The evaluation of two measures of behavioural and emotional difficulties for infants and toddlers.

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Abstract

The literature demonstrates that internalising and externalising difficulties are prevalent in children aged 1-3 years and, in some cases, continue into childhood and adolescence. These difficulties may obstruct an infant's social, emotional and cognitive development and threaten parent-infant attachment security, and therefore a case has been made for the early identification and intervention of difficulties in children aged 1-3 years. However, there are few measurement tools available for use in this age range that are well validated, appropriate for use in clinical and research settings, easily accessible, and inexpensive. The present study aimed to establish the psychometric properties of two measures of internalising and/or externalising difficulties in children aged 1-3 years, namely an adapted version of the Preschool Parental Account of Childhood Symptoms (PPACS-A) and the Strengths and Difficulties Questionnaire (SDQ).

Study one involved the confirmation of the factor structure of the SDQ and an exploration of its reliability in a community sample of children aged 12-30 months. Study two involved an exploration of the factor structure, reliability and concurrent validity of the PPACS-A in a preschool sample of children aged 1-3 years, considered at risk of behavioural difficulties. The concurrent validity of the SDQ was also determined using this sample, with an exclusion applied for children above 30 months old. Adequate five factor first order and second order model fit were confirmed for the SDQ. The reliability of the SDQ subscale scores varied, with differences found across infant age and gender. Exploratory factor analysis revealed a three factor structure for the PPACS-A. The reliability of the PPACS-A and its observed factors varied, with the 'disruptive behaviours' factor showing the most promising internal structure. The concurrent validity of the PPACS-A and SDQ were established with

the CBCL. The SDQ and PPACS-A show adequate validity but the internal consistency of subscales are inconsistent. The study demonstrates that both measures perform better in the measurement of externalising difficulties such as temper tantrums, oppositionality and aggression. Further exploration of the psychometric properties of the SDQ and the PPACS-A is warranted.

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1   Introduction

1.1   General Overview

This thesis aims to establish the validity and reliability of two assessment tools, namely the Strengths & Difficulties Questionnaire (SDQ) and an adapted version of the Preschool Parental Account of Childhood Symptoms (PPACS-A), for use in the measurement of internalising and/or externalising difficulties in children aged 1-3 years. The measurement of internalising and externalising difficulties in infancy and toddlerhood may be considered advantageous in clinical and research settings. Clinically, measurement supports the identification of parent-infant dyads who may benefit from preventative/early interventions. Such interventions, aim to alleviate risk factors which may exert negative effects on a child's development and/or the development/maintenance of the caregiving relationship (Bricker, Davis, & Squires, 2004; Wichstrøm et al., 2012) and report advantageous clinical outcomes (Wilson & Lipsey, 2007). Measurement also facilitates routine outcome measurement in clinical practice, an approach recommended in good practice guidelines (Division of Clinical Psychology, 2015). As such, the availability of psychometrically robust measurement tools may be considered consistent with government/professional strategies which affirm the importance of good clinical practice in early years service provision and intervening early to improve child outcomes (Independent Mental Health Task Force, 2016; Leadsom, Field, Burstow, & Lucas, 2013; NSF, 2004; Parsonage, Khan, & Saunders, 2014).

From a research perspective, the measurement of internalising and externalising difficulties in infancy and toddlerhood supports the examination of difficulties across the developmental lifespan. Measurement would allow for the completion of longitudinal studies which allow for the examination of possible

emotional, social and behavioural precursors to difficulties in later preschool years, middle childhood and beyond (Szaniecki & Barnes, 2016). At present, clinicians and researchers alike must rely on the use of different measures across age groups, which present methodological limitations e.g. variations in different measurement tools ability to identify clinical cases (Braet et al., 2011; Koot, Van Den Oord, Verhulst, & Boomsma, 1997). There are few validated instruments available for use in the 1-3 year age range which allow for the gold standard measurement of internalising and externalising difficulties, are methodologically robust enough for use in clinical and research settings, are inexpensive, are developed with diverse samples and/or are easy to score/interpret (Carter, Briggs-Gowan, & Davis, 2004; Szaniecki & Barnes, 2016). The SDQ and PPACS-A exemplify two measurement tools which could be used in the measurement of internalising and/or externalising difficulties in a unified manner, across age groups and settings, and therefore the psychometric properties of the SDQ and PPACS-A are of interest.

