (β=-.17, p≤.1).

Author, Year	Study Design & Country	Participants N, Age,	Parenting Variables	Main findings
Wittig & Rodriguez, 2019	Longitudinal USA	186 6 months	Authoritative, Authoritarian and Permissive	Higher maternal permissive parenting style predicted increased externalising (β=.210, p≤.01) and internalising (β=.335, p≤.001) problems. Higher paternal permissive parenting style (β=.227, p≤.001) predicted increased internalising problems, lower paternal authoritative parenting also predicted more internalising problems (β=-.312, p≤.001).
Wu & Cui, 2023	Longitudinal USA	1292 6 months	Maternal sensitivity	Path analysis found main effects of maternal sensitivity on internalising (β=-.19, p≤.01) and externalising problems (β=-.14, p≤.01).
Yu et al, 2018	Longitudinal USA	163 M=4.56 years	Physical punishment, Guilt induction	Path analysis indicated maternal guilt induction (β=-.22, p≤.05) and maternal physical punishment (β= .19, p≤.05) had main effects on internalising behaviour. Path analysis found no main effects of parenting on externalising problems.
Zupančič & Podlesek, 2010	Longitudinal Slovenia	253 3 years (M=37.9 months)	Stimulation, authoritative parenting, power assertion, ineffective control	Regression analysis indicated parenting did not contribute significantly to the prediction of internalising or externalising behaviour.

Table 6

Characteristics of included studies exploring temperament and internalising and externalising difficulties.

Author, Year	Study Design & Country	Participants N, Age,	Temperament Variables	Main findings
Acar et al, 2021	Cross-Sectional Turkey	118 16-36 months (M=27.91)	Difficult Temperament	Mediation analysis found a direct effect from difficult temperament to internalising problems (β =4.51, p≤.01) and from difficult temperament to externalising problems (β =5.88, p≤.01).
Ato et al, 2020	Cross-Sectional Spain	474 6-8 years	Difficult Temperament	Difficult temperament had a positive relationship with externalising (r=.29, p≤.01) and internalising problems (r=.43**).
Edwards & Hans, 2015	Longitudinal USA	412 5months M=5.1 months	Distress to novelty Anger/Frustration	Higher levels of distress to novelty increased the likelihood of experiencing externalising problems (OR=1.81, p≤.01, CI [1.19,2.76]).
Engle & McElwain, 2011	Longitudinal USA	107 M=32.7 months	Negative emotionality	Regression analysis indicated higher levels of negative emotionality predicted more internalising (β =.57, p≤.001) and externalising problems (β=.40, p≤.001).
Galitto, 2015	Longitudinal Canada	2631 2-3 years M= 2.57 years	Difficult temperament, unadaptable temperament	Structural equation modelling found significant direct effects of difficult temperament on externalising problems (β=.32, p≤.001) and of unadaptable temperament on internalising problems (β=.06, p≤.05).
Gulenc et al, 2018	Cross-sectional Australia	669 3 years	Difficult temperament	Regression analysis found a significant association between child difficult temperament and internalising problems (β=2.45, p≤.01, adjusted).
Hentges et al, 2019	Longitudinal Canada	1992 Birth-5 years	Negative Affect	Structural equation modelling found direct effects from negative effect to internalising problems (β=.32, p≤.01) and externalising problems (β=.24, p≤.01).
Karreman et al, 2010	Cross-sectional Netherlands	89 36 months	Anger, fear, Sadness, Impulsivity	Regression analysis found impulsivity (β =.60, p≤.001) and anger (β =.34, p≤.01) were significant predictors of externalising problems. Fear (β =.30, p≤.05) and impulsivity (β =-.43, p≤.001) predicted internalising problems.

Author, Year	Study Design & Country	Participants N, Age,	Temperament Variables	Main findings
Liang et al, 2019	Longitudinal China	84 6 months M=194 days	Temperamental withdrawal & Delayed Gratification	Regression analysis found temperamental withdrawal at 6 months significantly predicted internalising problems at 1 year (β=.48, p≤.01) but not at 2 years old. Withdrawal assessed at 6 months and ability to delay gratification at 2 years interacted to predict externalising problems (β=-.52, p≤.01) at two years old.
Loginova & Slobodskaya, 2021	Cross-Sectional Russia	370 2-7years M=5.1	Disagreeableness, Conscientiousness, Neuroticism, Extraversion, Openness	Regression analysis found disagreeableness (β=.16, p≤.01), conscientiousness (β=.58, p≤.001) and extraversion (β=.3, p≤.001) significantly predicted externalising problems. Neuroticism significantly predicted internalising problems (β=.4, p≤.001).
Morris et al, 2002	Cross-Sectional USA	40 M= 7 years 7 months	Irritable Distress, Effortful Control	Regression analysis for the relationship between effortful control and externalising problems was significant (β=-.34, p≤.05). Higher levels of irritable distress predicted more internalising problems (β=.36, p≤.05).
Padilla et al, 2020	Longitudinal USA	3480 Birth-5 years M=60.6 months	Negative Reactivity	Negative reactivity predicted internalising and externalising difficulties, specifically one standard deviation increase in negative reactivity was associated with a 6% standard deviation increase in internalising scores and a 7% standard deviation increase in externalising scores.
Paterson & Sanson, 1999	Cross-Sectional, Australia	74 5-6 years	Approach, persistence, inflexibility	Lower temperamental persistence predicted increased externalising problems (β=.24, p≤.05). Lower levels of approach predicted increased internalising problems (β= .41, p≤.001)
Paulussen-Hoogeboom et al 2008	Cross-sectional Holland	196 3 years M=3.4	Negative Emotionality	Mediation models found direct paths from negative emotionality to externalising behaviour (β=.44, p≤.01) and to internalising behaviour (β=.39, p≤.01.
Sirois et al, 2020	Longitudinal Canada	130 12 months M=12.60	Activity level, Social Fear, Anger Proneness	Multi-level modelling found children with higher levels of social fear had higher rates of internalising problems initially (y=7.13, p≤.001), however those with more social fear had less steep increases in internalising problems (y=-1.40, p≤.01). Children with higher levels of anger proneness and activity level had higher initial externalising behaviours (y=15.02, p≤.001 and y=10.58, p≤.01 respectively). Further, anger proneness interacted with time indicating children who were more anger prone had sharper decreases in externalising behaviours over time (y=-2.54, p≤.01).
Sturge-Apple et al, 2021	Longitudinal USA	201 M=26 months	Difficult temperament	Associations were found between difficult temperament assessed at age 2 and internalising problems (r=.31, p≤.05) and externalising problems (r=.44, p≤.05) reported two years later.

Author, Year	Study Design & Country	Participants N, Age,	Temperament Variables	Main findings
Ren & Zhang, 2017	Cross-sectional China	109 M=38 months	Persistence & Emotionality	Regression analysis found higher ratings of emotionality predicted more internalising (β= .518, p≤.001) and externalising (β = .636, p≤.001) problems. Children rated as lower in persistence had more internalising (β= -.281, p≤.01) and externalising problems (β=-.375, p≤.001).
Wittig & Rodriguez, 2019	Longitudinal USA	186 6 months	Orientating/regulating capacity, Negative Affect, Surgency	Higher negative affect predicted higher internalising behaviours (β=.170, p≤.01). Lower orientating/regulating capacity predicted higher externalising behaviours (β=-.170, p≤.01).
Wu & Cui, 2023	Longitudinal USA	1292 6 months	High intensity & Normal temperamental fear	Correlation found a very weak significant negative association between normal fear assessed at 6 months and externalising difficulties assessed at 36 months (r=-.09, p≤.01). Path analysis revealed no main effects of temperament.
Yu et al, 2018	Longitudinal USA	163 M=4.56 years	Inhibitory Control	Path analysis found a main effect of child inhibitory control on child externalising behaviour (β== -.26, posterior SD = .08, 95% CI [-.41,-.11]).
Zupancic & Podlesek, 2010	Longitudinal Slovenia	253 3 years at Wave 1 (M=37.9 months)	Extraversion, conscientiousness, neuroticism, disagreeableness	Regression analysis indicated high ratings of extraversion by teachers (β=0.21, p≤.001) and parents (β=0.13, p≤.05) predicted more internalising problems. Teacher rated disagreeableness (β=-0.27, p≤.001), extraversion (β=-0.32, p≤.01) and conscientiousness (β=0.24, p≤.01) were significant predictors in the model for externalising problems.

Table 7

Characteristics of included studies exploring interaction effects of temperament and parenting internalising and externalising difficulties.

Author, Year	Study Design & Country	Participants N, Age,	Parenting Variables, Temperament variables	Main findings
Acar et al, 2021	Cross-Sectional Turkey	118 16-36 months	Power Assertive Discipline Difficult Temperament	Difficult temperament was found to mediate the relationships between power assertive discipline and internalising and externalising problems. Children who had parents with high levels of power assertive discipline had temperaments that were more difficult and children with more difficult temperaments had more internalising (indirect effect=1.09, p≤.05, , CI 95% [CI [.25, 2.29]). The same effect was found with externalising problems (indirect effect=1.43, p.01, CI 95% [.40,2.69]).
Ato et al, 2020	Cross-Sectional Spain	474 6-8 years	Involvement, Limit Setting Difficult Temperament	An indirect mediation effect of involvement was found in the relationship between difficult temperament and externalising problems (indirect effect=.212, p≤.01, CI 95% [.103,.314]). An indirect effect of limit setting was also found in the association between difficult temperament and externalising problems (indirect effect=.782, p≤.01, CI 95%[.307,1.283]). For internalising problems, an indirect mediation effect was only found for involvement (indirect effect=.102, p≤.05, CI 95% [.016, .201]).
Edwards & Hans, 2015	Longitudinal USA	412 M= 5.1 months	Hostile Parenting Anger/Frustration	Infants with parents with higher levels of hostile parenting who had high levels of temperamental anger were at increased risk of developing co-occurring internalising and externalising problems (OR=1.72, p≤.01, CI 95% [1.17,2.54]).
Engle & McElwain, 2011	Longitudinal USA	107 M= 32.7 months	Punitive reactions, minimising reactions Negative emotionality	Maternal punitive reactions were associated with more internalising problems in boys when they were high in negative emotionality (β=.27, p≤.1). Paternal punitive reactions were related to more internalising problems in boys who were high in negative emotionality (β=.53, p≤.001).
Galitto, 2015	Longitudinal Canada	2631 2-3 years	Positive, Hostile/ineffective Difficult temperament, unadaptable temperament	The association between positive parenting and externalising problems was moderated by difficult temperament; children with difficult temperaments had more externalising problems when positive parenting was low (β= −0.208, p≤.001). The relationship between positive parenting and internalising problems was moderated by unadaptable temperament; children with unadaptable temperament had more internalising problems when positive parenting was low (β=-0.114, p≤.01).

Author, Year	Study Design & Country	Participants N, Age,	Parenting Variables, Temperament variables	Main findings
Karreman et al, 2010	Cross-sectional Netherlands	89 36 months	Warmth, Control Anger, fear, Sadness, Impulsivity	A moderating effect of paternal positive control was found in the relationship between impulsivity and externalising problems (β=-.24, p≤.05) Impulsivity was associated with externalising behaviours, but when paternal positive control was high this reduced the strength of the association (b=.10) compared to when paternal positive control was low (b=26). A moderating effect was found for parental negative control in the relationship between impulsivity and internalising problems for both mothers (β=.32, p≤.01) and fathers (β=.26, p≤.01). For children high in fear high parental negative control increased the association with internalising problems compared to when parental control was low. Mediation effects of parenting were tested but not found.
Liang et al, 2019	Longitudinal China	84 M= 6.37 months	Maternal Sensitivity Temperamental withdrawal	When maternal sensitivity was low temperamental withdrawal was positively associated with internalising problems at age 1 (β=.59, p≤.01), when maternal sensitivity was extremely high temperamental withdrawal was positively associated with internalising problems at age 1 (β=.42, p≤.05). The model predicting internalising problems at age 2 was not significant. For externalising problems, no interactive effects reached statistical significance.
Loginova & Slobodskaya, 2021	Cross-Sectional Russia	370 2-7years	Positive, inconsistent, punitive parenting Disagreeableness, Conscientiousness, Neuroticism, Extraversion, Openness	For children rated as low in openness positive parenting was a protective factor against externalising (RoS on X<29.25) and internalising problems (RoS on x<32.60). Punitive parenting was only associated with externalising problems in children who were rated as low or with average levels of conscientiousness, this association was not significant in highly conscientious children.
Morris et al, 2002	Cross-Sectional USA	40 M=7 years 7 months	Hostility, Psychological Control Irritable Distress, Effortful Control	Hostility and irritable distress interacted to predicted externalising behaviour (β=.27, p≤.1). Slope tests indicated at high levels of irritable distress, parental hostility predicted externalising behaviour (slope=.31, *F*[1,31]=6.62, p≤.05). Hostility and effortful control interacted to predicted externalising problems (β= -.39, p≤.01). Slope tests indicated at low levels of effortful control, parental hostility predicted externalising behaviour (slope=.39, F[1,31]=10.7, p≤.05). Internalising behaviour could be predicted from the interaction of irritable distress and psychological control (β=.34, p≤.05). At high levels of irritable distress psychological control predicted internalising problems (slope=.28, F[1,35]=4.11, p≤.05).

Author, Year	Study Design & Country	Participants N, Age,	Parenting Variables, Temperament variables	Main findings
Padilla et al, 2020	Longitudinal USA	3480 M= 60.6 months	Emotional Support Negative Reactivity	No significant effects were found of parenting as a mediated associations between temperament and either difficulty
Paterson & Sanson, 1999	Cross-Sectional, Australia	74 5-6 years	Warmth, punishment, Explanation, Obedience Approach, persistence, inflexibility	Parental punishment and temperamental inflexibility predicted externalising problems (β=-1.65, r^2= .27, t=-2.72, p≤.01). Specifically high levels of inflexibility and high levels of parental punishment increased externalising behaviour, at low levels of inflexibility or punishment difference in externalising problem was minimal.
Paulussen-Hoogeboom et al 2008	Cross-sectional Holland	196 M=3.4 years	Authoritative & Authoritarian Negative Emotionality	The positive association between negative emotionality and externalising problems was partially mediated by authoritative parenting (β=.7, p≤.05). The positive association between negative emotionality and internalising behaviour was fully mediated by authoritative parenting (β=.07, p≤.01)
Ren & Zhang, 2018	Cross-sectional China	109 M= 38 months	Supportive & Aversive Persistence & Emotionality	For children low in persistence fathers aversive parenting was associated with externalising problems (B=.259, p≤.001) but this association was not significant at high levels of child persistence. For children high in emotionality fathers aversive parenting was associated with more externalising problems (B=.206, p≤.01), but this was not significant at low levels of emotionality.
Wittig & Rodriguez, 2019	Longitudinal USA	186 6 months	Authoritative, Authoritarian and Permissive Orientating/regulating capacity, Negative Affect, Surgency	Low levels of infant surgency predicted more externalising problems when there were higher levels of maternal authoritative parenting (β=.185, p≤.01). High levels of infant surgency and higher maternal authoritarian parenting predicted more internalising problems (β=.174, p≤.01), this interaction was not significant at low levels of surgency. High levels of paternal authoritative parenting predicted lower internalising behaviours when infant surgency was high (β=1.292, p≤.01). Low levels of surgency predicted greater externalising problems when paternal permissive parenting was high (β=.097, p≤.05)

Author, Year	Study Design & Country	Participants N, Age,	Parenting Variables, Temperament variables	Main findings
Wu & Cui, 2023	Longitudinal USA	1292 6 months	Maternal Sensitivity Temperamental fear	A significant interaction between normal fear and maternal sensitivity was found (β=-0.09, t=-2.70, p≤.01) for internalising behaviours. When child temperamental normal fear was at mean and low levels, maternal sensitivity was related to less internalising problems when at low and medium levels, but internalising behaviours increased when maternal sensitivity was high. An interaction effect was found between maternal sensitivity and fear for externalising difficulties (β=.08, t=2.12, p≤.05), however slope tests found no significant effects at low, mean and high levels of temperamental fear.
Yu et al, 2018	Longitudinal USA	163 Mean age 4.56 years	Physical punishment, Guilt induction Inhibitory Control	Path analysis indicated no interactive effects on internalising behaviour. An interactive effect of maternal physical punishment and child inhibitory control was found for externalising behaviour (β==-.17, posterior SD =.07, 95% CI [-.30,-.04]). Specifically physical punishment assessed at wave 1 was associated with increased externalising behaviour a wave 2 in children who had low levels of inhibitory control (β=.29, posterior SD =.10, 95% CI [.10, .48]), at mean and high levels of inhibitory control this association was not significant.

Participants

All studies included both boys and girls and child gender split was generally even amongst infants and children. Hentges et al (2019) did not report child gender in the body of the article or within the descriptive statistics table.

Eight studies focused explicitly on mothers' parenting behaviour. Even studies that were not solely focused on maternal parenting reported the majority of respondents were mothers. For example, Edwards and Hans (2015) reported 98% of caregivers were mothers. Similarly, Galitto (2015) reported 93% of respondents were mothers. Paulussen-Hoogeboom et al (2008) reported that despite not setting out to only study mothers, as only five fathers completed questionnaires only data by mothers was included in analysis. Three studies explored both paternal and maternal parenting (Zupančič & Podlesek, 2010; Karreman et al, 2010; Engle & McElwain, 2011). Ren and Zhang (2017) was the only study to focus specifically on paternal parenting; both paternal and maternal parenting were reported but maternal parenting was controlled for in analysis to explore the unique contributions of fathers parenting practices.

The age range of the children included within the studies ranged from 5 months up to 8 years. The majority of studies (n=9) focused on toddlers (aged 1 year up to 3 years). Of the studies that explored children under the age of one (n=3) all of these studies were longitudinal in nature and outcomes were not collected until children reached toddlerhood. Loginova and Slobodskaya (2021) included the largest age range of participants (aged 2-7years) in their cross sectional study.

A small minority of studies (n=4) were conducted in Eastern countries (China, Russia, Turkey). Of the studies conducted within the USA, Canada or European countries (n=17) that provided details pertaining to ethnic diversity, five reported the majority or their participants were white. Three of these studies reported the majority of their participants were black. Yu et al (2018) was the only study to focus on the experience of Chinese-American children and Edwards and Hans (2015) was the only study with a majority Hispanic or Latino sample (52%). Information pertaining to racial and/or ethnic diversity was not always clear within studies. For example, Patterson & Sanson (1999) reported their sample reflected the multicultural nature of Australian society but failed to provide further details and sampling was not randomised.

Variables

Temperament. Loginova and Slobodskaya (2021) and Zupančič and Podlesek (2010) were the only two studies that explored personality traits instead of temperament traits. In total 22 temperament variables were used across the studies. Although various terminologies were used there appeared to be a great deal of overlap in how terms were conceptualised and assessed. Difficult temperament and negative emotionality were the most common temperament traits used by studies (n=10). Negative emotionality was explored by five studies, however there were differences in the terminology of this trait with some studies referring to it as negative emotionality, negative affect or negative reactivity. Different terms were used by Hentges et al (2019) and Paulussen-Hoogeboom et al (2008) but these two traits were assessed using the same scales of the same questionnaire. It is important to note that temperament researchers would posit that difficult temperament compromises elements of negative emotionality and effortful control (Putnam et al, 2002). Similarly, some studies explored fear, sadness or anger, all elements deemed to characterise negative emotionality (Rothbart & Bates, 1998). Inhibitory control, delayed gratification, impulsivity and effortful control were measured by four studies and again literature would indicate some commonalities amongst these variables (Nigg, 2017).

Parenting. There was great variation in which parenting behaviours and practices were explored with a total of 30 variables across all studies. Only two studies specifically explored parenting styles (Paulussen-Hoogeboom et al, 2008; Wittig & Rodriguez, 2019). Similar to temperament variables, there appeared to be conceptual overlaps in parenting variables, for example Sirois et al (2022) acknowledged maternal autonomy support shares links with maternal sensitivity (a variable explored by other studies), and correlation analysis of the two variables found a positive association ($r=.24$, $p<.001$). Further, 12 studies focussed on punishment or discipline, punitive parenting and hostile parenting which were deemed likely to share at least some commonality.

Sample Size and Analysis

The sample sizes were deemed adequate and appropriate for the statistical analysis completed for the majority of studies. For a few studies it was unclear if they had enough statistical power to detect significant results. Morris et al's (2002) study had the smallest sample at just 40 participants. For regression analysis some authors would recommend a sample size of ten observations per independent variable (Roscoe, 1975; cited in Memon et al,

2020). A larger sample may have been beneficial as there were three independent variables and two interaction variables added into the regression model. It is reported that lower statistical power and increased chance of type 2 errors can occur in tests that include interaction terms (Whisman & McClelland, 2005). As the study reported that one of their results approached significance, increasing power through a larger sample may have been beneficial. Karreman et al's (2010) study had only 89 participants despite running analytic tests separately for gender and parenting variables to reduce the number of predictor variables in their analysis some of their hypothesised interactions were not significant. A retrospective power analysis may have been helpful. Similarly, Engle & McElwain (2011) and Ren and Zhang (2018) both reported results approaching significance and had just over hundred participants in their study (107 and 109 respectively). Despite a large sample (n=3480) Padilla et al (2020) reported that due to multiple subgroups in their analysis and therefore small participant numbers there may not been enough power to detect some associations, however they did not run a power analysis to test this. Acar et al (2021) was the only study to acknowledge that due to their sample size some mediation analysis was not performed. This was also the only study to run a retrospective power analysis and reported the statistical power was 0.83, falling above the generally accepted minimum level of 0.8 (Cohen, 1988).

Measures

Child temperament. All but one study used questionnaires to assess temperament. Two studies used both questionnaires and observation (Edwards & Hans, 2015; Liang et al 2019). Observations were completed to assess different traits to those measured by questionnaires and were not done to complement parent reports. Wu and Cui (2023) was the only study that used just observation to assess temperament, this was completed within participant homes, they reported inter-rater reliability was over 80%.

The majority of respondents to questionnaires were mothers. Zupančič and Podlesek (2010) were the only researchers to include reports of temperament from mothers, fathers and teachers. The mostly widely used measure was the Child Behaviour Questionnaire (CBQ; Rothbart et al, 2001) (n=7). The Toddler Behaviour Assessment Questionnaire (TBAQ; Goldsmith, 1996), Infant Behaviour Questionnaire (IBQ; Putnam et al, 2014) and the Inventory of Child Individual Differences (ICID; Slobodskaya & Zupančič, 2010) were all used by two studies each. Only two studies did not use previously validated measures (Padilla et al, 2020; Gulenc et al, 2018). All studies that used measures of temperament that comprised of more

than one item provided Cronbach's alpha, this generally fell within acceptable limits (between 0.60 and 0.95; Ursachi et al, 2015). However, Liang et al (2019) reported an alpha of 0.57, this was acknowledged by the study authors who reported at the time of the study their measure was the only questionnaire that had Chinese norms and copyright.

Parenting. The majority of studies used self-report measures to assess parenting (n=14), six studies used observations, only Morris et al (2002) used child self-report. Four studies used both parents report of their parenting practices; two averaged the resulting scores and two studies ran analysis separately for mothers and fathers parenting. Of the studies that used observation Padilla et al (2020) and Edwards and Hans (2015) did not report any inter-rater reliability. The remaining four studies reported coefficients that fell within substantial or perfect agreement ranges according to Landis and Koch (1977). All studies that used observation were conducted within the home environment.