The SDQ for parents/caregivers of 2-4 year olds (*www.sdqinfo.com),* represents a downward extension of a parent self-report screening tool, used to screen referrals and routinely monitor outcomes in Child and Adolescent Mental Health Services (CAMHS) (Mathai, Anderson, & Bourne, 2002, 2003; Wolpert et al., 2012). The downward extension was applied to facilitate the measurement of internalising and externalising difficulties in children aged 2-4 years, in addition to the existing measurement of difficulties in children aged 4-16 years (R. Goodman, 1997). The SDQ is validated cross culturally for use in children aged 30 months and above (Croft, Stride, Maughan, & Rowe, 2015; D'Souza, Waldie, Peterson, Underwood, & Morton, 2016; Du, Kou, & Coghill, 2008; Ezpeleta, Granero, de la Osa, Penelo, & Domènech, 2013; Klein, Otto, Fuchs, Zenger, & von Klitzing, 2013; Sim et al., 2015; Theunissen,

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Vogels, de Wolff, & Reijneveld, 2013), but very little is known of its psychometric properties in younger preschool samples.

The PPACS-A represents an investigator led semi-structured interview, adapted from the Preschool Parental Account of Childhood Symptoms (PPACS; Sonuga-Barke, Lamparelli, Stevenson, Thompson, & Henry, 1994), for use in the measurement of externalising difficulties in children aged 1-3 years, as part of the Healthy Start, Happy Start (HSHS) randomised controlled trial (Ramchandani et al., submitted). No psychometric establishment has been performed on the PPACS-A to date. This chapter will review the literature, providing a rationale for the measurement of internalising and externalising difficulties in children aged 1-3 years old. Internalising and externalising difficulties will be discussed in relation to the behaviours/constructs classified within them. Then the reader will be given an overview of infant development in the first three years of life and how this may confound the degree of internalising and externalising difficulties reported in preschool children.

This will be followed by a consideration of what constitutes typical and atypical internalising and externalising difficulties. Then, a review of the prevalence, continuity and stability of subclinical/clinical internalising and externalising difficulties will be provided and the long-term outcomes of preschool children who present with such difficulties reported. The measurement of internalising and/or externalising difficulties in children aged 1-3 years will be discussed and an appraisal of instruments readily available for use with children in this age group provided. Finally, the chapter will conclude with an outline of the aims, research questions and hypotheses for the present study.

1.2   Developmental psychopathology

The developmental psychopathology literature postulates that challenging early life experiences, occasionally displayed as social, emotional and/or behavioural difficulties in early childhood, may increase one's vulnerability to the development of mental health difficulties in later life (Robins & Rutter, 1990; Sonuga-Barke, Thompson, Stevenson, & Viney, 1997). As such, the prevalence, continuity and long-term outcomes of difficulties in school-age children has been extensively researched in the literature (e.g. Anderson, Williams, McGee, & Silva, 1987; Esser, Schmidt, & Woerner, 1990; Gould, Wunsch-Hitzig, & Dohrenwend, 1981). There has been longstanding emphasis placed on the importance of good comprehensive assessment and early intervention in the reduction of difficulties in school age children, with clinical attention drawn to the advantageous outcomes of preventative/comprehensive interventions (Khan, Parsonage, & Stubbs, 2015; Parsonage et al., 2014).

However, in recent decades there has been increased interest in infant development and mental health, due to evidence that there are a proportion of children, aged under 5 years, who present with difficulties and go on to display difficulties during the school years and beyond (Briggs-Gowan, Carter, Skuban, & Horwitz, 2001; McGee, Partridge, Williams, & Silva, 1991; Moffitt, 1990). This suggests that it may be important to study infancy and toddlerhood as a period in which precursors to later psychopathology may emerge. In line with this view, the significance of internalising and externalising difficulties in preschool children has been of interest to researchers attempting to understand the developmental trajectories of childhood difficulties and the impact of various risk and/or resilience factors (Campbell, Shaw, & Gilliom, 2000; Shaw, Keenan, Vondra, Delliquardi, & Giovannelli, 1997; Sonuga-Barke et al., 1997). However, before this may be considered, an understanding of normative infant

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development and consequential reports of internalising and externalising difficulties is paramount (Cicchetti & Richters, 1993).