There was great variation in the self-report measures used by the studies, and not one full measure was used more than once. There were some concerns around some of the measures used. For example, Loginova & Slobodskaya, (2021) used the Alabama Parenting Questionnaire-Preschool Revision (APQ-PR; Clerkin et al, 2007), which has been specifically adapted for use with pre-school children however their sample included children up to the age of 7 years. Further one scale scored below typically acceptable levels for internal consistency (α=0.48). Several studies used various subscales or items of different measures, and it was not always possible to ascertain details of where items had come from. For example, Galitto (2015) did not indicate where they had sourced items for their measure. Paulussen-Hoogeboom et al (2008), and Paterson & Sanson (1999) both reported using various items from multiple parenting measures, followed by principle component analysis or factor analysis. Sturge-Apple et al (2022) used self-report measures completed within a laboratory setting. It is possible that such an environment may have enhanced social desirability responding, particularly to parenting questions, where an individual may be more likely to be concerned about negative evaluation.

Internalising and Externalising problems. All studies used questionnaires to assess internalising and externalising difficulties. The Child Behaviour Checklist (CBCL; Achenbach & Rescorla, 2001) was the most widely used measure (n=9), followed by the Strengths and Difficulties Questionnaire (SDQ; Goodman, 2001) (n=4). There were less concerns surrounding the validity and reliability of the measures used for assessing the outcomes

compared with measures of parenting as all studies used full measures, with reportedly sound psychometric properties. Paterson and Sanson (1999) and Karreman et al (2010) were the only studies to use reports from both parents and teachers. Typically studies used mother only report (n=9), four studies used aggregated scores from mothers and fathers, three studies used teacher reports and two studies used the primary care giver report who was usually the mother.

Analysis

The majority of studies (n=19) undertook initial correlation analysis, of these only four specified the type of correlation completed (Pearson's). Studies frequently used follow up regression analysis (n=10), path analysis including structural equation modelling was also common (n=8). The vast majority of studies commented on at least some of the assumptions required for the statistical methods undertaken. Three studies found their variables were skewed and either used log transformation or transformed variables into categorical data to overcome this.

Of the twelve longitudinal studies, nine studies reported retention rates. Eight studies compared drop outs with those who remained, three studies reported mothers tended to be older and have higher education than those who dropped out.

Fourteen studies reported on missing data, methods used to manage this included pairwise deletion (n=2), list wise deletion (n=1), Expectation Maximisation (n=2) Full Information Maximum Likelihood (FIML) Estimation (n=5), linear interpolation (n=1), multiple imputation (n=2) and Bayesian analysis (n=1).

Bias

Five studies did not explicitly comment if there were any conflicts of interest to declare. Eleven studies declared they were support by awards or funds from different projects. Risk of bias and financial conflicts of interest were deemed to generally be low within the included studies. This evaluation was made on the basis that the studies were not reporting on medications or therapeutic interventions. The one exception to this was Gulenc et al (2018) who used data drawn as part of a randomised control trial which was facilitated by some of the same study authors and so could have potentially introduced a risk of bias in data handling and interpretation.

There appeared to be bias in the socioeconomic status and education level of many of the studies participants. Ten studies reported that their sample was either middle class or well educated compared to the general population. Four studies did report steps were taken in the sampling procedure to increase diversity (of education, race and/or income) within their sample by oversampling from certain demographic backgrounds. For example, Wittig and Rodriguez (2019) reported their study oversampled for socio demographic risk factors. Therefore, to be eligible for inclusion mothers had to either be receiving government aid, living below the poverty line, have a high school education or less or be aged 18 or under.

Quality Assessment

In general, longitudinal studies were deemed to have better study design due to their ability to track changes over time. It is important to highlight Yu et al (2018) only had three months between time 1 and time 2 meaning development of difficulties may not have had enough time to unfold. Although Liang et al's (2019) study was longitudinal in design one of their temperament measures was assessed at the same time as their dependent variables were collected meaning causality cannot be inferred.

On the balance of the studies strengths and limitations it was deemed that study quality was generally similar. The exceptions to this were Paterson & Sanson (1999) and Morris et al (2002) whose methodology was deemed slightly weaker. Both were cross-sectional with small sample sizes (74 and 40 respectively). Morris et al (2002) did not provide information regarding recruitment methodology, and Paterson and Sanson's (1999) sampling was biased to children who attended Catholic schools who had already been recruited through another study first. Paterson and Sanson (1999) did not use a validated measure of parenting; reporting an adapted measure was used but did not detail what these adaptions were. Morris et al (2002) was the only study to use child report of parenting which was viewed as a strength. However, they reported their measure of internalising and externalising difficulties was done on the basis of a modified measure, providing no information as to how this was modified or if this version has been validated. It is important to acknowledge these studies were the oldest included within the review and as such were some of the first studies to begin exploring this research area.

Results

Temperament. All studies that assessed difficult temperament or aspects of difficult temperament (such as negative emotionality) and reported correlation analysis found positive

associations with internalising and externalising difficulties. The strength of the associations ranged from weak (r=.16; Galitto, 2015) to strong (r=.69; Ren & Zhang, 2017). Studies that conducted further follow up analysis also found links between difficult temperament and internalising and externalising problems. For example, Acar et al (2021) found direct effects of difficult temperament to both of these problems in their mediation analysis. Longitudinal studies found that earlier reports of temperament predicted later difficulties. For example, Engle & McElwain (2011) found negative emotionality in toddlers predicted more internalising and externalising problems six months later, and Padilla et al (2020) found negative reactivity at one year predicted more difficulties at age 4.

Two studies (Morris et al, 2002; Yu et al, 2018) found negative associations between effortful control and externalising problems. Karreman et al (2010) explored impulsivity which has been shown to have some conceptual overlap with effortful control (in that it may reflect a lack of; Wang et al, 2019) and found positive associations between impulsivity and externalising problems in their regression analysis.

Both studies that explored personality traits found disagreeableness, conscientiousness and extraversion significantly predicted externalising problems (specifically disagreeableness and extraversion were linked to externalising problems in a positive relationship and conscientiousness had a negative association). Regression analysis for internalising problems resulted in different traits reaching significance in the two studies. For Zupančič and Podlesek (2010) extraversion was a significant predictor for Loginova and Slobodskaya (2021) only neuroticism was a significant predictor.

Parenting. Results of analysis just exploring parenting found more insignificant results compared to temperament variables. For example, Paterson & Sanson (1999), Karreman et al (2010) and Liang et al (2019) failed to find any significant results for parenting. Although Zupančič and Podlesek (2010) found significant associations between parenting variables and the outcomes in correlation, regression analysis indicated that parenting did not significantly contribute to the variance explained by the models for either internalising or externalising difficulties (whereas child personality ratings did contribute significantly). It is of interest that these studies were conducted outside of the USA and Canada where the majority of the studies came from. It is plausible non-significant findings may reflect different impacts of parenting cross-culturally or possibly measures used may have not been appropriate for use cross

culturally. For example, Karreman et al (2010) used a translated measure and Liang et al (2019) used a measure developed in Canada for assessing maternal sensitivity in Chinese mothers.

Hostile and more punitive parenting traits were more commonly found to have significant associations with internalising and externalising problems compared to more positive aspects of parenting. Typically these more negative parenting practices formed positive associations with the outcomes, however it was not always clear cut as to which outcome they may affect. For example, Hentges et al (2019) found a direct effect of hostile parenting on externalising problems, but not internalising whereas Edwards and Hans (2015) found hostile parenting increased the likelihood of children experiencing internalising problems but not externalising. Similarly Yu et al (2018) found a direct effect of punishment on internalising problems, but Loginova and Slobodskaya (2021) found punishment predicted externalising problems. Gulenc et al (2018) found harsh discipline was positively associated with both internalising and externalising difficulties.

The picture for more positive aspects of parenting appeared more unclear than that for more negative/aversive traits. For example Galitto (2015) explored both positive and hostile parenting but only found significant results for hostile parenting, similarly Ren and Zhang (2017) only found associations between aversive parenting and no significant associations with supportive. Studies that did find significant results for more positive aspects of parenting found these formed negative associations with the outcomes, for example Sirois et al (2022) found maternal autonomy support (the degree to which mothers provide developmentally appropriate guidance to encourage agency) predict less steep increase in internalising and externalising problems over time.

There were some contradictions in studies that explored specific parenting styles, one found less authoritative parenting predicted more internalising problems (Wittig & Rodriguez, 2019), whereas another found a direct negative association with externalising problems only (Paulussen & Hoogeboom et al, 2008) and Zupančič and Podlesek (2010) found no significant effect of authoritative parenting.

In studies that explored both mother and father parenting, there were some differences by parent gender. For example Wittig and Rodriguez (2019), found maternal permissive parenting predicted internalising and externalising problems, however permissive parenting by fathers was only associated with internalising problems. Authoritative parenting was also a significant predictor of internalising problems but only for fathers. Engle & McElwain (2011)

found significant associations between maternal punitive reactions and children's internalising problems (r=.29**), however this association did not reach significance for fathers.

Interactions. 16 studies explored the interactive effects of parenting and temperament on internalising and externalising problems. Padilla et al (2020) was the only study that did not find evidence of an interactive effect. Their study explored if parenting mediated associations between temperament and internalising and externalising problems. Ato et al (2020) also explored the mediating effect of parenting and did find evidence of indirect mediation effects for both internalising and externalising problems, however their study explored the parenting variables of involvement and limit setting whereas Padilla et al (2020) explored emotional support. Interestingly Karreman et al (2010) tested both moderation and mediation models of parenting but only found evidence of a moderating effect. Moderating effects of parenting were also found by Liang et al (2019) but only for internalising problems. Further, parenting by temperament interactions at 6 months were only significant predictors of internalising problems when these were assessed 6 months later, when these difficulties were re-assessed a year and a half later the interaction between temperament and parenting was no longer significant.

There was some evidence that temperament may serve as a mediator of parenting. Acar et al (2021) found a mediation effect of difficult temperament in the association between power assertive discipline and internalising and externalising problems; parents who reported using higher levels of power assertive discipline had children with more difficult temperaments and children with more difficult temperaments had more externalising and internalising problems.

The majority of studies explored temperament as a moderator of the relationship between parenting and internalising and externalising difficulties. Galitto (2015) found that difficult temperament moderated the relationship positive parenting and externalising problems, whereas unadaptable temperament moderated the relationship between positive parenting and internalising problems. Several studies found moderating effects only at particularly high or low levels of certain temperament traits, for example Ren and Zhang (2017) found that only when children were low in persistence or high in emotionality was aversive parenting associated with increased externalising problems. Similarly, Engle & McElwain (2011) found both maternal and paternal punitive reactions were only linked to increased internalising behaviour in boys who were high in emotionality.

Discussion

The methodological quality of the papers included within the review were generally deemed to be similar across studies with some limitations that were noted across multiple studies. Several studies did not provide sufficient details regarding sampling methods therefore it was unclear if the studies could be generalised to the wider population. Similarly, the majority of studies appeared to have samples that were predominately well educated, white and representation of families from lower socioeconomic backgrounds appeared to be missing. Further, it was not possible to establish if there were different effects of parenting and temperament on the outcomes across different cultural contexts within this review. This was due to the fact the majority of studies came from the USA or Canada and explorations of this topic were limited from other countries, further there was such homogeneity in the variables explored direct comparison across countries was not feasible. A common critique of research is a bias to samples being recruited from Western, Educated, Industrialized, Rich, and Democratic (WEIRD) populations (Henrich et al, 2010). Cultural context is particularly pertinent in research exploring child rearing, as culture is thought to shape parenting beliefs and attitudes and subsequently parenting behaviour. Cultural nuances to parenting can be seen as adaptive to meet the demands and needs of the cultural context within which children are raised (Bornstein, 2012). Borstein (2012) argues against an ethnocentric perspective to parenting and highlights how considering cultural differences as key in understanding the interconnected processes between biology and environmental experiences.

Cohen and Varnum (2016) state that culture extends beyond nationality or ethnicity and contend that cultural variations can be seen on the basis of social class, region and religion and that these have bidirectional influences on psychological processes. There is research that highlights differences in parenting practices on the basis of socio-economic status and religion (Hoff et al, 2002; Petro et al, 2017). Further, parental education, income and employment status which are connected with socio-economic status (American Psychological Association, 2017) have all been linked to child development outcomes (Davis-Kean et al, 2021; Cooper & Stewart, 2021; Ruhm, 2004). A surprising finding of the review was that not one study came from a UK population, differences in parenting have been noted between Western societies (Harkness & Super, 2013). Further, social class which is often viewed as characteristically more dominant within British culture (Robson, 2016) is linked with parenting and subsequent child development outcomes (Cano, 2022), it is probable culturally informed parenting practices will differ in a UK population comparative to other Western societies such as the US.

Reviews of parenting literature between 1984-2015 have consistently found an absence of fathers within the literature (Phares & Compas, 1992; Phares et al, 2005; Parent et al, 2017). The results of this review were consistent with this picture. This is of concern as the findings from this review did indicate there were differences between mothers and fathers. Further, there is evidence that mothers and fathers differ in how they parent (for review see Yaffe, 2023). A meta-analytic review by Jeynes (2016) found significant unique contributions of fathers parenting and this contribution had the same effect across boys and girls. It was also found fathers parenting was associated with measures assessing psychological wellbeing and academic achievement, of note is the finding that fathers involvement reduced children's rates of delinquency and substance misuse. There was also evidence of differences in how fathers treat their daughter's comparative to their sons.

The majority of studies used self report measures for both parent and child variables. Common criticisms of self-report measures is that they can be subject to several biases, including perceptual, social desirability and recall bias (Zahidi et al, 2019). Social desirability bias may be attenuated in particular for measures of parenting, where participants may fear negative evaluation. Observational methods to assess parenting are often hailed as the best with arguments that they offer more objectivity (Fassnacht, 1982 as cited in Zahidi et al, 2019). However, observational methods are also subject to bias such as the Hawthorne effect (Parsons, 1974). In addition, they typically only cover a snapshot of a particular time period or context so may lack generalisability across time and context, coding of behaviours and interactions are also still open to subjectivity, further observational methods can be costly and time consuming to complete (Gardner, 2002). Given both observational and self-report measures are subject to different biases they may impact on study findings in different ways and direct comparison between the different methodologies may not be appropriate. Further, Zahidi et al (2019) argue that self-reports and observational methods may be capturing discrete constructs and therefore self-report measures should not be viewed as substitutable for observational methods.

It is notable that within this review parenting had the least consistency in in assessment comparative to the other variables explored, which may offer partial explanation for why the results of parenting on the two outcomes produced more insignificant findings than the temperament variables. Parenting may be particularly sensitive to changes across context and time. For example, Gardner et al (2012) hypothesises that changes to parental monitoring and expectations in the last three decades reflect adaptions to changes in societal changes to family context and structure. Further, the lack of consistency in assessment methods may also

represent variation in conceptualisations of parenting within the literature and fewer standardised/validated measures comparative to other variables. It does seem of concern that when standardised measures were not used or were changed by studies there was a lack of transparency about item measures, whilst it is important to recognise the constraints of word counts in published literature, this reduces replicability of research that may be using potentially new or helpful items.

The majority of studies used questionnaires to assess temperament and all studies used questionnaires for assessment of internalising and externalising problems. Similar to the finding with participants being primarily mothers the majority of questionnaires were completed by mothers. There is evidence that mothers and fathers reports on measures of temperament do demonstrate considerable agreement (Rothbart et al, 2001; Bayly & Gartstein, 2013). However, for internalising and externalising measures the evidence of parental agreement is mixed, with some reporting good agreement (Fält et al, 2018). A meta-analysis by Duhig et al (2018) found strong agreement for externalising problems but only moderate agreement for internalising difficulties. This indicates that gathering converging reports of children's internalising and externalising difficulties may be of benefit, particularly due to discrepancies in reports for internalising problems. Assessment measures of internalising and externalising problems were deemed appropriate in all studies.

For assessment of temperament, generally studies used validated measures, however as highlighted by Liang et al's (2019) study a challenge faced by researchers exploring temperament cross culturally is appropriate cross-cultural measures. Cheung & Cheung (2003) highlight how many personality measures used within Asian countries are 'imported' from Western societies. This may present an issue as the measures may not be validated within the target population and culturally specific personality traits may not be captured by them as they are based on Western norms. Translated measures, even those that are back translated pose a risk of measurement invariance as the underlying construct for the item may have different meanings across cultures, or translation has not accurately captured cultural nuances around how language is interpreted (Spector et al, 2015). A review by Dong and Dumas (2020) highlighted a lack of measurement invariance within personality measures studied cross-culturally, this means inaccurate conclusions may be being drawn within personality and potentially temperament research studied cross culturally.

Temperament traits that encapsulated higher propensities for distress such as difficult or negative affect were consistently associated with more internalising and externalising difficulties. Nearly all studies explored higher order dimensions of temperament (e.g. negative affect) and specific traits (e.g. anger) were rarely explored. Few studies explored more positive aspects of temperament but of interest is the finding that effortful control was linked to less externalising problems. Effortful control is thought to reflect aspects of executive function, and Zhou et al (2011) have argued they actually reflect the same construct but that different fields of research (temperament versus neuroscience) have resulted in a differentiation between the two concepts and propose a unitary model of self-regulation. A meta-analysis by Yang et al (2022) found longitudinal associations between executive function and externalising and internalising problems, with greater executive function predicting fewer problems.

Consistent with theoretical perspectives that highlight the reciprocal nature of parental and child influences on child development outcomes, the results of this review indicate that both parenting and child temperament play a role in internalising and externalising difficulties. Of note is that of the sixteen studies that explored both parent and child influences all but one found a joint effect of parent and child variables on the outcomes. This highlights the importance of research that is exploring these difficulties to consider both contributions of parents and children. There were some inconsistencies in how these patterns emerged, multiple studies found evidence for temperament as moderator in the relationship between parenting and the outcomes (Engle & McElwain, 2011; Galitto, 2015; Morris et al, 2002; Ren & Zhang, 2017; Wittig & Rodriguez, 2019; Yu et al, 2018). However, there was also evidence of moderating and mediating effects of parenting (Ato et al, 2020; Karreman et al, 2010; Liang et al, 2019; Loginova & Slobodskaya, 2021; Paulussen-Hoogeboom et al, 2008). This indicates that whilst we can conclude parenting and child factors play a role in these difficulties, deciphering the specific traits and how they interact requires further exploration. The results also indicate the importance of post hoc tests such as simple slopes or regions of significance in better understanding the interactions as for several studies interaction effects were only found at particularly high or low levels of temperament or parenting traits.

Limitations

There are some limitations of this review. Ascertaining further details surrounding sampling and also clarifying the measures used in studies that reported using modified measures could have been established via contact with the study authors. A further limitation

is that data extraction and quality appraisal was only conducted by the author, a more rigorous process would have been to have two individuals responsible for data extraction, appraisal and synthesis. A strength of this review is it represents one of the first known attempts to synthesise the data on parenting and child contributions to internalising and externalising problems and indicates areas that would benefit from further exploration in future research.

Recommendations for future research

The results of this review highlight the complex interplay between temperament and parenting on internalising and externalising problems. Several areas of further exploration have been identified through this review. A surprising finding was that no study could be found utilising a sample from the UK. There was generally a paucity of research exploring this topic cross culturally within other European countries and Asia with the exception of China. A need to explore, validate and develop culturally sensitive measures of parenting in particular was identified. All studies that explore this topic area should consider the bias within samples and future studies should consider the importance of recruiting nationally representative samples or over sampling from disadvantaged communities. Future research should also endeavour to increase the presence of fathers within the literature on parenting. An additional recommendation is to capture comparisons across parent, and child gender as unique interactions may be found.

There has been more of a focus within the literature on the impact of negative temperament traits on the risk for internalising and externalising problems. It would be of interest to future researchers to consider the impact between more positive attributes of temperament and parenting on internalising and externalising problems. The review revealed temperament traits captured even several years earlier do have the ability to predict problems much later. As research indicates early intervention and prevention strategies for mental health are less economically intensive, and there is evidence that parenting interventions can be efficacious in preventing childhood anxiety (Mihalopoulos et al, 2011). Longitudinal studies may provide a rich evidence base to highlight targets of future early intervention programmes.

Objectives of the Present Study

Review of research in this field indicated no prior study has explored this area within a UK sample. There are acknowledged cultural differences in parenting even between Western

countries (Harkness & Super, 2013) and so it was of interest to establish if a UK sample would reveal similarities or differences to previous literature.

The purpose of the present study was to further contribute to the literature pertaining to child and parenting influences on internalising and externalising problems. As discussed above broad dimensions of temperament (particularly negative affect and difficult temperament) frequently yield significant findings in the relationship with internalising and externalising problems. However, the study of specific narrower facets of temperament appear understudied, as do more 'positive' temperament traits. There is evidence that delayed gratification, risk aversion and patience have links with internalising and externalising problems, yet there is a lack of research exploring these traits, particularly how they interact with parenting. Therefore, this study focused on four temperament traits; negative affect, risk aversion, delayed gratification and patience.

As discussed in the above review there is evidence that earlier assessed temperament traits can predict future internalising and externalising problems. Therefore, this study also sought to establish if temperament assessed at an earlier age would predict later internalising and externalising problems. This study was interested in how child temperament and parenting individually influenced internalising and externalising difficulties in isolation within a UK sample. However, based on the above research and the indication that there is an interaction between parenting and child temperament on the outcomes of internalising and externalising difficulties, this study was specifically interested in the contribution of both parent and child temperament on these outcomes. Given the research that parents can parent differently on the basis of gender and that there are gender differences in internalising and externalising problems, this study aimed to consider gender of both parent and child in every analysis.

This study aimed to address the gap within the literature by exploring child temperament and parenting influences on internalising and externalising problems within a UK sample. The research had three objectives:

1) To identify if temperament (risk aversion, delayed gratification, patience and negative affect) assessed at age 3 could predict internalising and externalising problems assessed at age 5.

The following hypotheses were made for each variable on each outcome:

Risk Aversion: Children rated as more willing to take risks will have more externalising problems. Children rated as more risk averse will have more internalising problems.

Patience: Children rated as having more patience would have fewer externalising problems. No hypothesis was formed regarding patience and associations with internalising problems.

Delayed Gratification: Children rated as more impulsive (less able to delay gratification) would have more externalising problems. Again, no hypothesis was formed about if delayed gratification would be associated with internalising problems.

Negative Affect: Children who had higher ratings of negative affect were predicted to have more externalising problems. It was hypothesised negative affect would also be positively associated with internalising problems.

2) To identify if positive parenting was associated with internalising and externalising problems of children aged 5, considering the gender of the parent and child.

It was hypothesised children who had parents with higher ratings of positive parenting would have fewer internalising and externalising problems. It was anticipated there may be different effects based on parent and child gender interactions.

3) To explore the interaction between the four temperament traits and positive parenting on the outcomes of internalising and externalising problems, with consideration to parent and child gender.

The hypothesis for this objective was two tailed, the researcher anticipated there would be an interaction effect between parenting and temperament, but was unsure which temperament traits would interact with positive parenting on the two outcomes. Based on prior literature, it was anticipated that interactions may only be significant at certain levels of temperament by parenting interactions. For example, positive parenting and patience may only be significant at predicting internalising problems when there are high levels of positive parenting but not a low and mean levels of positive parenting. It was again hypothesised there may be differences on the basis of parent and child gender.

In the next section the methodological approach is described, and in chapters 4 and 5 the results and conclusions are presented, respectively.