1.3   Infant development

There is compelling evidence in the literature that preschool children, aged 1-3 years, experience social, emotional and behavioural difficulties which may otherwise be categorised as internalising and externalising difficulties (Briggs-Gowan, Carter, Bosson-Heenan, Guyer, & Horwitz, 2006; National Center for Toddlers and Families, 1994; Zeanah, 2011). Externalising difficulties, in infancy and toddlerhood, refer to overt behaviours such as noncompliance, aggression and hyperactivity. Internalising difficulties, in infancy and toddlerhood, refer to internal states such as anxiety, withdrawal and sadness (Campbell, 1995; Campbell et al., 2000; Gilliom & Shaw, 2004; Rubin & Mills, 1991). The prevalence of internalising and externalising difficulties in infancy and toddlerhood is somewhat explained by developmental shifts experienced in the first three years of an infant's life (Mares, Newman, & Warren, 2011). The first three years of life represent an idiosyncratic period within the developmental life span, due to rapid and complex developmental changes that occur (Gleason & Zeanah, 2005; Zeanah, Boris, & Larrieu, 1997).

In the first year of life, dramatic developmental changes occur across domains which impact an infant's behaviour, emotional expression and the behaviour of caregiving adults. For example, infants begin to differentiate emotions, develop an enhanced interest and ability to engage with adults and develop greater stability of sleep states (Emde & Harmon, 1972; Zeanah et al., 1997). Infants experience a significant developmental transition in the first year of life, defined as the onset of focused attention (Emde, 1984) and the discovery of intersubjectivity (Stern, 1985), in

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which they begin to act like they understand that their thoughts, feelings and behaviours can be understood by others. These adaptations continue to be cultivated into the second year of life. It is at this stage that infants develop a preference towards a small number of caregivers for nurture and comfort (Gleason & Zeanah, 2005; Zeanah et al., 1997). It is likely that in the first year of life, in the absence of language competencies, overt behaviours and negative emotional expression serve to communicate distress and/or displeasure.

From the first year through to the third year of life, infants implement emotional expressions of smiling, pouting and anger to help them obtain desired goals, for example, displaying anger to obtain a favourite toy after it has been taken away. Infants begin to test the limits of their physical and emotional dependence (e.g. by refusing to do things), and are more likely to demonstrate frustration in response to perceived limitations (e.g. through protesting, hitting and kicking others) (Alink et al., 2006; Gleason & Zeanah, 2005; Hay, Castle, & Davies, 2000; Keenan & Wakschlag, 2000). Some of the developmental shifts, detailed above, and their associated qualitative changes, result in behaviours that lead to the attainment and maintenance of proximity to infants preferred individual, typically the primary caregiver. These behaviours, defined as attachment behaviours by Bowlby (1998), are of great importance during the course of healthy infant development. For example, it is the continued proximity between infant and primary caregiver(s) that supports the development of emotion regulation competencies in infancy and toddlerhood.

A process of co-regulation in which parents manage infant's distress by soothing, changing the environment, changing their facial expression and/or meeting the infant's needs, helps support a child's emotional development in infancy and toddlerhood (Kopp, 1989; Silver, 2013). In the absence of proximity and/or this

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process, infants may present with an increased expression of negative emotions and/or display longer periods of negative emotion before returning to their normal state (Shaw et al., 1997). As such increased expressions of negative emotions in infancy and toddlerhood may be considered reflective of difficulties in the caregiving context. Qualitative features of the caregiving context received by infants in the first three years of life, such as parental sensitivity (Wolff & Ijzendoorn, 1997), are postulated to mould infant's expectations of relationships as they move into the wider social context and affect their social competencies in later relationships (Balbernie, 2002; Bowlby, 1998) and thus optimal contexts are sought by health and social care provisions (Leadsom et al., 2013; NICE, 2012; NSF, 2004).

From three years onwards, significant advancements in symbolic representation leads to dramatic cognitive, emotional and social advancements. Infant's emerging language skills increase their ability to understand other people's directives to them and allow them to make their intentions more apparent to others. During the first three years of life infants begin to consolidate and enhance their new competencies as they prepare to move into wider social contexts (Zeanah, Anders, Seifer, & Stern, 1989; Zeanah et al., 1997).