Chapter 3: Methods

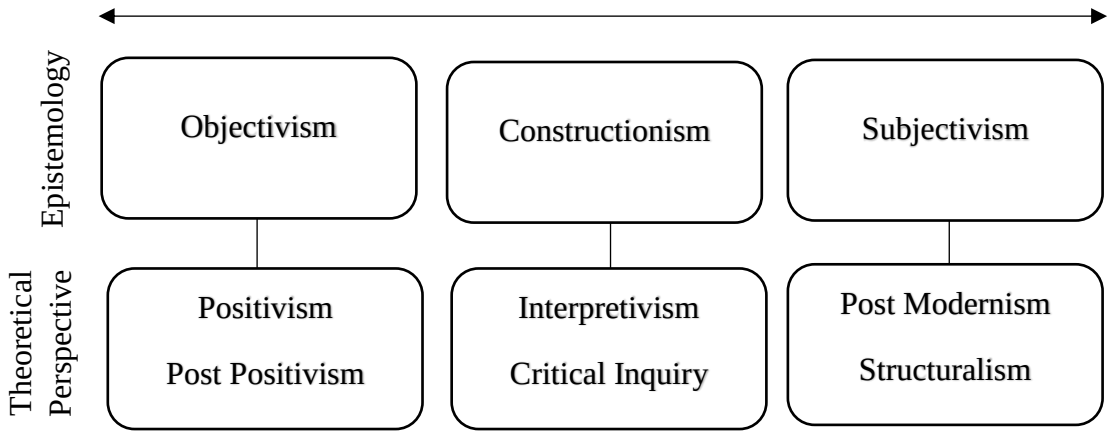
Epistemological position

Epistemology is defined as "the philosophical study of the nature, origin, and limits of human knowledge. The term is derived from the Greek epistēmē ("knowledge") and logos ("reason"), and accordingly the field is sometimes referred to as the theory of knowledge" (Martinich & Stroll, 2023, Introduction section). According to Crotty (1998; cited in Feast & Melles, 2010) four elements constitute the research process; epistemology, the theoretical perspective, methodology and methods, with each element informing the subsequent element. Epistemology can be viewed as lying on a continuum with objectivism at one end and subjectivism at the other.

Objectivism deduces that there is an objective reality and that this reality is external to the individual and separate from human experience, objectivism has close links with realism (Jonassen, 1991). Subjectivism by contrast would view reality as constructed by the individual, and the construction of meaning is influenced by the time/place or culture within which it occurs (Haynes, 2017). It is important to highlight that the epistemological position represents a spectrum of approaches opposed to distinct unified categories (Feast & Melles, 2010). Figure 2 depicts this spectrum and provides examples of theoretical approaches that can arise from different epistemological positons.

Figure 2

Epistemological positions and examples of theoretical perspectives that may arise from them



Note: Figure taken from PHD centre (n.d.) and Feast & Melles (2010).

Quantitative research has its roots in positivism, which asserts there is a singular truth (or reality) and this can be objectively measured (quantified). In this perspective the researcher sits outside of the research, and does not influence and nor is influenced by the enquiry as the truth is objective (Moroi, 2021). This theoretical perspective gives rise to experimental and survey research to measure quantifiable information that can be used to test a hypothesis (Crotty, 1998; cited in Feast & Melles, 2010). In regards to methodology this study sits within a positivist stance of research. However Cresswell and Poth (2018, p.15) state "whether we are aware of it or not, we always bring certain beliefs and philosophical assumptions to our research". They also acknowledge how our experiences can shape the focus of our research and how we go about conducting it (Cresswell & Poth, 2018).

Whilst this research and its methodology and methods are grounded in a theoretical perspective of positivism. I acknowledge the subjective component of the wider aspects of this research. It is widely acknowledged that self-report measures are often culturally specific in that the phenomena they are measuring, how that phenomena is viewed and responses individuals give are shaped by the culture in which they are taken (McNabb, 1990; Fischer, 2004). An example of this is within literature surrounding attachment. Attachment theory and subsequent measures of attachment types have been criticised as not being culturally sensitive and as reflecting Westernised ideals of individualism (Keller, 2013; Agishtein & Brumbaugh, 2013).

Further, it is important to acknowledge that many of the concepts drawn upon in this research are socially constructed. For example, race does not reflect biological differences but is rather a social construct, that has been used as a tool for oppression (Braveman & Dominguez, 2021). Psychiatric diagnosis is also a social construction (Eisenberg, 1988; Cooksey & Brown, 1998) and diagnostic labels have been critiqued as harmful and oppressive (Watson, 2019). Critiques have advocated for a move away from a medical understanding of human distress (i.e. 'what is wrong with you?') towards a perspective that views distress as understandable within the context of an individual's life experiences (i.e. 'what has happened to you?') (Johnston & Boyle, 2020).

In accordance with the notion that many aspects of this research encompass ideas that are socially constructed and that the use of certain terminologies may have historic or current roots in oppressions of individuals and communities. I have attempted in this research to be mindful of the use of language. Whilst the term internalising and externalising disorders is

common within the literature, the use of the terminology of disorder, particularly in reference to children's difficulties is viewed as unhelpful and pathologising. The researcher takes the stance that internalising or externalising difficulties (or problems) are reflective of emotional distress expressed in different ways and not of some inherent pathology or disorder held by individuals. Further, the perspective taken is that these difficulties are normal human emotional reactions to experiences that make sense and are understandable within the context of that individuals experiences and the system in which they sit. Whilst the researcher has tried to be cautious around language, they acknowledge that what is deemed acceptable can change across time and context. The use of the term racialised minorities or identities and ethnic minorities has been used within this research as this reflects the current preference held by these communities.

I reflect that the term that may better reflect my position in conducting this research may be that of critical realist. Critical realism has been positioned as an alternative to the extremes of positivism and post modernism in that it recognises there is an objective reality but that this reality cannot be fully known and that causal mechanisms that influence reality can sit outside of our awareness (Pilgram, 2014). From a critical realist perspective mental health is both real and also a social construction. Such that a diagnostic label may be socially constructed but the underlying emotional distress is very much real. A positivist view would be that there are observable cause and effect. A critical realist perspective would recognise that there may be a complex interplay between causal mechanisms, and some of these mechanisms may go beyond our awareness (Bergin et al, 2008). In conducting this research I am attempting to better understand some of the causal mechanisms at play but recognise there are wider influences both beyond the scope of this research and beyond what may be objectively measurable.

Design

This study will use secondary data analysis of information collected by Understanding Society. Understanding Society, the UK household Longitudinal Study (UKHLS) is a panel survey that collects information from UK households annually. The study began in 2009 and started with a population sample of 40,000 households from all over the UK (Benzeval et al, 2023). Each annual interview is referred to as a wave. Data for this study is available from waves 1- 12 (Jan-2009-May 2022). At wave 12 21,161 households participated in the survey (Carpenter, 2022).

UKHLS collates data on economic, behavioural and social factors to allow for multidisciplinary research on a range of topics and subjects. Data is collected on all residents of each household as long as they remain living within the UK. This includes data on any children residing within the household (Benzeval et al, 2023).

Data collection procedure

Each wave of data collection takes place across a 24 month period, for example data collection for wave 1 took place between 2009-2010 (All households take part annually in the same quarter as the previous year (Carpenter, 2021).

At each wave a range of questionnaires are administered including a household questionnaire, adult questionnaire and a youth questionnaire (for anyone aged 10-15 years). In addition, a household enumeration questionnaire is completed to establish members of the household and relationships between household members (Boreham et al, 2012). For the majority of waves, data collection primarily took place face to face using Computer Aided Personal Interviewing (CAPI). Computer-Assisted Self Interviewing (CASI) was used for self-completion sections of the questionnaires, alongside paper self-completion questionnaires for youths (Scott & Jessop, 2013). From wave 3 onwards Computer-Assisted Telephone Interviewing (CATI) was introduced for the purposes of maximising engagement with the survey. Participants who had not been available for face to face interview were followed up by phone and alongside a small number of households who had expressed telephone interview as their preference. At wave 7 online interviewing was introduced for the first time allowing participants to take part in web surveys (Carpenter, 2017).

Prior to the COVID-19 pandemic, data collection was still primarily conducted face to face within participant's homes, with the exception of a small number of households who took part via online or telephone interviews. During wave 11 (January 2019-May 2020), all face to face interviews were suspended after March 2020 in concordance with UK government lockdown restrictions and instead conducted online or via telephone. This meant during wave 11, 79% of interviews were completed online or via telephone (Carpenter, 2021). By wave 12 98% were completed either online or via telephone (Carpenter, 2022).

As an incentive to take part, participants receive either a £10 or £20 gift card (amount dependent on whether they have previously participated in the study) at each wave of data collection for their participation in the study (Carpenter, 2022). To minimise loss of participants

due to change of address, participants are also offered a £5 gift voucher if they move and provide updated address details (Scott & Jessop, 2013).

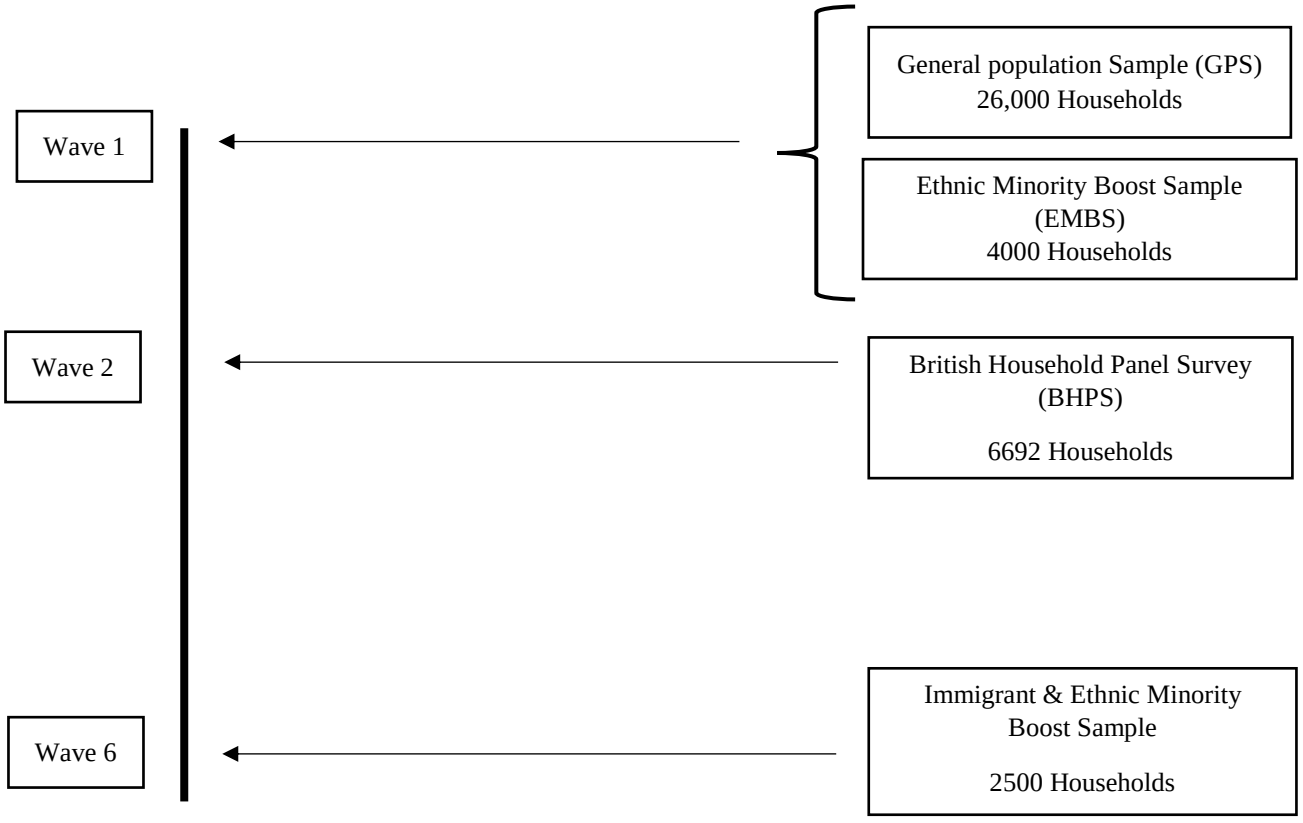
Sample

The UKHLS sample consists of four components, the General Population Sample, Ethnic Minority Boost Sample (EMBS), Former British Household Panel Survey (BHPS) sample, and the Immigrant and Ethnic Minority Boost Sample (Lynn, 2009). Figure 3 shows how many households are in each sample and when they were added into the main survey.

The General Population Sample (GPS) consists of 26,000 households from England, Scotland, Wales and Northern Ireland that were identified in 2009 when the UKHLS began. Sampling methods for the GPS were designed to produce a sample that is representative of the general UK household population. Households from England, Scotland and Wales were selected within 2 stages, in the first stage postal sectors were selected and in the second stage addresses were selected from these sectors.

Figure 3

Four components of UKHLS mainstage sample



There are approximately 9000 postal sectors within Great Britain. During the first stage, any postal sector that had less than 500 addresses was combined with a neighbouring sector. These sectors were then grouped into 12 regions based on nine Government Office regions in England (with London being split into two), Scotland and Wales. The 12 regions were then divided into three sub-strata (producing 36 further sub-strata), on the basis of the number of individuals within households that were classified as non-manual workers (based upon 2001 census information). These 36 sub-strata were further split into 108 sub divisions on the basis of population density. These sub divisions were then ordered on the basis of ethnic minority density (again drawing on 2001 census data). It was deemed important to proportionally stratify postal sectors on the basis of Government office regions, social class, population density and ethnic minority as it was anticipated these would likely correlate with several survey measures.

During the second stage, systematic random sampling was used to first identify 2640 sectors and then to identify 18 households from each of these sectors, producing a total of 47,520 addresses from England, Scotland and Wales. In addition, 2400 households from Northern Ireland were systematically selected from a national list of domestic addresses. From the identified addresses sample members were then identified by field interviewers. A total of 26,000 households were identified and consented to take part (Lynn, 2009).

The Ethnic Minority Boost Sample (EMBS) was included in the UKHLS at wave 1 alongside the GPS, and was designed to increase the number of adults in the survey from Pakistani, Bangladeshi, Indian, Caribbean, and African backgrounds. Similar to the GPS the EMBS sample was drawn from postal sectors. 3145 postal sectors thought to contain high proportions of individuals from ethnic minority groups were identified, sampling fractions and postcode stratification were then used to further narrow down this sample. In the final stages addresses were selected at random and members were identified by field interviewers. This resulted in the identification of a final boost sample of 4000 households. These methods were chosen in order to ensure equal representation from individuals from each of the targeted backgrounds (Berthoud et al, 2009).

The British Household Panel Survey (BHPS) began in 1991 and originally consisted of a sample of 5500 households, the BHSP ran for 18 waves up until 2008. It is important to note that the BHSP sample had additional boost samples added during the course of the survey (Lynn, 2009). Households from the BHPS were invited to take part in the UKHLS and joined the UKHLS sample in 2010 at wave 2 and this consisted of 6692 households (Boreham, 2012).

The Immigrant and Ethnic Minority Boost Sample includes individuals born outside of the UK and those from Indian, Pakistani, Bangladeshi, Caribbean, and African backgrounds. This sample was added to the main survey sample at wave 6 and includes approximately 2500 households. This sample utilised a similar method as described for the EMBS. Households were screened by field interviewers and were eligible for inclusion if at least one member of the household was an immigrant or from an ethnic minority background (Lynn et al, 2017).

For all samples when new individuals move into a household they are invited to be included in the survey, for as long as they are living in that household. If an individual who is not part of the survey has a child with someone who is part of the survey they are also invited to become sample members as they are able to provide key information about their children.

Parents or responsible adults are asked to provide information about children under the age of ten who live in their household. From wave 3 (2011-2012) onwards, a series of child development questions were asked. Child development questions are asked only at specific ages; 3, 5 and 8 years old (University of Essex, Institute for Social and Economic Research, 2023). Previously this data would have been stored in multiple files for the multiple waves of data collection. Understanding Society has now collated this information into a specific file known as the Pregnancy and Early Childhood (PEACH) dataset. The PEACH dataset has been created using data reported in the child file (main survey, waves 1 to 12). PEACH stores data in wide format so that data is easily accessible about individuals across multiple waves of data collection (University of Essex, Institute for Social and Economic Research, 2023).

The PEACH dataset provided the following information which was relevant to this study:

- Child temperament variables collected at age 3
- Child gender
- Outcome data collected at age 5 (Strengths and Difficulties questionnaire)
- The wave in which child information at age 3 and age 5 was collected

The following files available via Understanding Society were merged with the PEACH data set to provide additional information:

- The egoalt file contains information pertaining to the relationships between study participants and was linked with PEACH to establish each child's biological parents.

- The indresp file provides information about parent's age, marital status, employment status, education and parenting behaviour.
- Child ethnicity was identified using the xwavedat file.

Data from these files were merged with PEACH in wide format to keep information at the individual child level.

Eligibility

To be eligible for inclusion in the PEACH file children need to be potential respondents to at least one of the child development age group questions captured at 3, 5 or 8 years (University of Essex, Institute for Social and Economic Research, 2023). A child aged 6 years or older at wave 1 would not be eligible for inclusion as child development questions were not asked until wave 3, and they would be more than 8 years old at this data collection period. A total of 32,192 children have been included in Understanding Society between waves 1-12. Of these, 18,969 are included within the PEACH dataset. For the purpose of this study further exclusion criteria was if any of the independent or dependent variables or covariates were missing. As gender was controlled for at each analysis, children's data was excluded if the child's gender was recorded as inconsistent. This would have occurred if for example they were recorded as male at one wave and female at a later wave.

Measures & Variables

Outcome Variables: Internalising and Externalising Problems

The Strengths and Difficulties Questionnaire (SDQ; Goodman, 2001) is a 25 item questionnaire that is designed to assess behavioural and emotional difficulties in children aged 3-16. In UKHLS the SDQ is completed by the child's primary caregiver when the child is aged 5 and 8 years old. For the purpose of this study only the outcome data collected at age 5 was used.

The questionnaire consists of five subscales each containing five items; hyperactivity, conduct problems, peer relationship problems, prosocial behaviour and emotional problems. Each item consists of a statement, for example 'child is restless, overactive, cannot stay still for long' with possible responses ranging from not true, somewhat true, certainly true and can't say. These responses are scored from 0-2 and scoring of responses varies for each item. For example, for some items 0=not true, 1=somewhat true and 2=certainly true, whereas for others

these items are reversed. Each subscale is calculated by taking the sum of each item of that scale. A copy of the SDQ is provided within appendix D.

The sum of the subscales of emotional problems and peer relationship problems is indicative of internalising difficulties. Conduct problems and hyperactivity subscales are added to give a score indicative of externalising problems. Table 6 provides a summary of the scoring ranges and interpretation for all outcome (internalising and externalising problems) and independent variables. SDQ scores can be used as continuous or categorical variables; a four-fold classification has been generated and validated within a UK sample (Terapia, 2020).

Table 8

Summary table of independent and outcome variables, scoring ranges and interpretation.

		Scoring range	Interpretation
Outcome Variables	Internalising Problems	0-20	Higher scores indicate increased internalising difficulties
	Externalising problems	0-20	Higher scores indicate increased externalising difficulties
Independent variables	Risk aversion	1-7	Higher scores indicate more risk aversion (the child is less willing to take risks)
	Delayed Gratification	1-7	Higher scores indicate more impulsivity (low levels of delayed gratification)
	Patience	1-7	Higher scores indicate more patience
	Negative affect	3-12	Higher scores indicate more negative affect
	Positive Parenting	9-38	Higher scores indicate more positive parenting

For the purpose of this study SDQ scores will be treated as continuous variables, with higher scores indicating the presence of more difficulties. To utilise the data as categorical involves imposing an arbitrary 'cut-off' for classification resulting in a loss of important information (Altman & Royston, 2006). Kraemer et al (2004) highlight the increased amount of information and statistical power that is available when using continuous over categorical variables. For example, statistical analysis can yield significant or non-significant results dependent on where a given 'cut off' point is when using a categorical classification. A criticism of dichotomous approaches to psychological distress is that they miss the true continuum of phenomena that is seen within a population. Further, given that services that work with children draw upon a dimensional approach to understanding distress opposed to drawing on distinct diagnostic categories, conceptualising internalising and externalising difficulties as lying on a continuum better reflects current thinking and practice around how distress within children can be best understood.

The SDQ is one of the most widely used questionnaires both clinically and in research to assess emotional and behavioural difficulties (Stone et al, 2010) and has been shown to have concurrent validity with Rutter Behaviour Scales (Goodman, 2006). The Rutter Behaviour Scales (Elander & Rutter, 1996) are a well-established reliable and valid measure of child behavioural problems that are frequently used to assess for child emotional and behavioural problems (Muris et al, 2003). Comparison between Rutter Behaviour Scales and the SDQ showed that converging reports by parents and teachers were comparable or more favourable for the SDQ (Goodman, 2006). Further Nielsen et al (2019) found the SDQ was able to identify children between ages 5-7 years at increased risk of receiving a mental health diagnosis by preadolescence and recommended it to be a useful screening tool for identifying at risk children. Predictive validity was also found by Sharp et al (2005) who found parental and teacher reported scores on the SDQ predicted parental help seeking behaviour one year later.

A review by Stone et al (2010) found strong correlations between the SDQ total difficulties and the child behaviour checklist (CBCL) total scales. Externalising subscales on the SDQ and CBCL were also found to have strong correlations. However, it is of note that correlations for the subscales of internalising difficulties were below 0.7 for the SDQ and CBCL. They also found acceptable internal consistency, satisfactory test-retest reliability and interrater reliability although modest was reportedly better in comparison to other measures of child behavioural and emotional difficulties. The majority of the studies within the review also

supported the construct validity of the five factor model (hyperactivity, conduct problems, peer relationship problems, prosocial behaviour and emotional problems) (Stone et al, 2010).

Independent Variables: Child Temperament

When children reach ages 3, 5, and 8 the child's primary caregiver provides information about their child's temperament and development. For the purpose of this study only temperament information collected when the child was age 3 was used. Statements about their child's temperament are presented to caregivers and they are asked to indicate on a likert scale where they would place their child in relation to these statements. Statements indicative of child temperament have been adapted from the Mother and Child Questionnaire developed by the German Socio-Economic Panel (SOEP) (Goebel et al, 2018).

Three questions are used to assess child's risk aversion, patience and delayed gratification (impulsivity) these are detailed in appendix E.

Negative affect is a trait that has garnered particular attention within literature exploring links between temperament and internalising and externalising difficulties. Therefore, responses to three additional statements were utilised to generate a composite score of negative affect. These statements and potential responses are detailed in appendix F. Table 8 provides a summary of potential scoring ranges and the interpretation of these for all independent (including child temperament variables) and outcome variables.

In order to create a negative affect score where higher scores indicated more negative affect, the scores to 'child is easily irritated and cries' and 'the child is difficult to comfort' were reverse coded. It was deemed theoretically appropriate to create a composite score on the basis of these three variables as they map on to aspects of high emotional intensity and negative affect. Negative affect can be viewed as a higher order dimension that consists of a broader set of temperamental characteristics; including anger, frustration, sadness and difficulty in being soothed (Rothbart & Bates, 2007).

In contrast, delayed gratification (or impulsivity) is one of the fifteen primary traits that contribute to the higher order factors of negative affect, surgency and effortful control on the Children's Behaviour Questionnaire (CBQ; Rothbart et al 2001). Similarly, there is evidence that patience constitutes a component of broader categories of personality however, there is a paucity of research exploring links between this trait and mental wellbeing. For example, the superordinate personality trait of agreeableness in both the big five model of personality and

the HEXACO model is thought to encapsulate patience (and studies have found positive associations between patience and agreeableness (Fisher Dilalla, et al, 2021). There is less conceptual agreement surrounding risk aversion and conversely risk taking and what these terms actually represent and whether they form a multidimensional construct or unitary concept (Frey et al, 2017). Literature has found links between risk taking/aversion and personality traits including the big 5 (Nicholson et al, 2005; Pavlíček, et al 2021). Further, Frey et al (2017) argues that risk preference reflects a stable psychological trait. Risk aversion has been linked with internalising difficulties, most notably anxiety (Tieskens et al, 2021; Lorian & Grisham, 2012; Maner et al, 2007). Therefore, despite a lack of theoretical agreement surrounding the concept, it was considered appropriate to include this variable as literature indicated it might have important links with the outcomes of interest.

Independent Variable: Parenting Behaviour

Since wave 1 Understanding Society has collected self-report information about parenting behaviours and practices. This information is collected at every other wave (1, 3, 5, 7, 9, 11) (Aguirre et al, 2024). Nine items about parenting behaviours were combined to create a positive parenting behaviour index. Previous researchers have used this index to explore parenting behaviour (Aguirre et al, 2024). A separate score was generated for fathers and mothers to allow for comparisons based on parent gender during analysis. The items included within this index, potential responses and the scoring are detailed in appendix G. Table 6 details the scoring ranges and the interpretation of these for all independent (including positive parenting) and outcome variables.

The items asked are not child specific, parents are only asked the set of questions once if they have children under 16 and asked to report on their parenting of their children rather than give responses about their behaviour with each individual child within the household.

Scoring was reversed for items 1, 2, 3 and 6. In addition, to ensure equal weighting of each item, responses to item 2 (how often do you and your child spend time together on leisure activities?) were grouped to ensure that as with all other items the maximum score would be four. Responses were recoded as follows:

- 1= Never/rarely or once a month or less
- 2=Several times a month
- 3=About once a week

- 4=Several times a week or daily

Following this a total positive parenting score was created by taking the sum of all nine items. A higher score represented more positive parenting and a lower score represented less positive parenting.

During data management it was found that although many parents had a total positive parenting behaviour score this was not always available for the wave when their child was age 3. The data management software was programmed to fill in missing parenting behaviour scores from the closest available wave prioritising obtaining this information from the wave prior to age 3 data collection. For example if temperament data of the child at age 3 was collected at wave 5, the software would first seek a score from that wave. However, if this was not available it would then seek information from wave 3, then from wave 7. If this was still not available it would then try to obtain data from wave 1, then wave 9, then following this continue up until wave 11.

The rationale for obtaining parenting scores from different waves was to maximise the amount of participants that could be included within analysis. This was seen appropriate as theorists have emphasised the role of parent personality on parenting behaviours and functioning (Vondra et al, 2005). For example, Spry et al (2023) found evidence that preconception personality traits were associated with various elements of parenting, including parental self-efficacy, parental functioning and parent infant-bond. Further, van Aken et al (2007) evidence that parenting mediated the relationship between boys externalising problems and parents personality. Research indicates that following changes during young adulthood, from around age 25 years personality generally shows stability across time (see Bleidorn et al, 2022 for a meta-analytic review) and parenting is linked with personality, inferring some stability within parenting. Additionally, there is also evidence that parenting practices do endure across time and children. For example, Holden & Miller (1999) conducted a meta-analysis to explore stability of parenting, they identified a total of 89 longitudinal studies that explored parenting stability and change across time (n=56), children (n=13) and context (n=20). They found that there is stability in parenting and in particular this is more notable across time and children and to a lesser extent context. They concluded a snapshot of parenting has utility in capturing enduring qualities. Therefore, it was deemed theoretically appropriate to maximise data by pulling information from different waves.

Covariates

The covariates chosen to be entered into the regression models were selected on the basis of literature indicating links between these variables and child mental health and wellbeing. For example, Holstein et al (2021) found that consistent with prior reviews exploring parental education and child mental health, low parental education increased the risk of children receiving a diagnosis of a mental health condition. The picture for parental employment is less clear but a synthesis of the research into parental employment and child wellbeing outcomes by Heinrich (2014) indicates parental employment may have either positive or negative impacts on child outcomes dependent on a range of factors (such as type of employment, occupational stress, financial pressure and amount of hours worked).

Utilising data from the Millennium Cohort Study, Kiernan and Mensah (2010) found that children who had lived in households where the parents had been married throughout the first five years of their life were less likely to exhibit externalising problems, the risk of internalising problems was increased in children who grew up in single-parent families. McGrath et al (2014) followed over 2 million individuals born from 1955 to 2006 and found that individuals who were born to younger or older parents were at increased risk of experiencing a diagnosable mental health condition; the risk was lower in individuals whose parents were aged 25-29 at birth. A review by Bignall et al (2019) reported that evidence indicates an increased prevalence of mental health problems in individuals from racialised backgrounds. Further, routes into mental health services can vary across ethnic backgrounds as can access to provision of mental health support.

On the basis of the above research the covariates of parental education, employment status, marital status, parental age and child ethnicity were chosen for inclusion. All covariates were obtained from when the child was age 5 (the same age as when outcome data was collected) to control for how they may influence these outcomes. Parent information was captured for both parents so covariates for mothers and fathers could be entered into the corresponding models.

Parental Education: There were five possible categories for parental education; no qualification, other qualification, lower secondary (this would be equivalent to GCSE's), upper secondary (this would be equivalent to A Levels) and degree or higher.

Employment status: Excluding refusal to answer or missing data there are 15 possible categories captured by Understanding Society for employment status (Understanding Society, 2024). For the purpose of this study these categories were dichotomised into employed or

unemployed. Employed captured both full time and part time employment and self-employment. Unemployed included all remaining categories, which included but was not limited to; maternity leave, long term sick, retirement and being a student.

Marital status: Participants over the age of 16 can fall into one of 11 possible categories for marital status in Understanding Society (this includes divorce, civil partnership and being widowed etc.). For the purpose of this study, these categories were dichotomised into falling under the category of single/separated or married/living with a partner. Married or living with a partner encapsulated marriage, civil partnership and living as a couple.

Parental age: This was captured at the same time point as when their child's age five outcomes were collected.

Child ethnicity: Understanding Society has 18 categories to identify ethnicity. Due to small subsamples ethnicity was dichotomised into individuals from white backgrounds and individuals from an ethnic minority background.

Analysis

A series of Pearson's correlations were run to explore the relationship between the independent variables and the outcome variables. All independent and dependent variables were standardised to minimise multicollinearity and allow for comparison across different scales. As covariates included both categorical and continuous variables a series of linear regressions were run to establish relationships between covariates and the outcome variables. Independent two sample t-tests were run to explore if there were any gender differences on internalising and externalising scores and if there were any differences between mothers and fathers positive parenting scores.

Multiple linear regression analysis was used to explore the contribution of temperament, parenting and the interaction of these variables to the outcomes. A total of eight regression models were run; four for each outcome variable (internalising and externalising problems). For each outcome variable two analyses were run for boys, one for mothers parenting variables and one for fathers and two for girls, again with parenting variables run separately for mothers and fathers. Running regression analysis separately for parent gender was based on prior literature which indicated mothers and fathers parenting may have different effects on boys and girls, further it reduced the number of predictors within each regression. Predictors were entered into the regression in blocks. Figure 4 depicts the variables entered in each block. In

the first block all temperament variables collected at age 3 were added, in the second block the positive parenting score was added, in the third block interaction terms between the temperament variables and the parenting score and lastly in the fourth block all covariates were added. The benefit of adding variables in blocks, is that the contribution of each group of variables to the overall variance of the model can be considered. Table 9 shows the specific variables entered for each regression analysis. Finally, to further explore any significant interaction terms between parenting and temperament, simple slope tests were run exploring parenting and temperament variables at low (1 standard deviation [SD] below the mean), mean and high (1 SD above the mean) levels. All data management and analysis was conducted using Stata/MP 18.0 (StataCorp 2023).

Figure 4

Variables entered in each regression analysis

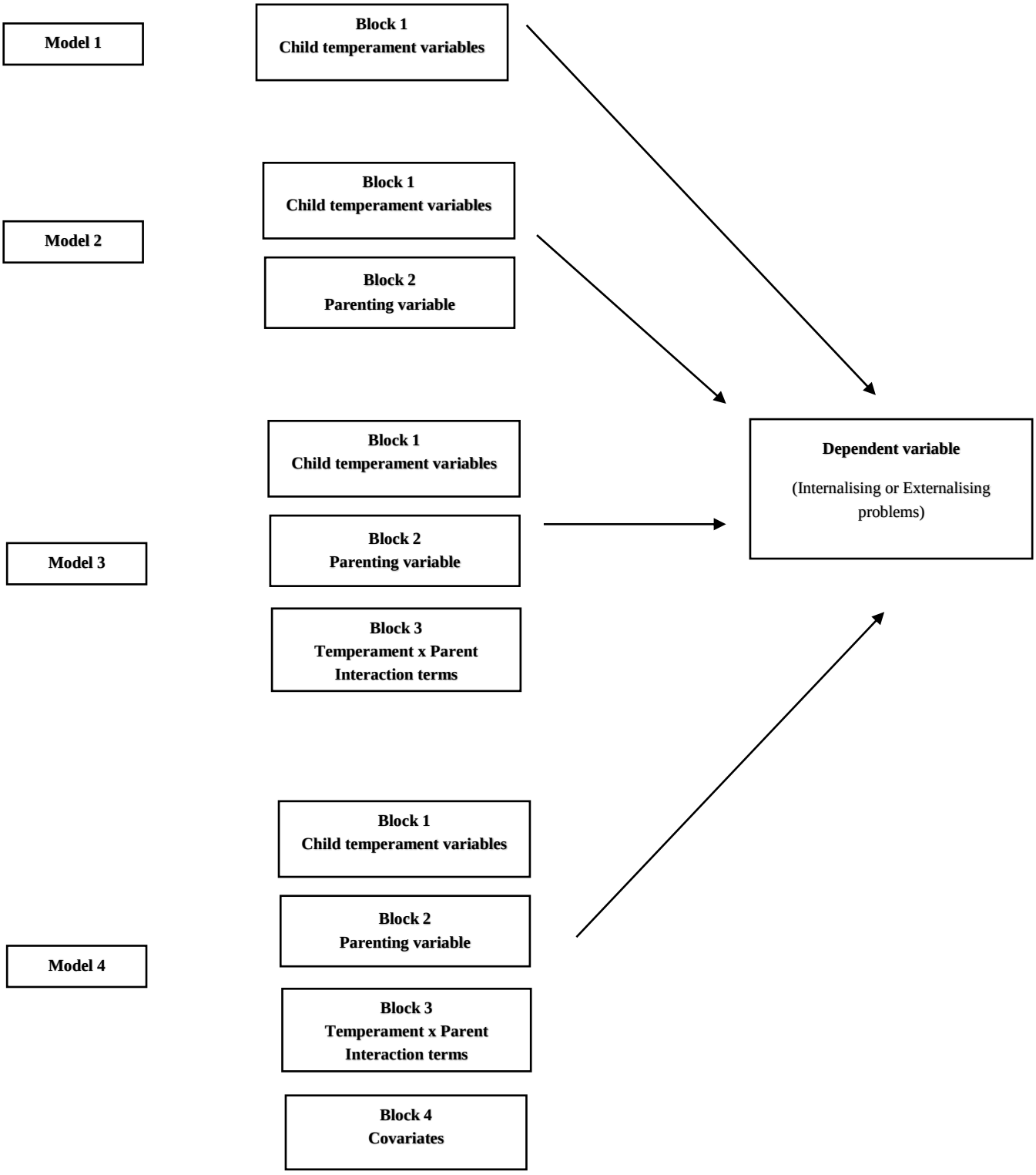


Table 9

Variables included in each regression analysis

Dependent variable:	Block 1	Block 2	Block 3	Block 4
Boys Internalising problems	Boys temperament variables: risk aversion delayed gratification Patience Negative affect	Mothers positive parenting score	Interaction terms: Mothers parenting score x Temperament variables	Covariates (parent specific) Mother's education Mother's Employment Child Ethnicity Mother's marital status Mother's age
Boys Externalising problems				
Boys Internalising problems		Fathers Positive parenting Score	Interaction terms: Fathers parenting score x Temperament variables	Covariates (parent specific) Father's education Father's Employment Child Ethnicity Father's marital status Father's age
Boys Externalising problems				
Girls Internalising problems	Girls temperament variables: risk aversion delayed gratification Patience Negative affect	Mothers positive parenting score	Interaction terms: Mothers parenting score x Temperament variables	Covariates (parent specific) Mother's education Mother's Employment Child Ethnicity Mother's marital status Mother's age
Girls Externalising problems				
Girls Internalising problems		Fathers Positive parenting Score	Interaction terms: Fathers parenting score x Temperament variables	Covariates (parent specific) Father's education Father's Employment Child Ethnicity Father's marital status Father's age
Girls Externalising problems				

Participants

Of the 18,969 children in the PEACH file only 3220 children had all available data needed for analysis. The primary reason for this was because as the data needed for the study had to be available at certain ages and not all children in the sample had been part of the study at the age for inclusion, this data was never collected and this naturally excluded many children from the sample used. This meant the majority of children were excluded from the sample on the basis of either missing child temperament variables or outcome variables (SDQ scores), very few children had missing ethnicity or gender information. After excluding children with missing data, children's information was matched with parent data, a small proportion of the sample (n=80) did not have any available parenting data so these children were further excluded, this resulted in a final sample size of 3140 children. Figure 5 shows the final sample and four sub-samples obtained for analysis.

In order for the sample to be considered representative of the general population weights need to be used. However, at the time of analysis Understanding Society did not provide weights for child data (Institute for Social and Economic Research, 2022). Therefore, this sample cannot be considered representative of the general population. List wise deletion was used to manage missing data although this could potentially cause bias in the remaining sample, the amount of participants excluded due to this method was very small. Further, as this study was exploratory in nature it was considered that the results could still provide useful information despite these potential biases.

Tables 10 and 11 provide the sample characteristics for the study participants and their parents.

Figure 5

Sample size of total sample and subsamples for each regression model

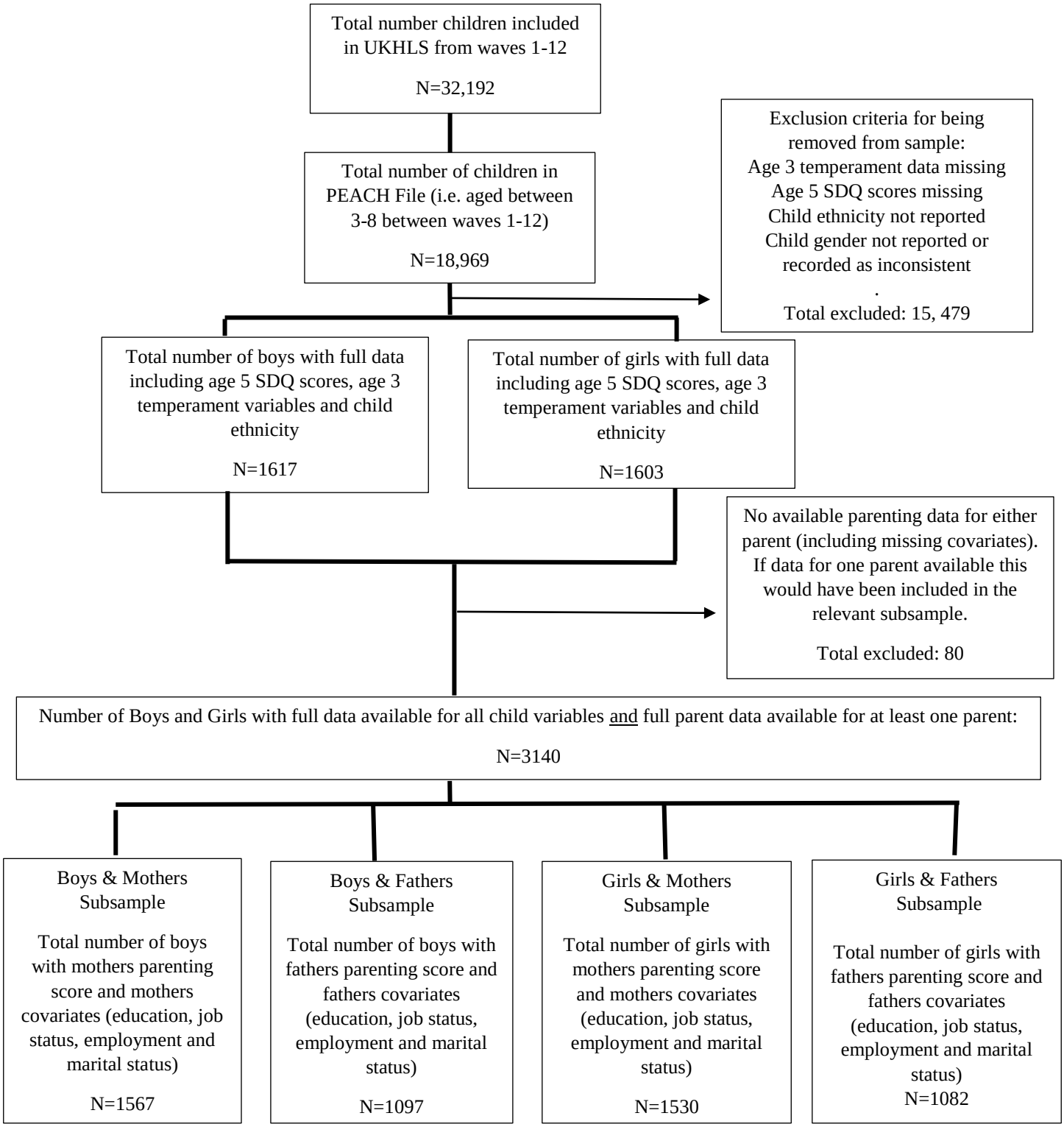


Table 10

Demographic information of final sample

Variable	n	%
Gender		
Boys	1583	50.41
Girls	1557	49.59
Ethnicity		
White	2381	75.83
British/English/Scottish	2291	72.96
Irish	41	1.31
Any other white background	49	1.56
Ethnic Minority	759	24.17
White & Black Caribbean	38	1.21
White & Black African	17	0.54
White & Asian	61	1.94
Any other mixed background	244	7.77
Indian	97	3.09
Pakistani	110	3.50
Bangladeshi	47	1.50
Chinese	9	0.29
Any other Asian Background	24	0.76
Caribbean	27	0.86
African	63	2.01
Arab	11	0.35
Any other ethnic group	11	0.35

Note. For analysis due to small sub samples ethnicity was grouped into Ethnic Minority or White.

Table 11

Demographic information of the parents of the final sample

Variable	Mothers	Fathers
n (% of total sample)	3097 (98.63%)	2179 (69.39%)
Age in years, M ± SD (range)	35.87 ± 5.62 (19-53)	39.23 ± 6.25 (24-70)
Education		
No Qualification n (%)	104 (3.36%)	71 (3.26)
Other qualification n (%)	103 (3.33)	111 (5.09)
Lower Secondary (GCSE) n (%)	648 (20.92)	417 (19.14)
Upper Secondary (A Level) n (%)	630 (20.34)	524 (24.05)
Degree or higher degree n (%)	1612 (52.05)	1056 (48.46)
Employment		
Unemployed n (%)	1006 (32.48)	141 (6.47)
Employed n (%)	2091 (67.52)	2038 (93.53)
Marital Status		
Single/Separated n (%)	475 (15.34)	38 (1.74)
Married or living as a couple n (%)	2622 (84.66)	2141 (98.26)

Ethical issues

Participants in the study are provide with written and oral information about the purpose of the UKHLS, funding, how they were chosen to take part and the confidentiality and security of their data (Understanding Society, 2024[b]).

Ethical approval has been provided by University of Essex Ethics committee for data collection and data linkage by Understanding Society for all waves of data collection (reference number: ETH1920-0123 for wave 12 data collection; Institute for Social and Economic Research, 2022). No further ethical approval was required to link the PEACH datafile with any of the other UKHLS files. The ethical approval statement for the data can be retrieved here: https://www.understandingsociety.ac.uk/documentation/mainstage/user-guides/main-survey-user-guide/ethics.

The dataset was downloaded from the UK Data Archive on an Essex Partnership University Foundation Trust Laptop. This device is password protected and stored within a private residence and not a shared location. The device is a National Health Service (NHS) trust device and as such anti-virus updates are completed automatically and routinely. All analysis was completed on this device and therefore there was no need for transmission of data files elsewhere.

Every participant within the study has a unique person identifier (PIDP) and as such all data was already completely anonymised. Linking different files did not provide sufficient information to make any participant from the study identifiable.

Dissemination

This study forms part of the written requirements for thesis for the Doctorate in Clinical Psychology at the University of Essex. As part of this it will be uploaded to the University of Essex Research Repository and will be openly available through the online library. The University of Essex holds an annual Health and Social Care Staff and Student conference. This research has already been presented in poster format at these conferences on two occasions in June 2022 and June 2023. In October 2023, preliminary findings were presented to staff and students of the Doctorate in Clinical Psychology. This research will again be presented at the annual Postgraduate research in Health and Social care conference in June 2024. External conferences such as those held by the British Psychological Society and local NHS services will also be approached to establish if this research is of interest for dissemination in these forums.

This research is likely to be of interest to a range of disciplines and professionals who work with children and parents. A better understanding of the aetiology of internalising and externalising difficulties will likely interest professionals working within social care and mental health teams. Findings may be used to inform how parenting practices may influence these difficulties and therefore contribute to an evidence base that can identify prevention and treatment programmes. For example, findings indicating the impact of parenting can guide clinical teams on where parenting interventions may be most effective and reduce costs of wasting clinical resources where these may be better targeted elsewhere. Similarly, if children who display certain temperamental traits at age 3 are more likely to experience internalising or externalising difficulties, this can indicate to future researchers, which children and parents may benefit from support before these problems fully emerge. This research may also be of

particular interest as after reviewing the literature I could not find indication that the methodological approach of this study to explore parenting and child temperament influences on internalising and externalising problems has previously been undertaken, similarly, no evidence of a similar study could be found within a UK population.

At the time when the systematic literature review was conducted the researcher could not find any evidence of a review exploring child temperament and parenting influences of children's internalising and externalising problems being conducted. As such, this synthesis may be of interest in its own right and therefore will be submitted for publication in a relevant journal.

As the study has potential implications for developing the understanding of professionals within health and social care, academic journals focussing on child development and psychology (for example Developmental Psychology, Child Development, Journal of Child Psychology and Psychiatry and Allied Disciplines) will be approached for publication.

Chapter 4: Results

Results

Descriptive statistics of the independent and dependent variables are provided in table 12. Correlation coefficients of the independent and dependent variables by gender are listed in table 13. None of the predictor variables had an r value of .7 or above which is the typical value given to indicate potential multicollinearity between variables (Duda, 2022; Rekha, 2019). Coefficients for the covariates and dependent variables are presented in table 14.