From the above, it is evident that developmental transitions from infancy through to toddlerhood (0-36 months) may be experienced as escalations in behavioural difficulties such as temper tantrums, oppositionality and aggression (Keenan & Wakschlag, 2000). This view is supported by developmental studies examining the trajectory of difficulties in infancy and toddlerhood, which reveal that parental reports of externalising difficulties increase when an infant is aged 24 months (Achenbach, 1992; Gleason & Zeanah, 2005; Tremblay, 2004), and begin to decline from their third birthday onwards (Alink et al., 2006). Increased expression of

internalising and externalising difficulties in the infant-toddler period may also be indicative of difficulties in the care giving context and subsequently impact an infant's emotional development. In line with this notion, insecure attachment configuration, exposure to disagreements about child-rearing practices and parenting hassles, have all been associated with the development of internalising difficulties in the preschool years (Shaw et al., 1997).

1.3.1   Typical and Atypical internalising and externalising difficulties

The rapid and complex developmental changes that occur in the first three years of life make it difficult to determine the significance of internalising and externalising difficulties that present in infancy and toddlerhood, that is, whether they represent typical variations of developmental behaviours or clinically significant difficulties. Two operationalisations of atypical internalising and externalising difficulties are: 1) departures from age-appropriate norms, that is, difficulties that are normatively common but infrequent in very young children and 2) exaggerations of normative developmental processes, that is, difficulties that are extreme in intensity, easily precipitated and occur across settings (Wakschlag, Tolan, & Leventhal, 2010).

These operationalisations are supported by the literature which has attempted to delineate normative internalising and externalising difficulties from those of clinical significance using multiple research designs. For example, Belden and colleagues (Belden, Thomson, & Luby, 2008), explored whether differences in tantrum behaviours (e.g. intensity and frequency) could be identified in 'healthy' versus 'mood and/or disruptive disordered' preschoolers aged 3-6 years (Belden et al., 2008, pg.118). Preschool children were placed into one of four groups based on the application of DSM-IV algorithms. The four groups were: 'healthy' preschoolers;

preschoolers who met DSM-IV criteria for a mood disorder; preschoolers who met DSM-IV criteria for a mood disorder and a behavioural disorder; and preschoolers who met DSM-IV criteria for a behavioural disorder (n=279). Tantrum behaviours were measured by caregiver report using the Preschool-Age Psychiatric Assessment (Egger & Angold, 2004). The authors reported that healthy preschoolers showed significantly less tantrum behaviours than any other group. This suggests that higher rates of tantrum behaviours in preschool children may be indicative of clinically significant difficulties which might warrant further exploration.

Wakschlag and colleagues (Wakschlag et al., 2007), split a heterogenous sample of preschool children (n=327), age unknown, into three groups (non-disruptive, subclinical or disruptive) using diagnostic methods. They coded child behaviour, using an observation measure, during parent-child and examiner-child interactions to determine the pervasiveness, intensity, duration and predictability of disruptive behaviours across groups. It was reported that qualitative features of disruptive behaviours and its pervasiveness were distinguishable across groups, with the subclinical and disruptive group showing a higher rate of behaviours across most of the disruptive behaviours (e.g. defiance, temper loss and aggression towards adults and objects) examined.

Keenan & Wakschlag (2004) examined the behaviour of referred and nonreferred preschoolers aged 2.5-5.5 years old (n=129). The referred group represented preschoolers referred to a psychiatry clinic for aggression, noncompliance and/or temper tantrums. The authors reported that referred preschoolers had significantly higher rates of behavioural difficulties than non-referred children as measured by the Kiddies Schedule of Affective Disorders and Schizophrenia for School Age Children (Keenan & Wakschlag, 2004). Collectively, these findings

support the suggestion that the frequency, severity and/or pervasiveness of difficulties in preschool children may serve as an indicator of the clinical significance of difficulties in this age group. From this, it is tenable that the measurement of the frequency, severity and/or pervasiveness of difficulties in this age group may prove advantageous, as high scores may provide professionals and parents with indicators of difficulties that surpass normative behaviours and thus may warrant further attention. These parent-infant dyads may benefit from preventative/early intervention or signposting to appropriate support services.