Table 12

Descriptive statistics of the independent and dependent variables by gender

	Boys			Girls		
	Mean	SD	Range	Mean	SD	Range
Internalising Problems	2.84	2.85	0-17	2.76	2.81	0-17
Externalising problems	5.70	3.58	0-17	4.68	3.34	0-19
Risk aversion	3.02	1.54	1-7	3.12	1.53	1-7
Delayed Gratification	4.50	1.35	1-7	4.31	1.34	1-7
Patience	3.90	1.47	1-7	3.92	1.44	1-7
Negative affect	4.78	1.64	3-11	4.79	1.64	3-11
	Fathers			Mothers		
	Mean	SD	Range	Mean	SD	Range
Positive Parenting	27.74	3.17	15-37	28.28	2.89	16-38

Table 13

Correlation coefficients for each independent and dependent variable by gender

	Internalising	Externalising	Risk Aversion	Delayed Gratification	Patience	Negative affect	Mothers parenting	Fathers Parenting
Internalising	-	.434***	.129***	-.024	-.138***	.282***	-.089***	-.106***
Externalising	.425***	-	-.115***	.229***	-.363***	.323***	-.225***	-.211***
Risk Aversion	.158***	-.061*	-	-.420***	-.022	.081***	.015	-.030
Delayed Gratification	-.053	.146***	-.368***	-	-.170***	.066**	-.092***	-.100***
Patience	-.171***	-.330***	-.021	-.068**	-	-.319***	.123***	.112***
Negative affect	.273***	.298***	.089***	.037	-.353***	-	-.178***	-.126***
Mothers parenting	-.129***	-.224***	.004	-.035	.137***	-.191***	-	.468***
Fathers Parenting	-.064*	-.148***	.077**	-.059*	.079**	-.101***	.454***	-

Note. Boys are shown above the diagonal and girls are shown below.

*p≤0.05 ** p≤0.01 ***pp≤0.001

Table 14

Coefficients (β) between covariates and the dependent variables

		Boys		Girls	
		Externalising	Internalising	Externalising	Internalising
Ethnicity (white=1)	Coefficient	.201	-.011	.204	-.008
	p-value	.001	.856	<0.001	.878
Maternal age	Coefficient	-.029	-.015	-.023	-.027
	p-value	<0.001	.001	<0.001	<0.001
Paternal age	Coefficient	-.009	-.006	-.012	-.014
	p-value	.043	.156	.003	.001
Maternal marital status (married=1)	Coefficient	-.398	-.296	-.254	-.238
	p-value	<0.001	<0.001	<0.001	<0.001
Paternal marital status (married=1)	Coefficient	-.339	-.139	-.452	-.367
	p-value	.090	.477	.004	.023
Maternal employment (1=employed)	Coefficient	-.325	-.357	-.209	-.271
	p-value	<0.001	<0.001	<0.001	<0.001
Paternal employment (1=employed)	Coefficient	-.521	-.352	-.619	-532
	p-value	<0.001	.002	<0.001	<0.001
Maternal education (1=no qualification)					
Degree or higher	Coefficient	-.937	-.617	-.518	-.701
	p-value	<0.001	<0.001	<0.001	<0.001
Upper secondary	Coefficient	-.628	-.559	-.392	-.662
	p-value	<0.001	<0.001	.006	<0.001
Lower Secondary	Coefficient	-.511	-.277	-.239	-.467
	p-value	<0.001	.056	.090	.001
Other qualification	Coefficient	-.490	.022	-.091	-.451
	p-value	.013	.909	.613	.013
Paternal education (1=no qualification)					
Degree or higher	Coefficient	-.497	-.395	-.435	-.156
	p-value	.004	.020	.002	.287
Upper secondary	Coefficient	-.338	-.419	-.302	-.028
	p-value	.053	.016	.041	.856
Lower Secondary	Coefficient	-.042	-.162	-.334	.029
	p-value	.813	.355	.027	.851
Other qualification	Coefficient	.151	.070	-.316	-.147
	p-value	.458	.730	.088	.442

T-Tests

An independent samples t-test to explore the difference in internalising problems between boys (M=2.97, SD=2.93) and girls (M=2.84, SD=2.79) revealed no significant differences (t(3134.58)=1.32, p=0.185). The t-tests exploring differences between boys (M=5.92, SD=3.69) and girls (M=4.87, SD=3.45) externalising problems was significant (t(3129.9)=8.21, p<0.001), indicating boys were rated as experiencing more externalising problems then girls.

A t-test exploring differences between mothers (M=28.21, SD=2.91) and fathers (M=27.76, SD=3.17) positive parenting scores revealed significant differences (t(4914)=-5.437, p<0.001), indicating mothers self-reported more positive parenting than fathers.

Regression analysis

The coefficients presented in the subsequent section were adjusted for all variables (child temperament, parenting, child temperament by parent interaction terms and covariates).

Boys Internalising problems. Table 15 depicts the regression models for mothers and fathers parenting for boys internalising problems.

Boys Internalising Problems: Mothers model. The regression model exploring boys temperament and mothers parenting score on internalising problems was significant and explained 14% of the variance in internalising problems (R^2 = .136 F(17, 1549) = 14.32, p < .001). Both risk aversion (β = .11, p<.001) and negative affect (β =.24, p<.001) significantly contributed to the model. Boys rated as more risk averse at age 3 had more internalising problems at age 5, and higher levels of negative affect at age 3 predicted more internalising problems at age 5. In the second block mothers's parenting was added but this did not increase the amount of variance explained by the model significantly. Similarly, no significant effect was found for any of the parenting by temperament interaction terms and adding this block of variables to the model did not increase the amount of variance explained in internalising problems significantly. The covariates within the model explained 4% of the total variance (ΔR2 =.04, p<.001). The covariates of mothers employment (β =-.20, p<.001) and mothers marital status (β =-.21, p<.01) were significant. Mothers who were in employment or who were married had sons with less internalising problems than mothers who were single or unemployed. Contrary to the literature, child ethnicity, mother age and mother education did not significantly contribute to the model.

Table 15

Regression analysis results for boys internalising problems by parent gender

	Mothers			Fathers		
	Coefficient	Standard Error	ΔR^2	Coefficient	Standard Error	ΔR^2
Risk aversion	.113***	.027	.095***	.145***	.032	.097***
Delayed Gratification	-.001	.027		-.036	.032	
Patience	-.049	.026		-.006	.031	
Negative affect	.237***	.026		.237***	.030	
Positive Parenting	-.017	.025	.002	-.041	.029	.005*
Risk aversion x positive parenting	.006	.026	.002	-.015	.032	.002
Delayed Gratification x positive parenting	.0129	.027		-.038	.032	
Patience x positive parenting	-.023	.027		.010	.031	
Negative affect x positive parenting	.031	.026		-.011	.029	
Education (1=No qualification)			.038***			.02**
Other Qualification	.249	.188		.228	.204	
Lower Secondary (GCSE)	-.057	.139		.010	.178	
Upper secondary (A Level)	-.246	.141		-.174	.178	
Degree or higher	-.239	.138		-.143	.174	
Employment (1=Employed)	-.195***	.055		-.227*	.114	
Ethnicity (1=White)	.093	.059		.056	.070	
Marital status (1=Married)	-.210**	.067		-.137	.255	
Age	-.004	.004		-.008	.005	

Note. All estimations include constant terms *p≤0.05 ** p≤0.01 ***pp≤0.001

Boys Internalising Problems: Fathers model. The model exploring boys temperament variables and fathers parenting score on internalising problems was also significant (R^2 = .124, F(17, 1079) = 8.95 p<.001), however this model explained slightly less of the variance in outcome than the model run for mothers (12% comparative to 14%) . Similar to the model run for mothers boys who were rated as more risk averse at age 3 had more internalising problems at age 5 (β = .15, p<.001) and coefficients were similar in size. Higher ratings of negative affect were also linked to more internalising problems (β =.24, p<.001) and coefficients were the same as the model for mothers; indicating a 1 unit increase in ratings of negative affect at age 3 predicted a .24 increase in boys internalising problems by age 5. As was found with mothers, there was no significant effect of fathers parenting score on internalising problems and none of the temperament by parenting score interaction terms were significant. The addition of the block of covariates explained 2% of the variance within the model (ΔR^2= .02, p<.01), however the only covariate that was significant was fathers employment. Fathers who were employed had sons with less internalising problems at age 5 (β=-.23, p<.05). In contrast to mothers father's marital status did not significantly contribute to the model.

Boys Externalising Problems. Table 16 depicts the regression outputs for boys externalising problems for the models run for fathers and mothers.

Boys Externalising problems: Mothers model. The models exploring boys temperament and mothers parenting on externalising problems was significant and explained 29% of the variance of boys externalising problems (R^2 = .289, F(17, 1549) = 37.03, p<.001). Mothers parenting contributed to explaining 2% of the variance within the model (ΔR^2=.016, p<.001). The addition of interaction terms also contributed to an increase in variance explained, albeit this was a very small increase (ΔR^2=.007, p<.01). Entering covariates in the fourth block contributed to explaining 5% of the overall variance of the model (ΔR^2=.047, p<.001).

All temperament variables were significant within the model. Boys rated as less risk averse at age 3 had more externalising problems at age 5 (β =-.07, p<.01). However, the magnitude of this effect would be considered trivial according to Cohen's criteria as it is less than 0.1; indicating an increase of one unit in the rating of risk aversion would predict only a .07 increase in externalising problems two years later(Cohen, 1988, as cited in Nieminen, 2022). Similarly, boys rated as less able to delay gratification (i.e. they were rated as more impulsive) presented with more externalising problems (β =.14, p<.001) by age 5. Boys with higher ratings of negative affect at age 3 also were more likely to have more externalising

problems (β =.21, p<.001) by age 5. Boys with more patience had less externalising problems (β =-.27, p<.001).

Mothers parenting was also a significant predictor within the model (β =-.12, p<.001), in that the higher the score on the positive parenting behaviour index the less externalising problems in boys. Two interaction terms were significant. Mothers parenting by risk aversion (β =.06, p<.05) which is indicative that the less positive the parenting and the lower the rating of risk aversion in boys (i.e. they were deemed more willing to take risks), the more externalising problems boys had at age 5. Mothers parenting by delayed gratification was also significant (β =.06, p<.05) indicating that boys rated as more impulsive who had less positive parenting were more likely to present externalising problems at age 5.

Mothers education was significant within the model but only when comparing mothers who had GCSES (β=-.34,p<.01), A levels (β=.-35, p<.01) or degrees (β=-.51, p<.001) with mothers with no qualifications. No significant effect was found for mothers with other qualifications in comparison to mothers with no qualifications. The coefficient for mothers with degrees compared to mothers with no qualifications would be classed as a large effect size according to Cohen's criteria (Cohen, 1988, as cited in Nieminen, 2022). The education covariates indicate that mothers with qualifications of GCSE or higher have sons with less externalising problems and this effect is largest when mothers hold a degree or higher qualifications. Mothers employment (β=-.13, p<.01) and marital status (β=-.23, p<.01) were also significant. Mothers employment predicted sons having less externalising problems, further mothers who were married or lived as a couple had sons with less problems compared to mothers who were single. Although mothers age was significant (β= -.01, p<.01) and formed a negative association indicating older mothers had sons with less externalising problems this effect size would be deemed trivial (Cohen, 1988, as cited in Nieminen, 2022). Boys ethnicity was also significant (β=.19, p<.001), indicating boys with white identities had more externalising problems than boys with racialised identities.

As the interaction terms between mothers positive parenting and boys risk aversion, and between mothers parenting and boys delayed gratification were significant, simple slope tests were run to further explore these interactions, these are shown in figures 6 and 7. Slopes were plotted at low (1 SD below the mean), mean and high (1 SD above the mean) for both child temperament variables and mothers parenting.

Table 16

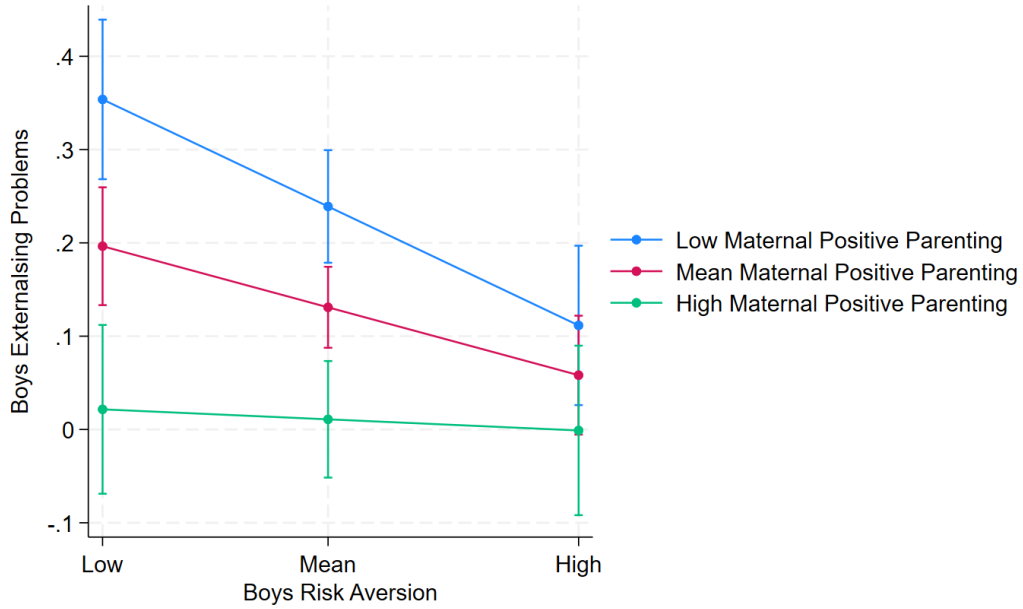
Boys externalising problems by parent gender

	Mothers			Fathers		
	Coefficient	Standard Error	ΔR^2	Coefficient	Standard Error	ΔR^2
Risk aversion	-.073**	.025	.215***	-.084**	.030	.225***
Delayed Gratification	.141***	.025		.109***	.030	
Patience	-.261***	.024		-.260***	.028	
Negative affect	.207***	.024		.235***	.028	
Positive Parenting	-.119***	.023	.019***	-.119***	.027	.022***
Risk aversion x positive parenting	.061*	.024	.007**	.041	.030	.002
Delayed Gratification x positive parenting	.058*	.025		.008	.030	
Patience x positive parenting	-.031	.025		-.004	.029	
Negative affect x positive parenting	.026	.024		-.012	.026	
Education (1=No qualification)			.047***			.030***
Other Qualification	-.254	.174		.144	.188	
Lower Secondary (GCSE)	-.345**	.128		.007	.165	
Upper secondary (A Level)	-.347**	.130		-.118	.164	
Degree or higher	-.511***	.127		-.245	.160	
Employment (1=Employed)	-.134**	.051		-.340***	.105	
Ethnicity (1=White)	.190***	.054		.090	.064	
Marital status (1=Married)	-.229***	.062		-.393	.235	
Age	-.012**	.004		-.002	.004	

Note. All estimations include constant terms *p≤0.05 ** p≤0.01 ***pp≤0.001

Figure 6

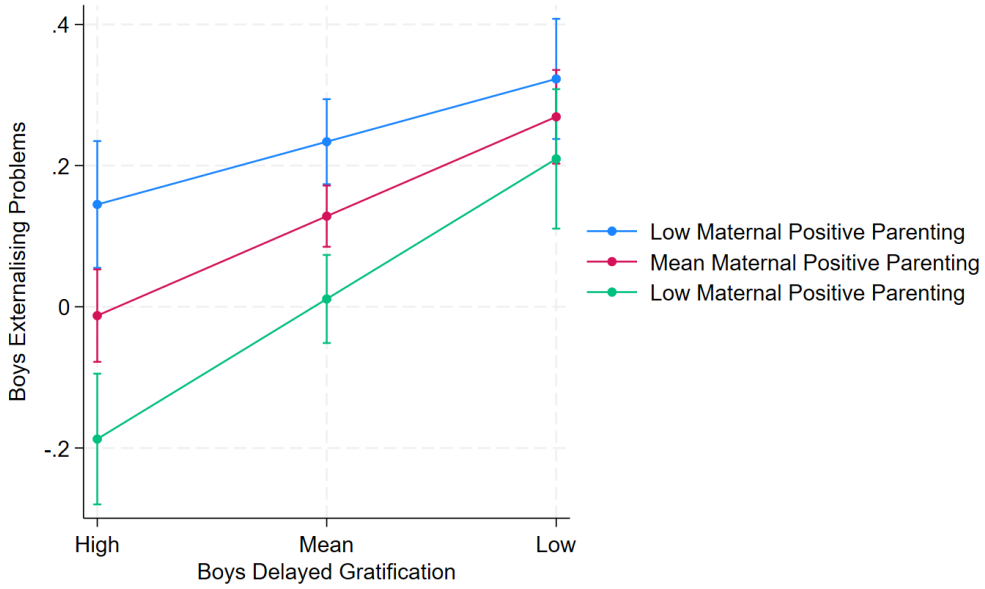
Interaction between maternal positive parenting and boys risk aversion on boys externalising problems.



Note. Predictive margin at 95% confidence interval shown.

Figure 7

Interaction between maternal positive parenting and boys delayed gratification on boys externalising problems.



Note. Predictive margins at 95% confidence interval are shown.

Slope analysis for boys externalising problems by mothers parenting and boys risk aversion revealed boys risk aversion was significantly associated with boys externalising

problems at low (β =-.127, p=0.000) and mean (β =-.073, p=.003) levels of maternal positive parenting but not high levels of maternal positive parenting (β=-.012, p=.736) and there was no interaction effect. When maternal positive parenting is at mean or low levels boys with less risk aversion (i.e. they are more likely to take risks) have more externalising problems than boys with high levels of risk aversion.

Slope analysis for boys externalising problems by mothers parenting and boys delayed gratification was significantly positively associated at low (β =.089, p=0.006) mean (β =.141, p=.000) and high (β =.198, p=0.000) levels of maternal positive parenting. However, again there was no crossover interaction. Boys who were rated with low ability to delay gratification (i.e. they were more impulsive) had more externalising problems and this effect was heightened at lower levels of maternal positive parenting.

Boys Externalising problems: Fathers model. The model run for boys externalising problems with fathers variables included was significant and explained 28% of the variance in externalising problems (R^2 = .279, F(17, 1079) = 24.55, p<.001). The addition of fathers parenting into the block of predictors was significant and explained 2% of the variance within the model (R^2=.02, p<.001), the contribution of the interaction terms of fathers parenting and temperament was not significant. The block of covariates was significant and explained 3% of the variance in boys externalising problems (R^2=.03, p<.001).

As with the model run for mothers all temperament variables contributed significantly, with boys who were rated as less risk averse (i.e. more willing to take risks) at age 3 having more externalising problems at age 5 (β =-.08, p<.01). Higher ratings of negative affect (β =.23, p<.001) and lower levels of delayed gratification (β =.11, p<.001) at age 3 predicted more externalising problems in boys by age 5. Boys rated as having more patience had less externalising problems (β =-.26, p<.001). Fathers parenting was a significant predictor and the coefficient was the same size as for the mother's model. Higher scores on positive parenting index predicted fewer externalising problems (β =-.12, p<.001), indicating a one unit increase in fathers positive parenting predicted a .12 reduction in the rating of externalising problems. By contrast to the model run for mothers, none of the father parenting by temperament interaction terms were significant.

As with the model run for mothers adding covariates explained additional variance (ΔR^2=.03, p<.001), but in the fathers model only fathers employment was significant (β=-.34, p<.001). Boys of fathers who were in employment had fewer externalising problems compared

to boys of unemployed fathers. Whilst mothers employment was significant in the prior model the effect size would have been considered small, by contrast in the model run for fathers employment reached a medium effect size (Cohen, 1988, as cited in Nieminen, 2022).

Girls Internalising problems. Table 17 depicts the regression outputs for the models exploring mothers and fathers parenting by temperament interactions on internalising problems for girls.

Girls Internalising Problems: Mothers model. The model for the interaction between girls temperament and mothers parenting on internalising problems was significant and explained 15% of the variance in girls internalising problems ($R^2 = .149$, $F(17, 1512) = 15.59$, $p<.001$). The block of temperament variables contributed to 10% of the variance explained ($R^2=.10$, $p<.001$), mothers parenting contributed to a small amount of variance ($\Delta R^2=.01$, $p<.01$) as did entering the block of covariates ($\Delta R^2=.35$, $p<.001$). The addition of the mother's positive parenting by temperament interactions did not significantly contribute to the model.

The temperament traits of risk aversion, patience and negative affect as well as mothers parenting were all significant predictors within the model. Similar to the finding for boys the more risk aversion at age 3 the more internalising problems girls were reported to have at age 5 ($\beta = .13$, $p<.001$) and the coefficient was similar in size to the model for boys ($\beta = .11$). Girls rated as having more patience had less internalising problems ($\beta = -.08$, $p<.01$), although this would be deemed a very small effect size it is of interest that this temperament variable was significant for girls internalising problems but not for either of the models run for boys. Highers scores of negative affect were linked to more internalising problems for girls ($\beta =.19$, $p<.001$), and the coefficient was slightly smaller than in the boys model ($\beta =.24$). Mothers who were rated as having more positive parenting had girls with less internalising problems ($\beta =-.06$ $p<.05$). Although the effect size would be deemed trivial it is of interest that mothers parenting was significant for girls but not for boys. None of the interaction terms between girl's temperament and mothers parenting were significant.

Mothers' education, mothers' employment and mothers' age were all significant covariates. Mothers education was only significant at predicting internalising problems for mothers who had A levels or higher; having a mother with A levels ($\beta = -.35$, $p<.01$) or a degree or higher ($\beta = -.31$, $p<.05$) predicted less internalising problems in girls compared to mothers with no qualifications.

Table 17

Regression analysis results for girls internalising problems by parent gender

	Mothers			Fathers		
	Coefficient	Standard Error	ΔR^2	Coefficient	Standard Error	ΔR^2
Risk aversion	.128***	.025	.104***	.110***	.032	.117***
Delayed Gratification	-.015	.025		-.024	.031	
Patience	-.079**	.025		-.084**	.031	
Negative affect	.193***	.025		.240***	.030	
Positive Parenting	-.059*	.024	.006**	-.016	.028	.001
Risk aversion x positive parenting	.032	.025	.005	.070*	.031	.008
Delayed Gratification x positive parenting	-.014	.025		-.014	.030	
Patience x positive parenting	.044	.026		.022	.032	
Negative affect x positive parenting	-.020	.025		-.024	.030	
Education (1=No Qualification)			.035***			.022***
Other Qualification	-.259	.171		-.068	.191	
Lower Secondary (GCSE)	-.251	.135		.149	.158	
Upper secondary (A Level)	-.354**	.137		.146	.155	
Degree or higher	-.305*	.133		.079	.149	
Employment (1=Employed)	-.135**	.051		-.438***	.112	
Ethnicity (1=White)	.052	.052		-.026	.064	
Marital status (1=Married)	-.112	.065		-.203	.183	
Age	-.019***	.004		.013	.004	

Note. All estimations include constant terms

*p≤0.05 ** p≤0.01 ***pp≤0.001

These coefficients would be considered a medium effect size and it is of note, mothers education was not significant for boys internalising problems. Similarly, if mothers were in employment this predicted less internalising problems in girls (β = -.14, p<.01), although beta was slightly smaller for the model run for girls than boys. As mothers' age increased less internalising problems were predicted (β = -.02, p<.001), although the effect size of this would be deemed negligible.

Girls Internalising Problems: Fathers model. The model exploring temperament and fathers parenting on girls internalising problems was significant and explained 15% of the variance in girls internalising problems (R^2 = .147, F(17, 1064) = 10.81, p<.001). Only the block of temperament variables (R^2 = .117, p<.001) and covariates (ΔR^2=.022, p<.001) significantly explained the amount of variance in girls internalising problems.

As with the model for mothers, the temperament traits of risk aversion, patience and negative affect were all significant predictors. The more risk aversion girls had at age 3 the less internalising problems they were reported to have two years later (β = .11, p<.001); the coefficient was slightly smaller for girls internalising problems compared to boys (β = .14). Girls rated as having more patience had less internalising problems (β = -.08, p<.01), although the effect size would again be considered very small this temperament variable was not significant in the model for boys internalising problems. Again higher scores of negative affect were linked to more internalising problems for girls (β =.24, p<.001) and beta was the same as for the boys. This indicates for both boys and girls a one unit increase in negative affect would predict a .24 increase in ratings of externalising difficulties. Fathers parenting on its own did not contribute significantly to the model but the interaction between fathers parenting and girls risk aversion was significant (β = .07, p<.05), albeit the effect was very small. It is of interest that this interaction was not found in the model run for boys internalising problems.

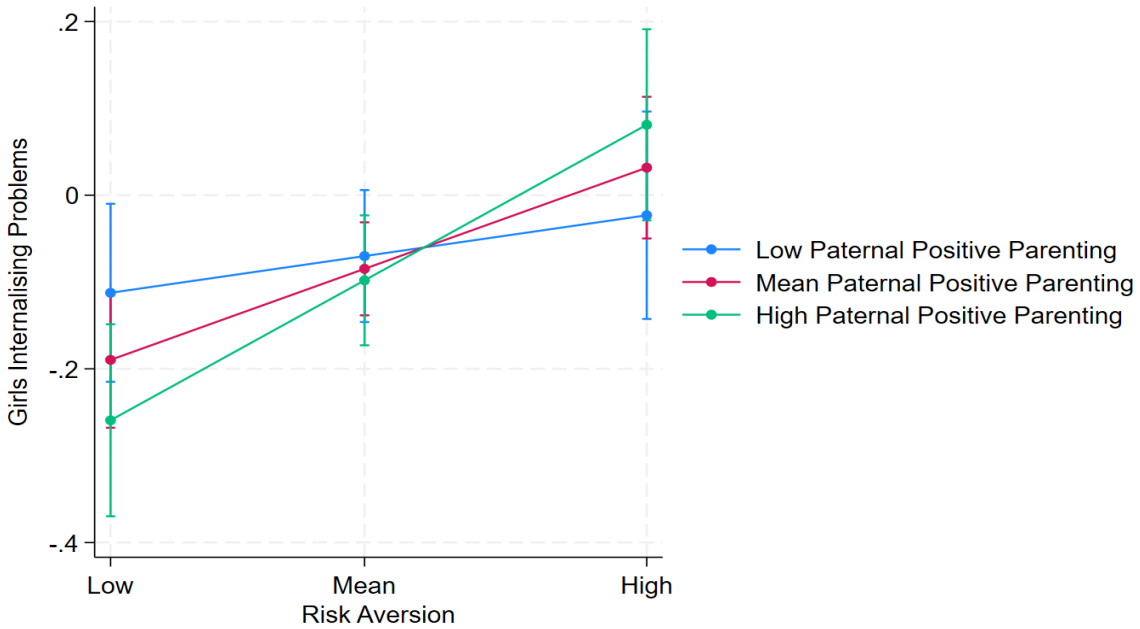
Adding covariates into the model contributed to explaining 2% of the overall variance in girls internalising problems (ΔR^2=.02, p<.001), the same as with the model run for boys and fathers. Only fathers employment (β = -.44, p<.001) and fathers age (β = -.01, p<.01) were significant covariates. The effect size of father's age would be deemed very small but employment would be considered a medium effect size based on Cohen's criteria (Cohen, 1988, as cited in Nieminen, 2022). Interestingly father's employment was also significant in the model run for boys but the coefficient was much smaller (β = -.23) indicating that fathers employment may be more important for girls internalising problems compared to boys. In both

models fathers employment predicted less internalising problems compared to fathers who were unemployed.

To explore the interaction between fathers parenting and girls risk aversion on girls internalising problems simple slope tests were run plotting parenting and girls risk aversion at high (1 SD above the mean) mean and low (1 SD below the mean) levels, the results are shown in figure 8. Fathers parenting by girls risk aversion was not significant at low paternal positive parenting (β=.047, p=.279), however was significant at mean (β=.117, p=.000) and high (β=.179, p=.000) levels of fathers positive parenting and there was a crossover interaction effect. At low levels of risk aversion, more positive parenting by fathers appeared to reduce rates of internalising problems for girls, compared to girls of fathers with mean levels of positive parenting. Conversely, girls who were less likely to take risks (i.e. had high levels of risk aversion) who had fathers who reported more positive parenting had more internalising problems than girls who had high levels of risk of version and mean levels of positive parenting. This is of interest as it contradicts the hypothesis that more positive parenting would reduce the likelihood if internalising problems as it indicates more paternal positive parenting had an aversive impact on internalising problems in girls who were particularly risk averse.

Figure 8

Interaction between paternal positive parenting and girls risk aversion on girls internalising problems.



Note. Predictive margins at 95% confidence interval are shown.

Girls Externalising problems. Table 18 shows the output for the regression models run for girls externalising problems by parent gender.

Girls Externalising Problems: Mothers model. The model exploring girls temperament variables, mothers parenting and the interaction between these on externalising problems was significant and explained 23% of the variance in girls externalising problems (R^2 = .230, F(17, 1512) = 26.29, p<.001). The temperament variables of delayed gratification, patience and negative affect at age 3 were all significant predictors of later externalising problems. Girls who were rated as better at being able to delay gratification (i.e. they were not very impulsive) had less externalising problems (β = .10, p<.001), similarly girls were rated as more patient had less externalising problems (β = -.23, p<.001). Girls were rated as having higher levels of negative affect had more externalising problems (β = .17, p<.001). In comparison to boys, the betas for all temperament variables were smaller for girls and overall the model accounted for less variance in externalising problems in girls than boys (23% comparative to 28%).

Mothers parenting contributed to explaining 2% of the variance within the overall model (ΔR^2=.02, p<.001). A higher rating of mothers positive parenting predicted less externalising problems (β = -.14, p<.001), indicating an increase in one unit of mothers positive parenting would predict a .14 reduction in girls externalising problems . Girls risk aversion was not significant which contrasted with the results found for boys. However, similar to boys an interaction effect was found with mother's positive parenting and risk aversion. The less positive the parenting and the lower the rating of risk aversion at age 3 the more externalising problems reported for girls at age 5 (β = .06, p<.05) this effect size was the same for boys. This effect size would be deemed very small according to Cohen's criteria (Cohen, 1988, as cited in Nieminen, 2022. However, as interaction effects were of particular interest to this study simple slope tests were conducted to further explore this interaction. The interaction was plotted at high (1 SD above), mean and low (1 SD below) levels of maternal positive parenting and at high, mean and low levels of girls risk aversion. Figure 9 displays the interaction between mothers positive parenting and girls risk aversion on girls externalising problems. The results of the slope tests found the interaction between mothers parenting and girls risk aversion was only significant at low levels of maternal positive parenting (β=-.100, p=.003), and not at mean (β=-.038, p=.114) and high (β=.0233, p=.496) levels. This indicates at low levels of mother's positive parenting, girls who have low levels of risk aversion (i.e. they are more likely to take risks) have more externalising problems compared to girls with high levels of risk aversion.

Table 18

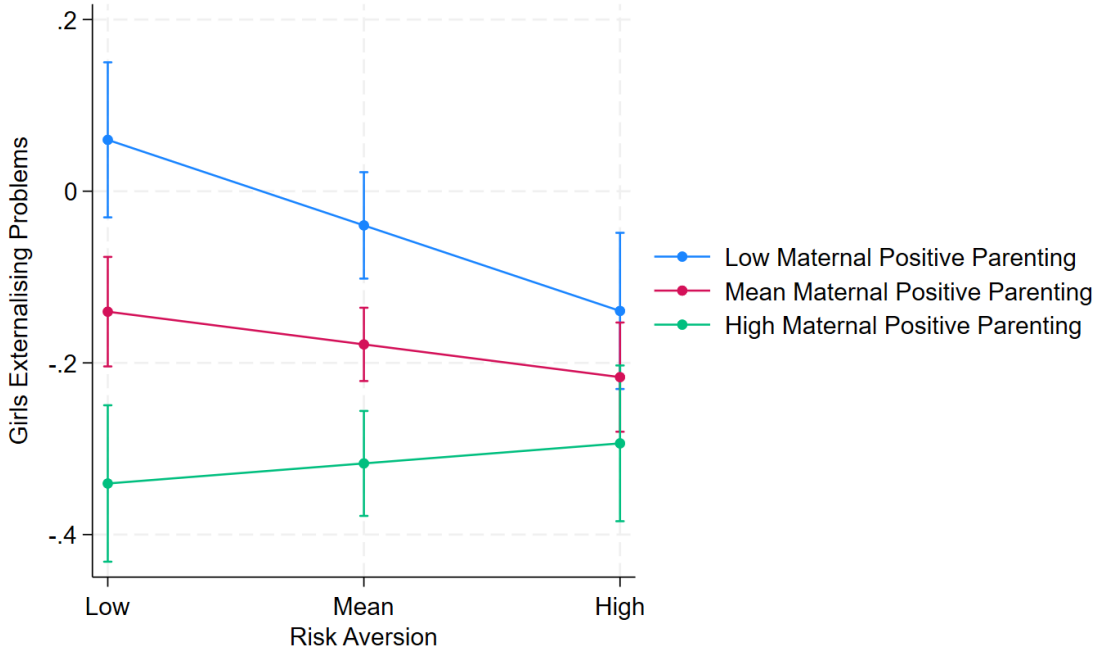
Regression analysis results for girls externalising problems by parent gender

	Mothers			Fathers		
	Coefficient	Standard Error	ΔR^2	Coefficient	Standard Error	ΔR^2
Risk aversion	-.038	.024	.168***	-.018	.029	.180***
Delayed Gratification	.099***	.024		.108***	.029	
Patience	-.230***	.024		-.195***	.028	
Negative affect	.168***	.024		.231***	.028	
Positive Parenting	-.139***	.023	.023***	-.078**	.026	.009***
Risk aversion x positive parenting	.062*	.024	.004	.106***	.029	.015***
Delayed Gratification x positive parenting	-.006	.024		-.013	.028	
Patience x positive parenting	.013	.025		.050	.029	
Negative affect x positive parenting	-.011	.024		.010	.028	
Education (1=No Qualification)			.033***			.026***
Other Qualification	-.019	.164		-.088	.174	
Lower Secondary (GCSE)	-.209	.129		-.183	.144	
Upper secondary (A Level)	-.239	.131		-.463***	.107	
Degree or higher	-.241	.127		.156**	.058	
Employment (=Employed)	-.085	.049		-.231	.167	
Ethnicity (1=White)	.184***	.050		-.009*	.004	
Marital status (1=Married)	-.090	.062		-.121	.141	
Age	-.019***	.004		-.010	.137	

Note. All estimations include constant terms *p≤0.05 ** p≤0.01 ***pp≤0.001

Figure 9

Interaction between maternal positive parenting and girls risk aversion on girls externalising problems.



Note. Predictive margins at 95% confidence intervals are shown.

Covariates contributed to explaining 3% of the variance within the model (ΔR^2=.033, p<.001). Being an older mother predicted less externalising problems, albeit the magnitude of this effect was extremely small (β = -.02, p<.001). In terms of ethnicity, girls with white identities had more externalising problems than girls with racialised identities (β = .18, p<.001). It is of interest that for boys externalising problems mothers employment, marital status and education (specifically if they had A levels or above) were all significant covariates but this was not the case for girls externalising problems.

Girls Externalising Problems: Fathers model. The model exploring the interaction between fathers parenting and girls temperament variables was also significant (R^2 = .230, F(17, 1064) = 18.71, p<.001). The father's model explained 23% of the variance, whereas the same model run for boys explained 28% of the variance in externalising problems. As with the model run for mothers, delayed gratification, patience and negative affect were all significant predictors. Similar to the finding with mothers parenting, girls rated as better able to delay gratification had less externalising problems (β = .11, p<.001), girls rated as more patient also had less externalising problems (β = -.20, p<.001) and girls rated as having higher levels of negative affect had more externalising problems (β = .23, p<.001). Fathers parenting was also

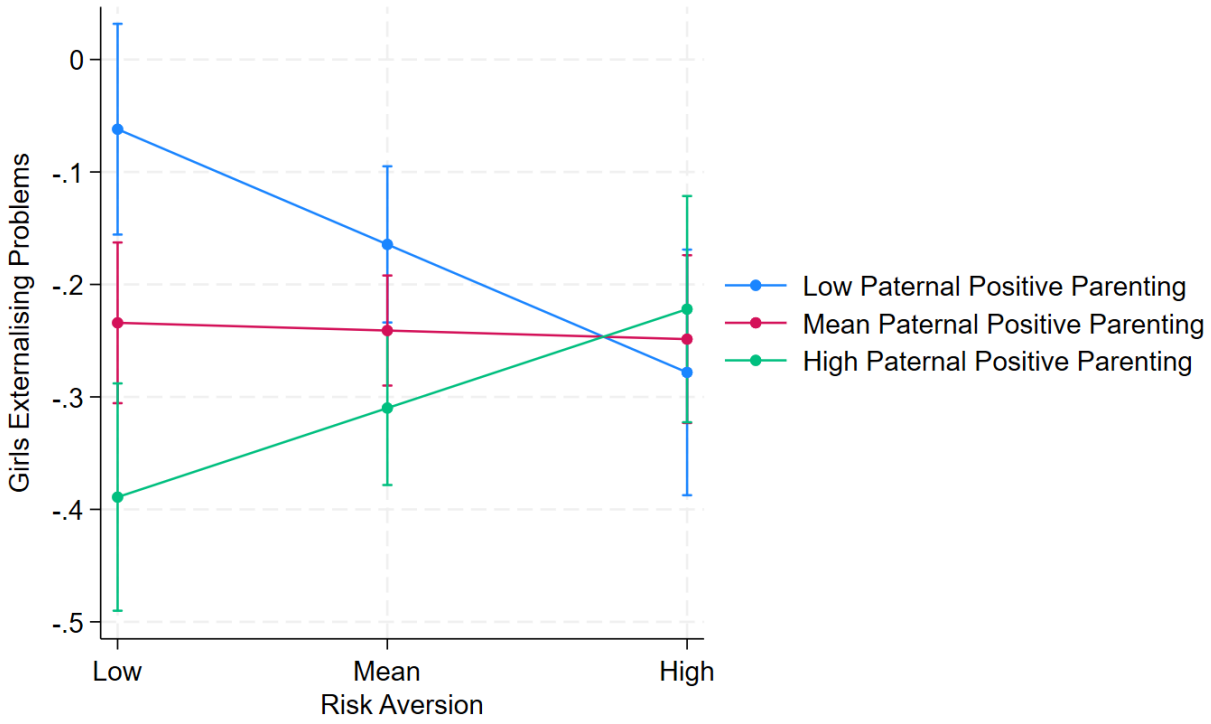
significant with more positive parenting predicting less externalising problems in girls (β = -.08, p<.01). However, beta was smaller for fathers than for mothers positive parenting (β = -.14, p<.001), and it was also smaller compared to the model run for boys and fathers (β = -.12, p<.001). As with the model run for mothers, risk aversion on its own was not significant but a significant interaction was found for risk aversion and parenting for fathers (β =.11, p<.001). Indicating the less positive the parenting and the lower the rating of risk aversion at age 3 the more externalising problems they had at age 5.

Adding covariates into the model accounted for 3% of the overall variance (ΔR^2 =.03, p<.001). Like in the model run for boys externalising problems fathers employment was a significant covariate (β = -.44, p<.001). Additionally for the girls model fathers age (β = -.01, p<.001) was significant, with being older predicting less externalising problems; however the effect size would be deemed trivial. The effect of fathers employment was larger for girls than for boys (β = -.44***, compared to -.34*** for boys). In both models, fathers employment predicted less internalising problems compared to fathers who were unemployed. As in the model for mothers child ethnicity remained significant (β=.16, p<0.001) with girls identified as being white having more externalising problems compared to girls with racialised identities.

To further explore the significant interaction term between girls risk aversion and fathers positive parenting on girls externalising problems simple slope tests were conducted, at mean, low (1 SD deviation below the mean) and high (1 SD deviation above the mean) levels of girls risk aversion and fathers positive parenting. Figure 10 depicts the interaction. The test revealed no significant effect at mean levels of fathers positive parenting (β=.008, p=.793, however at high and low levels of paternal parenting there was a significant interaction effect. Notably at high levels of paternal positive parenting there was a positive association with risk aversion (β=.088, p=.027) and externalising problems, at low levels the association was negative (β=-.114, p=.004). This indicates when risk aversion is low (i.e. girls are willing to take risks) and paternal positive parenting is at high levels then girls have less externalising difficulties, conversely low paternal positive parenting is associated with more externalising problems at low levels of risk aversion.

Figure 10

Interaction between paternal positive parenting and girls risk aversion on girls externalising problems.



Note. Predictive margins at 95% confidence intervals are shown.

Due to the number of analyses run, for clarity a higher order summary table is provided in table 19 summarising the key significant terms from all regression analyses.

Table 19

Summary of findings from all 8 regression models

		Internalising Problems		Externalising Problems	
		Boys	Girls	Boys	Girls
Mothers Model	Temperament Variables	Risk aversion (β=-.11***) Negative affect (β=.24***)	Risk Aversion (β=.13***) Patience (β=-.08**) Negative Affect (β=.19***)	Risk aversion (β=-.07**) Delayed Gratification (β=.14***) Patience (β=-.26***) Negative Affect (β=.21***)	Delayed Gratification (β=.10***) Patience (β=-.23***) Negative Affect (β=.17***)
	Parenting	Not significant	Mothers positive Parenting (β-.06*)	Mothers Positive Parenting (β=-.12***)	Mothers Positive Parenting (β=-.14***)
	Parenting * Temperament interaction terms	No significant terms	No significant terms	Risk aversion * positive parenting (β=-.06*) Delayed Gratification* positive parenting (β=.06*)	Risk aversion * positive parenting (β-.06*)
Fathers model	Temperament Variables	Risk Aversion (β=-.15***) Negative affect (β=.24***)	Risk Aversion (β=.11***) Patience (β=-.08**) Negative Affect (β=.24***)	Risk aversion (β=-.08**) Delayed gratification (β=.11***) Patience (β=-.26***) Negative affect (β=.24***)	Delayed Gratification (β=.11***) Patience (β=-.20***) Negative Affect (β=.23***)
	Parenting	Not Significant	Not significant	Positive Parenting (β=-.12***)	Positive Parenting (β=-.08**)
	Parenting * Temperament interaction terms	No significant terms	Positive Parenting*Risk aversion (β-.07*)	No significant terms	Risk aversion * positive parenting (β-.11***)

*p≤0.05 ** p≤0.01 ***pp≤0.001

Chapter 5: Discussion

Summary of findings and Interpretations

Objective 1: To identify if child temperament traits assessed at age 3 could predict internalising and externalising problems two years later.

The first aim of this study was to identify if temperament traits assessed at age 3 would predict internalising and externalising problems at age 5.

It was hypothesised that the temperament trait of risk aversion assessed at age 3 would predict both internalising and externalising problems at age 5, with higher levels of risk aversion being linked to more internalising problems, and lower levels being linked to more externalising problems. For internalising problems children who were rated as more risk averse at age 3 had more internalising problems at age 5. This finding was not unsurprising given that research in adults has found that trait anxiety is linked with more risk averse behaviour (Maner et al, 2007). Further, both animal and human studies have found links between risk aversion and shyness (Cole & Quinn, 2014; Yu & Sun, 2023; Addison & Schmidt, 1999). Shyness is also considered to share conceptual overlap with Kagan's concept of behavioural inhibition (Rubin, 2001). Prior literature has consistently linked both shyness and behavioural inhibition with internalising problems, in particular anxiety (Karevold et al, 2012; Bekkhus et al, 2021; Sandstrom et al, 2020).

For externalising problems, boys who were more willing to take risks at age 3 had more externalising problems at age 5. However, for girls this temperament trait was not a significant predictor of future difficulties in either the model run for mothers or fathers. One plausible explanation is that parents rated risk aversion differently for their sons than their daughters so there was not a direct comparison across scores between boys and girls. For example, gender norms may dictate an expectation that females will generally be more cautious and risk averse than males (Colón, 2021). There is evidence that men that adhere to more strict gender norms engage in more risk taking behaviours (Courtenay, 2000; as cited in Burrell et al, 2019). Therefore the threshold for girls to be rated as highly risk averse may be lower for girls than boys, as there may be an expectation that girls are generally more risk averse. Risk aversion may also be perceived as a more socially desirable or permissible trait within girls than boys and so due to social desirability responding parents may have been less inclined to report their sons as risk averse than their daughters. It is of note that risk aversion by parenting did form a

significant interaction for girls externalising problems and this is discussed in the subsequent sections.

Based on prior literature, negative affect was predicted to be positively associated with both internalising and externalising problems; support was found for this hypothesis. Higher levels of negative affect at age 3 predicted more internalising problems at age 5. This finding was consistent with prior research and the results from the systematic literature review. Psychological models used to understand anxiety and depression (for example Cognitive Behavioural Therapy; CBT) may offer explanation for the link between internalising difficulties and negative affect. Individuals who are more prone to negative affect may be more likely to interpret events negatively or predict more aversive outcomes, these negative cognitive appraisals may serve to contribute to poorer self-esteem, increase depressive experiences and increase feelings of anxiety (Greenberger & Padesky, 1995).

Similarly, as anticipated, higher ratings of negative affect at age 3 were predictive of more externalising problems at age 5 for both boys and girls. This is consistent with findings from the systematic review and Oldehinkel et al's (2004) study which linked negative affect with both internalising and externalising problems. The researchers suggested that whilst other temperament traits may impact individuals' abilities to regulate their behaviour or their attentional processes, negative affect may predispose individuals to externalising problems through the experience of heightened frustration when efforts to achieve goals or tasks become blocked. Shamispour et al (2018) studied negative affect and aggression and proposed that negative affect may predispose individuals to interpret situations in more negative ways which in turn can contribute to them being more prone to aggressive responses. Similar to the hypothesis for internalising difficulties with negative cognitive appraisals being linked to increased feelings of low self-esteem or anxiety (Greenberger & Padesky, 1995). Negative affect may increase negative cognitive appraisals which may also subsequently feed into externalising behaviour. Certainly, a CBT model of behavioural problems would identify negative affect and negative appraisals as maintenance factors. Further targets of interventions for these problems in children would include improving emotion regulation (Sukhodolsky et al, 2016). The link between negative affect and negative cognitive appraisals may also offer partial explanation as to why externalising and internalising problems often co-occur (Fanti & Heinrich, 2010; Lilienfeld, 2003).

No hypothesis was formed as to whether the temperament trait of patience may predict internalising problems. Despite this, patience was a significant predictor of internalising difficulties but only for girls; girls with more patience had fewer internalising problems. This finding somewhat mirrors what was found by Aghababaei and Tabik (2015) who found negative associations between patience and anxiety and depression in adults. The researchers hypothesised that there may be neurobiological differences in individuals with high levels of patience that allow them to better cope with waiting for rewards (such as through cognitive avoidance or emotional reappraisal) and being able to cope with delays prevents potential aversive impacts to self-esteem. It is plausible that an effect of patience on internalising difficulties was missed in the boys model. However, another possibility may be to do with how patience is viewed across gender. Patience is generally perceived as a feminine trait, whereas decisiveness may be viewed as more masculine (Gerzema & D'Antonio, 2013). It is plausible that when girls display patience this is more highly valued than when boys do. The value placed on this may help girls cope even better with waiting for rewards and further buffer against impacts to self-esteem. Whilst the magnitude of the finding was smaller for patience than for risk aversion and negative affect the fact that it aligns with other research is notable and further of interest given that patience has rarely been studied in exploring links with psychological wellbeing in either adults or children.

For externalising problems, it was predicted that children who were rated as being more patient would have fewer externalising problems and support was found for this. The literature exploring this trait and its links to psychological wellbeing is scarce. However, as patience reflects an ability to tolerate and remain calm in the face of feelings of frustration (Cambridge University Press & Assessment, 2024) and links have been found between patience and emotion regulation capabilities (Gökçen et al, 2020; Schnitker et al, 2017). It is plausible that greater patience may help children regulate feelings of frustration and subsequently not act on them resulting in fewer externalising behaviours.

No hypothesis was formed regarding delayed gratification and internalising problems and no significant associations were found. However, it was anticipated it would predict externalising problems, which was supported by the results. Children who were better able to delayed gratification (i.e. were less impulsive) also had fewer externalising problems, this was consistent with Liang et al's (2019; see literature review) study. This is not unsurprising, impulsivity forms part of the diagnostic criteria for Attention Deficit Hyperactivity Disorder (ADHD; American Psychiatric Association, 2013) and the Diagnostic and Statistical Manual

(DSM) five lists conduct disorder and oppositional defiant disorder under the category of impulse control (American Psychiatric Association, 2024) and these diagnoses would be considered to be reflective of an externalising difficulty. Further, Martel et al (2017) has found evidence that impulsivity actually forms a core component of externalising problems and recommends targets of interventions should focus on improving impulse control.

Objective 2: To identify if positive parenting was associated with internalising and externalising problems of children aged 5.

The second aim of this study was to explore if positive parenting was associated with internalising and externalising difficulties. It was hypothesised positive parenting would be associated with fewer internalising and externalising problems, it was anticipated there would be gender interactions between parent and child in these associations.

T-tests revealed that mothers self-reported increased positive parenting compared to fathers. Research indicates that mothers are more likely to provide emotional support to their children (Bianchi & Casper, 2000; The Associated Press and NORC, 2021). Further, mothers tend to take on the majority of childcare responsibilities within the UK and therefore spend more time with their children (Vagni, 2023; Howlett, 2020). This may mean mothers have reported spending more quality time with their children (an item on the parenting index) and by default when mothers spend more time with their children they may have more opportunities compared to fathers to praise them, and to talk to them about things that matter (other items that were included on the parenting measure).

For boys internalising problems positive parenting by either mothers or fathers was not a significant predictor. For girl's, mother's positive parenting was a significant predictor for internalising problems; girls who had mothers with more positive parenting had less internalising problems. There is evidence that mothers talk more about their emotions with their daughters than they do with their sons and subsequently girls may be more readily able to recognise and attend to their emotions (Kuebli et al, 1995; Fivush et al 2000, Aznar & Tenenbaum, 2014). Further, there is evidence that girls are socialised to express sadness and other internalising emotions such as fear and anxiety more than boys which may then elicit care-giving responses from others (Chaplin, 2015). Mothers with higher levels of positive parenting (that incorporates more time spent with their child and more time spent talking about things that matter to them) may be having more emotionally laden conversations and

subsequently nurturing girls ability to name, regulate and seek out support when experiencing distress reducing the likelihood of them developing internalising problems.

Of relevance to the finding of mothers positive parenting reducing the likelihood of girls having internalising problems is the finding that mothers who had education of A levels or above had daughters with less reported internalising problems. This aligns with prior research. For example, a large prospective cohort study by Holstein et al (2021) that followed children from 0 to age 8 found that both parental education and parent child relationship were independent risk factors in predicting a diagnosable mental health disorder. They also found that although they had independent effects they reinforced each other, with children who experienced adverse parent-child relationship and who had parents from a lower educational background having a threefold risk of having a diagnosable mental health condition. There is evidence that parental education may contribute to increased parental sensitivity or warmth (Pelchat et al, 2003; Klebanov et al, 1994). Similarly, research has found links with education and emotional intelligence. Yükçü and Demircioğlu (2020) found that parental emotional literacy (which incorporates emotional awareness and regulation) predicted children's regulation of emotions. Further, a study by Dereli et al (2016) found evidence that maternal education was a significant predictor of child emotion understanding and regulation. A meta-analysis by Zimmer-Gembeck et al (2022) found that parental regulation was linked with more positive parenting and subsequently fewer internalising problems in children. Therefore, higher level of educational attainment may be linked to improved emotional regulation which has positive impacts on parenting. This may then support the development of their child's self-regulation, reducing the likelihood of the development of internalising problems. It is possible that for girls, mothers' positive parenting is particularly important in preventing the development of internalising problems and maternal education may enhance traits and practices that allow girls to better understand, communicate and regulate their emotions.

These findings would align with theories around attachment, from this perspective when children develop a secure base with their parent, they are then more likely to explore the world around them (Salter Ainsworth & Bell, 1970). This is sometimes known as the dependency paradox, the more secure we feel in our relationship with another the more independent we can become, safe in the knowledge that if needed we can return to that secure base (Feeney, 2007). For children, feeling secure that a caregiver is available if needed encourages exploration in the face of novel situations. By contrast children who do not feel secure in their attachment can experience heightened anxiety in novel situations as they are

unsure there caregiver will be available if needed (Salter Ainsworth & Bell, 1970). It is therefore plausible that girls who experience their mothers as responsive and attuned to their emotional needs experience less anxiety and therefore are rated as having fewer internalising problems. The potential increased sensitivity and emotional literacy of mothers with higher education may further support this process.

Parenting was significant across all four models run for externalising problems, indicating regardless of parent gender, higher scores of positive parenting reduced the amount of externalising problems in their children. Interestingly, mother's age was significant for both boys and girls parenting but father's age was not. As mother's age increased, children had fewer externalising problems. This mirrors previous findings that mother's age is associated with fewer externalising problems (Saha et al, 2009; Tearne et al, 2015). A review by Tearne (2015) states that on the basis of the current literature it is unlikely that maternal age is part of a causal mechanism in the development of these difficulties, but rather a reflection of psychological and social factors that are linked with being older. For example, older mothers may have access to greater economic resources, which may improve the environment in which the child is raised, allow access to intervention if problems do arise earlier, as well as reduce parental stress. Further maternal age has been associated with increased family stability and also increased positive parenting (Tearne, 2015).

The finding that positive parenting appears to play a larger role for externalising than internalising problems was mirrored by Cooke et al's (2022) meta-analysis which found that parental sensitivity formed negative associations with both internalising and externalising problems, but that the effect size was significantly larger for externalising problems. The authors cite this finding has been found in previous meta-analyses that have explored the influence of father's responsivity and child's attachment insecurity on internalising and externalising difficulties (Rodrigues et al, 2002; Groh et al 2017 both cited in Cooke et al, 2022).

One explanation may be that there are other variables relevant in the relationship between parenting and internalising problems. For example, Cooke et al (2022) found effect sizes between parental sensitivity and internalising problems were largest in low socio-economic groups, compared to mid-high groups. Relevant to this is, that this study found the amount of variance accounted by the models for externalising difficulties was almost double that of what was accounted in the models for internalising problems. This may reflect that other

relevant variables specific to internalising problems were not included within the analysis. Bista et al (2024) found that language difficulties was a specific risk factor for children displaying primarily internalising problems comparative to children who experienced both internalising and externalising problems and children who had no difficulties. Keiley et al (2003) found peer neglect (which consisted of not being actively liked or disliked by other pupils at school) was specifically associated with internalising problems only. Similarly, Oland and Shaw (2005) propose that a factor in the development of children displaying 'pure' internalising problems (i.e. they experience these difficulties in the absence of co-occurring externalising problems) was poor peer relationships.

Another plausible explanation for the difference in effect size of parenting on internalising and externalising problems is that internalising problems may be under reported by parents, and there is evidence of discrepancies between child and parent reports (Sourander et al, 1999; Herjanic & Reich, 1997). Externalising problems reflect observable behaviours, this contrasts with internalising difficulties that reflect an internal state. Whilst some aspects may be notable (such as withdrawal or self-reported difficulties), internalising problems are harder to detect (Wilmshurst, 2005; as cited in Nezhad et al, 2011). Further, for the same reason individuals outside of the family network may be more likely to observe and report to parents externalising problems therefore increasing their likelihood of being detected. Further, externalising problems may be deemed more socially unacceptable and therefore more readily notable (Fraser-Thill, 2021).

Objective 3: To explore the interaction between temperament traits and positive parenting on internalising and externalising problems.

The third aim of this study was to explore the interaction between temperament and parenting on internalising and externalising problems. It was anticipated that gender of parent and child would be important in these interactions. No specific parent by temperament interactions were hypothesised.

For internalising problems only the model estimates for girls and fathers found a significant temperament by parenting interaction. Post hoc tests indicated a cross-over interaction; when girls were rated as having low levels of risk aversion (i.e. they were more willing to take risks) high levels of fathers positive parenting reduced internalising problems. By contrast when girls were rated as highly risk averse, more positive parenting by fathers increased ratings of internalising problems. This is a surprising finding as it indicates that more

positive parenting does not necessarily reduce internalising problems and can potentially increase rates in girls with a highly risk averse temperament.

Although surprising this is not the first finding of its kind, two studies from the systematic literature review explored maternal sensitivity (fathers were not included in either study) and their findings are relevant to this finding for risk aversion. Wu and Cui (2023) found that children with low temperamental fear were more likely to develop internalising problems when maternal sensitivity was high, comparative to when maternal sensitivity was at moderate levels. Similarly, Liang et al (2019) found very high levels of maternal sensitivity increased the positive association between infant temperamental withdrawal and internalising problems. The authors proposed that when mothers are sensitive to their infants they may be more likely to protect their temperamentally withdrawn children from situations when they notice they begin to become distressed or wish to leave, thus reducing opportunities for the child to learn that they can cope and to regulate their emotions. It is plausible similar processes may occur for risk aversion, being aversive to taking risks may demonstrate similarities in child behaviour as withdrawal or fear. Therefore girls who display higher levels of caution in novel situations may evoke a response in fathers that shields them from trying new things or learning that they can cope, which in turn may increase the prevalence of internalising problems such as anxiety.

A potential explanation for why this finding was only found for fathers may be that fathers are more likely to shield their daughters from situations they find aversive. Shulman and Seiffge-Krenke (2015) claim the origins of fathers overprotection of daughters may stem from historic gender norms where daughters were viewed as property of their fathers. Whilst female autonomy and gender roles have evolved across time, paternal overprotection may be a reflection of a continuation of social narratives developed from historic perceptions and practices. Mascaro et al (2017) used neural imaging of fathers and found differential brain activity in response to their daughter's facial expressions comparative to sons. Further, they found fathers were more likely to use language concerning sadness with their daughters. Chaplin et al (2005) found that fathers attended more to their preschool age daughters 'submissive' (anxious or sad) facial expressions than they did their sons. Further, greater parental attention to submissive facial expressions predicted more displays of submission by daughters two years later.

In regards to externalising problems, more temperament by parenting interaction terms reached significance within the regression analysis. For boys externalising problems both

delayed gratification and risk aversion by mothers positive parenting reached significance within the model. There were no significant interaction terms with fathers parenting for boys. For girls, mothers' positive parenting and fathers' positive parenting both interacted with risk aversion in the prediction of externalising problems.

The results indicate that boys rated as low in risk aversion had more externalising problems when mothers were rated as having low levels of positive parenting comparative to mothers with mean levels of positive parenting. High levels of positive parenting did not have a significant effect on the outcome. This indicates that boys who are more willing to take risks may be more at risk to externalising problems when mothers positive parenting is also low. A meta-analysis by Karreman et al (2006) found that compliance was specifically negatively associated with parental negative control. Extreme defiance would be considered characteristic of externalising problems (Campbell et al, 2000). The positive parenting index may have captured elements of parental negative control (for example spanking/slapping as forms of punishment, shouting, yelling, and not involving the child in setting rules). Therefore, boys who are more likely to take risks may be less compliant when they experience low levels of positive parenting from mothers thus contributing to elevated rates of externalising behaviour.

Consistent with prior research this study found boys were rated as having significantly more externalising problems than girls. Of note is research that has explored parents' responses to risk taking. Morrongiello and Dawber (1999) found sons were encouraged to be more independent when it came to attempting a novel risk taking task (climbing and sliding down a fire pole) compared to girls. Girls were also given more warnings about safety and additional physical assistance with the task. Further, the researchers found that boys were rated as higher on measures of risk taking than girls. This research indicates that risk taking is more expected by boys than girls and parents may act in ways that encourage this. It is possible for boys who are particularly prone to being more likely to take risks this could contribute to increased displays of externalising behaviours.

For girls an interesting finding for the temperament variables was that risk aversion was not a significant predictor on its own, however for both the fathers and mothers models positive parenting interacted with risk aversion. Post hoc tests indicated that for mothers parenting, low levels of positive parenting were particularly pertinent for externalising difficulties; girls who are temperamentally less risk averse (i.e. more willing to take risks) may be particularly susceptible to the impact of low levels of maternal positive parenting and subsequently have

more externalising problems. Similar to the hypothesis for girls internalising problems and mothers, a plausible explanation is that mothers play an important role in helping their daughters to understand and express their emotions. It is notable that Oldehinkel et al (2004) found shyness (which shares links with risk aversion) may serve as a risk for internalising problems and a protective factor for externalising problems. When girls are more likely to take risks, (and therefore perhaps are more susceptible to externalising problems) have mothers who display less positive parenting, this may reduce opportunities or the likelihood that their children will communicate their feelings in a constructive manner. Thus, making it less likely they will inhibit maladaptive responses, subsequently increasing the likelihood of emotional communication being displayed outwardly in the form of externalising behaviour.

A clear crossover interaction occurred for fathers and risk aversion for girls externalising problems. At high levels of positive parenting as risk aversion decreased so did girls externalising problems. Conversely, at low levels of positive parenting as risk aversion decreased externalising problems increased. This indicates for daughters who are more willing to take risks, fathers positive parenting may play an important role in preventing the development of externalising problems. Of note is the finding regarding fathers education; fathers who had an education of A-levels or higher, had daughters with less externalising problems. A study by Cabrera et al (2007) found fathers education predicted more supportive paternal parenting, and supportive parenting by fathers was associated with children's emotion regulation.

It is important to consider the above finding of fathers' parenting and risk aversion impact on girls externalising problems in conjunction with the finding for risk aversion and fathers' positive parenting on internalising problems. It would appear girls more willing to take risks benefit (show less externalising problems) from higher levels of positive parenting by fathers; however when girls are more risk averse, high levels of positive parenting may place them at risk of more internalising problems. This finding indicates that particularly for girls, temperament traits may be an important consideration for establishing appropriate parenting interventions.

Delayed gratification by mothers positive parenting was significant within the boys model. Boys rated as being less impulsive (i.e. high levels of delayed gratification) generally had fewer externalising problems and as positive parenting increased, externalising problems decreased. Delayed gratification is closely linked with effortful control (Kochanska et al, 2000)

and is notable that Morris et al (2002) found that when effortful control was low, parental hostility predicted increased externalising behaviour. These findings are also consistent with literature around children's development of self-regulation, which has been linked with the development and trajectory of externalising problems (Perry et al, 2018). As aforementioned delayed gratification is linked with effortful control, and self-regulation is thought to encapsulate effortful control (Karreman et al, 2006; as cited in Morawska et al, 2019). Infants are unable to self-regulate and depend on their care givers to develop self-regulatory capacities. Unsurprisingly positive aspects of parenting are consistently linked with supporting the development of self-regulation (Morawska et al, 2019; Islamiah et al, 2023; Karreman et al, 2006).

From an attachment theory perspective, the infant-parent relationships is crucial in supporting infants to develop self-regulatory capacities (Levy, 2021). For children who are more temperamentally prone to dysregulation they may be particularly reliant on parenting to modify and develop these self-regulatory capacities. Of note are findings that self-regulation is amenable to parenting intervention. A review by Morawska et al (2019) found parenting interventions delivered during infancy, preschool and school age periods all had positive outcomes on children's self-regulation. Further, there was evidence of interventions having preventative benefits even in at risk groups such as children from lower socio-economic groups, those who had been fostered and children who were born preterm. The authors acknowledge that there is a dearth of research exploring parenting intervention on children's self-regulatory capacities and recommend this as an area of future exploration.

Additional considerations

Several covariates were entered into the regression models based on prior literature and whilst specific hypothesis were not made regarding these, there were interesting findings that may contribute to a better understanding of the mechanisms involved in the aetiology of internalising and externalising difficulties. Children with white identities had reportedly more externalising problems compared to children with racialised identities. This is consistent with other research conducted within UK populations where children with white identities have been shown to have different developmental trajectories of behavioural problems compared to those with racialised identities (Gutman, 2019). Similarly, a systematic review found that individuals from some racialised identities (specifically Black African and Indian) had fewer mental health problems than children with white identities, with children from other backgrounds showing

similar rates (Goodman et al, 2008). Of interest is that within the US this finding is often reversed; with children from Ethnic Minority backgrounds reportedly having more behavioural problems (Mak & Rosenblatt 2002; Nguyen et al. 2007, both cited in Gutman, 2019) thus highlighting important difference across two Western countries.

It is plausible that children with white identities do display more externalising problems, but an alternative consideration is that there may be differences in how parents from different ethnic backgrounds view and report on their children's behaviour. For example, it is plausible parents with white identities may view certain behaviours as more problematic than individuals from ethnic minority backgrounds view them, thus reporting is different on the SDQ. Similarly, there is certainly literature of cultural and social differences on the interpretation of self-reporting items (McNabb, 1990) and Ruby (2020) report that studies exploring measurement invariance for ethnicity on the SDQ is mixed. Specifically, within a UK population, Goodman et al (2010; as cited in Ruby, 2020) has found evidence of comparability between children with White British identities and children from Indian British backgrounds. However, Ruby (2020) reports explorations of differences across other racialised identities is missing.

For internalising problems, parental employment was significant for both mothers and fathers. This indicates parental employment reduced the likelihood of children having internalising problems. The picture for externalising problems and parental employment was less clear, for boys externalising problems parental employment reduced the likelihood of externalising problems, for girls parental employment was not significant. Heinrich (2014) reports that parental employment can have both positive and negative consequences on child wellbeing and a range of factors are relevant to exploring this. For example, type of occupation, work stress, hours worked, how soon mothers returned to work after the birth of their child, and child care arrangements, are all relevant considerations. Of relevance to the findings of this current study is a meta-analysis by Lucas-Thompson et al (2010) who found that parental employment was related to fewer internalising problems reported by teachers, however no significant effect was found for externalising problems. It is plausible that employment is more important as a factor for internalising problems than externalising. As internalising problems encapsulate peer relationships problems on the SDQ, this finding may be linked to research that suggests that good quality child-care experiences are linked with increased social competence (Kontos et al, 1994, Peiner-Feinberg et al, 2001; as cited in Lucas-Thompson et al, 2010).

Critical appraisal

The findings of the above study highlight the complex interplay of factors involved in the aetiology of internalising and externalising problems. The study indicates that different factors may interplay in the development of these difficulties. Whilst beyond the scope of this study it is important, acknowledge the role of genetics in the constructs examined. Studies have found evidence of a role of genetics in both temperament and personality (Saudino, 2005; Hill et al, 2016; Bratko et al, 2017). For example, a meta-analysis by Vukasović and Bratko (2015) that used data of over 100,000 participants estimated that 40% of differences in personality were due to genetic factors, an estimate that is consistent with other studies (Bratko et al, 2017). There is also evidence of a role of genetic factors for both internalising and externalising problems (Gjone, & Stevenson, 1997; Verhulst & Boomsma, 2003; Nikstat & Riemann, 2020). Gjone and Stevenson (1997) found consistent with previous studies that genetics appears to play an important role in the stability of internalising and externalising difficulties in children over time (estimating that genetics accounted for between 55%-66% stability). They also found that shared factors (including parenting) accounted for 23-37% of the stability of problems over time.

Taking an ecological systems theory approach to child development (Brofenbrenner, 1979; as cited in Härkönen, 2001), this study has mainly focused on the bidirectional influences between the individual (temperament) and one particular micro system (the parent). Brofenbrenner (1979, as cited in Härkönen, 2001) argues that it is these bidirectional influences in the microsystem that exert the strongest influence on the child, but systems outside of this can impact these inner structures (Härkönen, 2001). This study has tentatively considered some influences at the macro level (such as social and cultural norms) however, these have not formed the main focus of this study. It is important to recognise not only the microsystem of the family around the child but also the impact of other systems including the macro systems in which children are raised.

In considering the wider macro-system it is important to consider the findings of this study in the context of the culture they were explored. This study mirrored results that have been found in other countries for example negative affect was linked to both increased internalising and externalising problems indicating some cross-cultural similarities. There were also some different findings for example, children with white identities displayed more externalising problems than those with racialised identities which contrasts with results found

in the US (see Mak & Rosenblatt 2002; Nguyen et al. 2007, both cited in Gutman, 2019). Further, it is important to recognise that the importance of temperament on child wellbeing may be a particularly pertinent factor within Western individualistic cultures, but that within collectivist cultures where group identity and cohesion is of greater value, individual temperament factors may be less salient (Markus & Kitayama, 1994).

One of the novel aspects of this study was the exploration of child temperament and parenting influences within a UK sample. At the time of the literature review no study that reported on a UK population for both internalising and externalising problems could be found for children aged 8 or younger. A benefit of utilising data from Understanding Society was that a large participant pool was readily available allowing for the study to have a significant sample. As a rule of thumb for regression analysis at least 10 observations are recommended per predictor (Statistics Solutions, 2024) with some recommending up to 20 (Gotelli, 2004, as cited in Jenkins & Quintana-Ascencio, 2020). The smallest subsample was 1082 and 14 predictors were entered into the regression indicating that the sample size should have had sufficient power for the analytic tests run.

Whilst some studies from the literature review have had the benefit of larger samples, no study ran analysis separately for parent and child gender. As previously highlighted, associations between parenting and temperament have been found to differ on the basis of both child and parent gender (Porter et al, 2005; Sanson & Rothbart, 1995). Further, there is evidence that fathers and mothers parent their sons and daughters differently (Starrels, 1994; Leaper et al, 1998; Morawska, 2020). A strength of this study is the consideration of these differences and in contributing to the understanding of how gender may influence child psychological outcomes. Given the findings of this study of different interactions on the basis of child and parent gender, previous studies may have missed the opportunity to capture these effects.

It is important to recognise that whilst this study did benefit from a large sample, some covariates had to be grouped in ways that may have missed important nuances, as without this grouping sub samples would have become too small. For example, parental employment was grouped into employed versus unemployed. As discussed as part of the findings, Heinrich (2014) highlights that parental employment can have beneficial or aversive consequences and this is due to a range of factors including amount of time worked. For example, Heinrich (2014) reports children have better cognitive outcomes when their mothers work part time rather than

full time during the first three years of their lives. Similarly, Brooks-Gunn et al (2010) found evidence that full time but not part time employment during children's first 12 months impacted on children's cognitive development during first grade. Key differences may have been found if it had been within the scope of this study to explore different types of employment such part time versus full time work.

Another important example of an issue with needing to group categories more broadly for this study is with how ethnicity was conceptualised for analysis. Children were either identified as coming from white or ethnic minority backgrounds. It is important to recognise and highlight the differences across ethnic backgrounds and how specific identities may have vastly different experiences. Particularly, when there is evidence of differences in rates and developmental trajectories of externalising problems amongst different ethnic minority groups (Goodman et al, 2008; Gutman, 2019). Exemplar of the problem with a dichotomous categorisation of ethnicity is that Gypsy or Irish traveller and white British would both had come under the category of having white identities. Similarly, individuals from Indian backgrounds and individuals from Arab background would have both been categorised as coming from an ethnic minority backgrounds. It is logical to assume that these individuals will have vastly different cultural expectations, norms and experiences that will shape parenting, child development and perspectives on these. For example, individuals from gypsy and traveller communities are recognised as having distinct cultural norms and heritage and there are a number of distinct individual groups that fall under the category of gypsy or traveller (for example Romany Gypsies, Irish Travellers and Bargees) (Sweeney & Matthews, 2017). Further, experiences of stigma and discrimination which impact psychological wellbeing are well documented for individuals from gypsy traveller communities, an experience which will be vastly different to individuals with white British identities (Sweeney & Matthews, 2017).

The consideration of the broader construct of negative affect alongside the specific facets of delayed gratification, risk aversion and patience makes an important contribution to the literature on temperament. Putnam et al (2002) highlights the importance of a move to increased specificity in temperament research due to evidence that differential outcomes have been found for specific aspects of temperament. In particular, the exploration of patience and risk aversion is of note. Whilst there is research exploring risk aversion (and conversely risk taking) and the outcomes of internalising and externalising problems, the literature review indicated this had not been explored in the context of an interaction with parenting. The finding of girls risk aversion by fathers parenting was particularly striking in that there was a clear

cross over interaction for both internalising and externalising problems in girls by fathers positive parenting. The trait of patience has been particularly understudied and so the finding that patience independently predicts internalising and externalising problems in girls and externalising problems in boys is notable.

Whilst this study benefitted from the exploration of multiple temperament traits including both the broader dimension of negative affect and specific facets and both well studied and under studied constructs. A limitation rises from how these were assessed. As the project relied on secondary data it was beyond the scope of this project to select the instruments of measurement for the variables. It is important to acknowledge that it would have been preferable for validated measures to be used within the study, particularly for variables (i.e. negative affect) that have well established validated measures that have been used frequently by other researchers. For example the Child Behaviour Questionnaire (CBQ; Rothbart et al, 2001) assesses negative affect and the literature review indicated multiple studies (n=7) had used this.

Temperament was reported by the child's primary caregiver. As discussed as part of the systematic literature review there are advantages and disadvantages to self-report measures. They can be open to several biases and interpretation may be dependent on the cultural context of the individual reporter (Zahidi et al, 2019; McNabb, 1990). However, there is evidence that parent reported measures can provide a valid index of child temperament (Rothbart & Bates, 2007). Parenting measures may also be particularly susceptible to social desirability responding. Further, Putnam et al (2002) argues that measures of temperament and parenting may be at risk of non-independence when reported by the same individuals, as characteristics that influence their reporting on one measure may also affect their reports on the other. However, a notable strength of self-report measures is argued by Morris et al (2002; as cited in Kiff et al, 2011) that self-report measures may have the benefit of capturing behaviours or practices that might otherwise be missed through observational measures.

The SDQ is a widely validated measure (Goodman, 2006; Sharp et al, 2005; Stone et al, 2010) and was used by several studies (n=4) captured within the systematic literature review. As with measures of temperament and parenting internalising and externalising problems were assessed by the child's primary caregiver. Fält et al (2018) found good inter-rater agreement between parents on the SDQ indicating that informant information from one parent may be sufficient to give a good indication of their child's difficulties. They also

suggested that discrepancies that can occur between teacher and parent report may reflect differences in behaviour seen across different contexts.

There are some concerns within temperament and psychopathology literature regarding the conceptual overlap between temperament and psychological problems. Lahey (2004) states that measures of temperament often include items that are synonymous with symptoms of psychological difficulties. A further consideration is that some researchers argue that psychopathology can be understood as part of the continuum of temperament, this is known as the spectrum model. Examples within this model would be that depression and anxiety may reflect extreme ends of the negative affectivity profile and ADHD may be understood as reflecting (a lack of) effortful or inhibitory control (Rettew & McKee, 2005). A synthesis of the literature by Rettew and Mckee (2005) proposed that an alternative model-the risk model offered the strongest theoretical understanding. Within this model temperament is viewed as separate from mental health difficulties but that certain traits or combinations of traits may increase an individual's risk to certain psychological difficulties. They cite that multiple mediating and moderating variables have been found between temperament and psychopathology and that temperament only explains some variance of psychiatric diagnoses as evidence for this theoretical framework.

Despite the aforementioned difficulties with the use of self-report measures it is important to recognise that data captured on a large scale with a vast number of participants would not have been possible with the use of observational measures. One strength of this study is the time difference of when temperament and the outcomes were assessed. Temperament was assessed at age 3 and internalising and externalising problems were assessed two years later. Assessment at the same time period may serve to increase associations between temperament and behavioural/emotional measures, and that this can be mitigated at least somewhat by asking at different time points. Further, the time difference also serves to highlight the predictive capability of temperament in the development of difficulties.

The approach to explore both independent and interaction effects of parenting and temperament on the outcomes would be considered a strength of this study. Regression analysis using interaction terms was used by some authors within the systematic literature review. However, this study benefitted from a much larger sample allowing more predictors to be entered into the regression models whilst still retaining sufficient power. Further, this study ran analysis separately for both child and parent gender which the results of the literature review

indicate no prior study has done. Whisman & McClelland (2005) have stated that studies that use interaction terms do tend to have less power. Aiken & West (1991) argue that effect size of interaction terms tends to be an underestimation of the true effect. Further, Champoux and Peters 1987 (as cited in Kiff et al, 2011) report that often with interaction terms there may only be small changes in the amount of variance explained within a model but that this does not mean the interaction effect itself is small. Therefore, the results of several significant interaction terms within this study is notable.

Implications, Recommendations and future directions

Although well documented that gender plays a role between temperament and parenting (Porter et al, 2005; Sanson & Rothbart, 1995), and there is even evidence of a moderating effect of gender in the relationship between temperament and parenting (Gordon, 1983; as cited in Putnam et al, 2002). The systematic literature review indicated that whilst studies may consider gender of parent or the child, few consider the interplay between the two. Engle & McElwain (2011) was the only study in the systematic literature review that included both maternal and paternal parenting and also child gender. However, their study only controlled for gender in their analysis and did not run an analysis separately for parent and child gender. The results of this study highlight the importance on considering gender in the parent-child dyad. Future research that explores interplay between parent and child factors (such as temperament) and child development, particularly internalising and externalising problems should endeavour to consider this within the context of gender.

In regards to gender, the systematic literature review highlighted how fathers continue to be missing from the literature, a finding that has been consistently found in previous meta-analyses (Phares & Compas, 1992; Phares et al, 2005; Parent et al, 2017). This study found different effects on the basis of mothers and fathers parenting, and certainly other research indicates clear differences in parenting dependent on parents' gender (Yaffe, 2023). This study offers valuable insight in how fathers parenting may help reduce risks of internalising and externalising problems developing. It is recognised the role of fathers has significantly changed over time. Traditionally fathers may have been the main breadwinners with mothers expected to take on the majority of child rearing activities (American Psychological Association, 2009). Perceptions around gender roles and subsequent barriers to women developing their professional carers have shifted over time meaning women are more likely to return to work after having children. Further, whilst historically it would have been economically viable for

many families to get by on one income, increasing economic pressures have contributed to a rise in the number of families that now have two working parents. These changes undoubtedly come with changes in the role of fathers in child rearing, for example 'stay at home dads' mean fathers are now taking on more child rearing responsibilities than historically and this is likely to continue to increase (American Psychological Association, 2009). Therefore, there is a clear need for future research to include fathers within the parenting literature.

The systematic literature review and consolidation of literature for this research revealed that the temperament traits of difficult temperament and negative affect have both received a lot of attention within the field. As recommended by Putnam et al (2002) research may benefit from moving away from these broader conceptualisations and focusing more on narrower dimensions of temperament. The results of this study highlight how focussing on specific traits may enrich the understanding of links between temperament and internalising and externalising problems. The findings in relation to patience are exemplar of this given not only the paucity of research exploring its impact on either internalising or externalising problems but the lack of research exploring it in the context of either adult outcomes or more general child wellbeing outcomes. Therefore, the finding that increased patience was associated with fewer internalising problems for girls and fewer externalising problems for both boys and girls, and that this fits with emerging literature on adults, indicates that this may be a particular trait that warrants further attention.

The exploration of the interaction between parent and child factors in the aetiology of internalising and externalising problems has been explored primarily in the US. Given that this study found both results that paralleled previous research in the US (for example findings that indicate increased negative affect is associated with more problems) and also some differences (for example the link between being from a racialised minority background and externalising problems appears reversed in the UK compared to findings from the US). Future research would benefit from exploring across and within different cultural contexts. Research should aim to not only extend beyond countries but also under investigated groups, for example comparing differences between different cultural groups from within the same country. The utilisation of secondary data analysis of population surveys may be particularly beneficial for these purposes as they often have the benefit of larger samples sizes.

As research indicates a strong genetic component in relation to temperament and personality (Saudino, 2005; Vukasović & Bratko, 2015; Hill et al, 2016; Bratko et al, 2017) as

well as for both internalising and externalising problems (Gjone, & Stevenson, 1997; Verhulst & Boomsma, 2003; Nikstat & Riemann, 2020). Research that is able to control for the potential confounding effect of genetics in this topic area would be of interest. Typically, such research would need to rely on data collected from twins or adoptive and non-adoptive twins (Saudino, 2005).

The wider clinical implication of this study highlights two key aspects. Firstly, that when it comes to parenting interventions for internalising and externalising problems increasing positive parenting alone is an over simplification. The results of this study highlight that boys and girls who score low on measures of risk aversion, may particularly benefit from increased positive parenting to help reduce the incidence of externalising problems. For girls who are highly risk averse, fathers parenting appears important, and it would appear increasing positive parenting from fathers may actually place them at risk of more internalising problems. These results indicate that success of interventions may benefit from consideration of child individual differences. Further, as was hypothesised one mechanism through which positive parenting may contribute to further internalising problems in risk averse girls was through fathers shielding them from situations they find aversive. Interventions that aim to target increasing parent's skills in promoting their child's self-regulation specifically may be beneficial. Fathers shielding daughters from aversive situations does not teach them they are able to cope and manage, so if parents are instead supported to encourage their children to approach situations they find anxiety provoking and support them to regulate and manage difficult feelings that arise this may be of benefit.

A second key aspect of this study is that certain temperament traits may place children at increased risk of later internalising or externalising problems. There is evidence that early intervention for psychological problems can prevent the development of more serious difficulties in adults, but also in children and adolescents (Cuijpers et al, 2005) even in at risk groups (Morawska et al, 2020), as well as offer economic savings (Mihalopoulos et al, 2011). Further, it has been argued that parents may be more able and willing to invest time and effort into a child who is prone to distress when their child is younger but may struggle to continue this as their child grows (Crockenberg, 1986; as cited in Putnam et al, 2002). Therefore intervening at an earlier stage may have the added advantage of parents being able to invest more energy into using techniques and strategies learnt through intervention programmes.

Early intervention is also congruent with ideas from research that has explored both genetics and shared environmental influences (including parenting) on internalising and externalising problems. For example, Gjone and Stevenson (1997) have highlighted that as both genetic and shared factors influence stability of difficulties, identifying children who are at increased risk due to genetic vulnerability and averse environmental factors, has clinical utility in identifying children who may benefit from early or preventative intervention.

The conclusions drawn from this study would indicate that parenting interventions that focus on supporting children to develop their emotion regulation may be of benefit in the prevention of both internalising and externalising difficulties. In fact, the Solihull approach to parenting is built on the premise that in order for parents to offer containment (of feelings that are unmanageable to a child) the parent must be first supported to contain their own feelings and anxieties. The approach maintains that this allow parents to think more clearly about what their child's behaviour may communicate and attune more effectively to them (Early Intervention Foundation, 2023). Evidence has been found that this approach can be helpful for improving child behaviour outcomes, promoting prosocial behaviour in children, reducing parent and child anxiety and improving parent child relationship (Early Intervention foundation, 2023). Similarly, there is evidence for other approaches that encourage the development of self-regulation through parenting intervention (Morawska et al, 2019). Recommended interventions of children's mental health problems include individual and group therapies such as CBT as well as systemic approaches such as Functional Family Therapy (Roth et al, 2011). Whilst there is evidence for the efficacy of these approaches (Roth et al, 2011), approaches that focus on increasing parents capacities to support their child's self-regulation may be a more amenable and cost effective target for preventative intervention (Morawska et al, 2019).

Self-reflexivity

I consider myself a critical psychologist and I reject the notion of psychiatric diagnosis. A perspective that stems from my own lived experience of mental health difficulties but also as a clinician who has witnessed the harm that can arise from a medical model approach to human distress. I was shocked by the use of the language of 'disorder' in some of the research on children. In line with this, I would like to clarify I view internalising and externalising difficulties as reflecting the different ways individuals may manage and deal with emotional distress rather than inherent pathologies. However, I feel some apprehension with my research,

in that if/when published it may be used and described in terms and ways that do not align with my own beliefs, which therefore poses the risk that it may contribute to narratives that I feel pathologise understandable human reactions and responses.

Reflecting on this research, I recall at the start of my training on the doctorate when considering what topic area I would like to explore, drawing a complete blank as to what I should investigate. Having spent several years working in various clinical contexts with clients, at the start of my journey I positioned myself as 'more of a clinician than a researcher'. Throughout my clinical work it is not the specific model or 'task' I have undertaken with a client that has struck me but the relational aspects and the transformative power these can have for both client and clinician. In connection to this I have had a long-standing interest in understanding early relational experiences, in particular attachment theory has always been an area of interest. It is this interest that pulled me into this topic area as the focus of my research.

This research at times has felt like one of the most daunting tasks I have ever endeavoured. The amount of data alone was overwhelming and having not attempted research since my undergraduate days, I recall at the start truly believing that quite simply I was not smart enough to complete this project and wishing that I didn't have to do it. However, as I started the process my relationship with the project changed; it was exciting to explore something new, to develop a sense of mastery (particularly around data management) and to apply my critical psychology lens to my own work.

An aspect of client work is to sometimes be presented with parts of our own experience reflected back at you in the therapy room. This can obviously be a challenge, but it is something that is to be expected given the nature of the work. They say most "research is mesearch" (Beatrice Beebe, as cited in van der Kolk, 2014, p.109) and I think what has surprised me most about this project is how, similar to some of my client work, it has connected with aspects of my own personal experience. The research has made me reflect and connect more deeply with some of my own earlier experiences and at times this has been far more confronting than I would have expected or wanted. A psychodynamic perspective may suggest that aspects of ourselves can become projected into our research, and with that we may project our own idealism. I wonder if some of the struggle at times in completing this work has been in recognising that in making this achievable and realistic, parts of it are not what I would have fully hoped. In this way this project has evoked difficult feelings and challenges, but it has also pushed me to do more, be better and work harder than I ever have. In the struggle of attempting

what had felt like a herculean task I feel I have truly grown, not only as researcher but as a person. I feel my relationship with this thesis will have a lasting impact on me, and it has allowed me to better recognise my own resilience and determination.

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Appendix A

This appendix details the Critical Appraisal Skills Programme (CASP) Checklist for case control studies that was used for the systematic literature review. Please note not all questions were appropriate for the studies included in the review so are not presented in table 3 in the main body of text.

Question	Possible response
Did the study address a clearly focused issue?	Yes
	Can't Tell
	No
Did the authors use an appropriate method to answer their question?	Yes
	Can't Tell
	No
Were the cases recruited in an acceptable way?	Yes
	Can't Tell
	No
Were the controls selected in an acceptable way?	Yes
	Can't Tell
	No
Was the exposure accurately measured to minimise bias?	Yes
	Can't Tell
	No
Aside from the experimental intervention, were the groups treated equally?	List
Have the authors taken account of the potential confounding factors in the design and/or in their analysis?	Yes
	Can't Tell
	No
How large was the treatment effect?	Comment
How precise was the estimate of the treatment effect?	Comment
Do you believe the results?	Yes
	No
Can the results be applied to the local population?	Yes
	Can't Tell
	No
Do the results of this study fit with other available evidence?	Yes
	Can't Tell
	No

Appendix B

This appendix details the Critical Appraisal Skills Programme (CASP) Checklist for cohort studies that was used for the systematic literature review. Please note not all questions were appropriate for the studies included in the review so are not presented in table 3 in the main body of text.

Did the study address a clearly focused issue?	Yes
	Can't Tell
	No
Was the cohort recruited in an acceptable way?	Yes
	Can't Tell
	No
Was the exposure accurately measured to minimise bias?	Yes
	Can't Tell
	No
Was the outcome accurately measured to minimise bias?	Yes
	Can't Tell
	No
Have the authors identified all important confounding factors?	Yes
	Can't Tell
	No
Have the authors taken account of the potential confounding factors in the design and/or in their analysis?	Yes
	Can't Tell
	No
Was the follow up of subjects complete enough?	Yes
	Can't Tell
	No
Was the follow up of subjects long enough?	Yes
	Can't Tell
	No
What are the results of this study?	Comment
How precise are the results?	Comment
Do you believe the results?	Yes
	Can't Tell

	No
Can the results be applied to the local population?	Yes
	Can’t Tell
	No
Do the results of this study fit with other available evidence?	Yes
	Can’t Tell
	No
What are the implications of this study for practice?	Yes
	Can’t Tell
	No

Appendix C

This appendix provides a copy of the quality appraisal form used by the review author to guide the quality appraisal for the systematic review.

Study Citation:

Was the research question clear?

Was the need for the study adequately substantiated? Explain.

Is the clinical need/wider context of the study explored?

What was the design of the study?

How were the data collected (one time (cross-sectional) or repeated over time (longitudinal)?

What were the limitations of the data collection methods?

Describe the sample.

How was the sample selected (eligibility criteria)?

How is the sample representative of the population?

Consider: Sampling sizes, gender of children and parents, family structure, SES, Education/ Occupation, Ethnicity

Is attrition documented-how was it managed?

Describe the variables of interest.

If it is a correlation study, on what variables are associations being examined?

Were there any confounding variables?

Was the sample size large enough to detect a statistically significant association or difference?

Was a power analysis performed?

Were there any potential sources of bias?

Did the study author note any limitations/sources of bias?

Consider financial conflicts and funding

Describe the reliability and validity of the measures.

Were the measures appropriate for the population or the variable being studied? Explain

Are there any aspects of the procedure that are unclear?

Are the measures specifically valid for this population (e.g. consider age when tools were administered)

Was the measure modified in anyway-was this appropriate?

Was the whole measure used? If not are the subscales used valid on their own?

Were the analysis plans (statistical methods) described in detail?

How were the data distributed (e.g., normal versus skewed)?

Were the correlative and comparative tests appropriate for the type of data analysed and the questions asked? Explain

Consider assumptions that may be held by certain statistical tests.

What were the main findings?

Was there clinical significance? Statistical significance?

How statistically significant? E.g. $p<0.01$

Did the authors put their findings in the context of the broader literature on this topic? Explain

Appendix D

This appendix details the questions asked on the Strengths and Difficulties Questionnaire (SDQ; Goodman, 2001) and the corresponding subscales. Potential responses include; not true, somewhat true, certainly true and can't say.

SDQ Subscale: Emotional Problems
Child often complains of headaches, stomach-aches or sickness
Child has many worries, often seems worried
Child is often unhappy, down-hearted or tearful
Child is nervous or clingy in new situations, easily loses confidence
Child has many fears, easily scared
SDQ Subscale: Conduct Problems
Child often has temper tantrums or hot tempers
Child is generally obedient, usually does what adults request
Child often fights with other children or bullies them
Child often lies or cheats
Child steals from home, school or elsewhere
SDQ Subscale: Hyperactivity/Inattention
Child is restless, overactive, cannot stay still for long
Child is constantly fidgeting or squirming
Child is easily distracted, concentration wanders
Child thinks things out before acting
Child sees tasks through to the end, good attention span
SDQ Subscale: Peer Relationship Problems
Child is rather solitary, tends to play alone
Child has at least one good friend
Child is generally liked by other children
Child is picked on or bullied by other children
Child gets on better with adults than with other children
SDQ Subscale: Prosocial Behaviour
Child is considerate of other people's feelings
Child shares readily with other children (treats, toys, pencils etc.)

Child is helpful if someone is hurt, upset or feeling ill
Child is kind to younger children
Child often volunteers to help others (parents, teachers, other children)

Appendix E

This appendix details the questions, responses and scores for the child temperament traits of risk aversion, patience and delayed gratification.

Variable	Question	Responses and scores
Risk Aversion	Parental assessment of child risk aversion: how willing is child to take risks?	1= " Completely willing to take risks ", 2 , 3, 4, 5, 6, 7=" Completely unwilling to take risks "
Patience	Is child generally an impatient child, or a child with a lot of patience?	1=very impatient, 2, 3, 4, 5, 6, 7=very patient
Delayed Gratification	Is child generally a child who takes a long time to reflect on things and thinks before acting, in other words, not at all impulsive, or is child a child who acts without much reflection, in other words, is very impulsive?	1=not at all impulsive, 2, 3, 4, 5, 6, 7=very impulsive

Appendix F

Temperament variables, responses and scores used to create negative affect score

Question	Responses and scores
Child is usually happy and content.	1-Agree completely 2-Agree somewhat 3-Disagree somewhat 4-Disagree completely
Child is easily irritated and cries frequently.	
Child is difficult to comfort when crying.	

Appendix G

Items included in the positive parenting behaviour index

Item number	Item	Responses and Scores
1	How often do you shout or yell at your child?	1-Never 2-Seldom 3-Sometimes 4-Very often
2	How often do you and your child spend time together on leisure activities or outings outside the home such as going to the park or zoo, going to the movies, sports or to have a picnic?	1-Never or rarely 2-Once a month or less 3-Several times a month 4-About once a week 5-Several times a week 6-Almost every day
3	Children vary a great deal in how often they talk to their parents about things that matter to them. How often does your child/ any of your children talk to you about things that matter to them?	1-Most days 2-More than once a week 3-Less than once a week 4-Hardly ever
4	How often do you allow your child/any of your children to help set rules?	1-Never 2-Seldom 3-Sometimes 4-Very often
5	How often do you praise your child?	1-Never 2-Seldom 3-Sometimes 4-Very often
6	How often do you spank or slap your child?	1-Never 2-Seldom 3-Sometimes 4-Very often
7	In the past 7 days, how many times have you eaten an evening meal together with your child and other family members who live with you?	1-None 2-One to two times 3- Three to five times 4-Six to seven times
8	How often do you hug or cuddle your child?	1-Never 2-Seldom 3-Sometimes 4-Very often
9	Most children have quarrels with their parents at some time. How often do you quarrel your child/any of your children? Is it...	1-Most days 2-More than once a week 3-Less than once a week 4-Hardly ever

List of Abbreviations

Abbreviations	Meaning
APQ-PR	Alabama Parenting Questionnaire-Preschool Revision
CASP	Critical Skills Appraisal Programme
CBQ	Child Behaviour Questionnaire
CBCL	Child Behaviour Checklist
CBT	Cognitive Behavioural Therapy
FIML	Full Information Maximum Likelihood Estimation
IBQ	Infant Behaviour Questionnaire
ICID	Inventory of Child Individual Difference
NHS	National Health Service
PRISMA	Preferred Reporting Items for Systematic reviews and Meta-Analyses
SD	Standard Deviation
SDQ	Strengths and Difficulties Questionnaire
TBAQ	Toddler Behaviour Assessment Questionnaire
UKHLS	UK Household Longitudinal Study