However, it is important to note that the aforementioned studies have relatively small sample sizes and therefore the generalisability of findings to large preschool samples is questionable. Additionally, the aforementioned measurement of difficulties are all reliant on parental report. Parental report is influenced by parental emotional state and/or psychopathology (Briggs-Gowan, Carter, & Schwab-Stone, 1996) and parent-infant attachment style (Lyons-Ruth, Easterbrooks, & Cibelli, 1997), however, these were not controlled for in the studies cited. The limitations of parental report methodology will be discussed in more detail later. Lastly, the studies highlighted either do not provide demographic information pertaining to preschool age or have used older preschool samples who range from 2.5-6 years. This goes beyond the scope of the preschool sample of interest here, but it highlights a useful operationalisation of clinically significant internalising and externalising difficulties, which may be considered in younger samples.

There is no literature available which denotes typical vs. atypical internalising difficulties, in part because of the difficulty in identifying early manifestations of internal emotions but also because of a lack of developmentally driven theoretical models (Goldberg, Gotowiec, & Simmons, 1995; Shaw et al., 1997). However, the

literature suggests that clinically significant externalising difficulties may result in the emergence of internalising difficulties, due to the potential impact of externalising difficulties on the development/maintenance of relationships (Keenan & Wakschlag, 2000). In line with this notion, the literature suggests that internalising and externalising difficulties co-develop (Gilliom & Shaw, 2004) and therefore one might argue that the same pattern (typical vs. atypical) of internalising difficulties should be expected in preschool children.

1.4   The prevalence of clinically significant internalising and/or externalising difficulties in children aged 1-3 years

Internalising and externalising difficulties which may be considered to fall within subclinical/clinical thresholds have been reported in children aged 1-3 years cross culturally (Briggs-Gowan et al., 2001; Jenkins, Bax, & Hart, 1980; Koot & Verhulst, 1991; Lavigne et al., 1996; Newth & Corbett, 1993; Richman, Stevenson, & Graham, 1975); with reported estimates ranging from 7-35%. These prevalence rates are similar to those reported in cross sectional examinations of difficulties in older school age children (Egger & Angold, 2004; Skovgaard et al., 2007). Briggs-Gowan and colleagues (Briggs-Gowan et al., 2001) examined the prevalence of internalising and externalising difficulties in a large representative sample of 1-2 year old children (n=1280) in the United States, using the Child Behaviour Checklist for 2-3 year olds (CBCL/2-3; Achenbach, 1992) and the difficult child and parent-child dysfunctional interaction domains of the Parenting Stress Index (PSI; Abidin, 1990). They reported that 6.7% (n=85) and 9.3% (n=119) of 2 year olds scored in the subclinical or clinical range of the internalising and externalising subscales of the CBCL respectively. Additionally, they reported that 8.6% (n=110) of 1-2 year olds reported high scores on

one or both aforementioned domains of the PSI. No demographic differences were reported across scores.

Similar prevalence estimates were reported in an examination of 211 infants aged 17-19 months (Skovgaard et al., 2007) using clinical and standardised measurement tools e.g. the Child Behaviour Checklist (CBCL/1.5;Achenbach & Rescorla, 2000) and the Infant Toddler Symptom Checklist (ITSCL; Degangi, Poisson, Sickel, & Wiener, 1995b). Skovgaard and colleagues (Skovgaard et al., 2007) reported that clinically significant difficulties, in accordance with the International Classification of Diseases (ICD-10; World Health Organization, 1992) and the diagnostic classification Zero to Three (DC 0-3; Zero to Three, 1994), were found in 16% of the sample. Difficulties included hyperactivity/inattention, behavioural and emotional difficulties. Similarly, Jenkins and colleagues (Jenkins et al., 1980) reported that roughly 10% of a London sample of 1-2 year old children had internalising and/or externalising difficulties as determined by parent and paediatrician reports.

van Zeijl and colleagues (Van Zeijl, Mesman, Stolk, et al., 2006) examined the occurrence of externalising difficulties in the early preschool years. Externalising difficulties were measured in a general population sample of one year old (n=786), two year old (n=720) and three year old (n=744) children, using the Child Behaviour Checklist/1.5-5. The authors reported that most CBCL items occurred in more than 10% of one year olds and over one-third of items occurred in more than 25% of one year olds. Additionally, the authors reported significantly lower externalising scores for one year olds compared to two and three year old children.

Examinations of children within the 2-3 year age range have reported similar patterns of prevalence. Richman et al. (1975) examined the prevalence of

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externalising difficulties in a London sample of 3 year old children (n=705) using the Behaviour Screening Questionnaire (BSQ; Richman & Graham, 1971). They reported that 7% (n=52) of the sample endorsed items demonstrating moderate to severe externalising difficulties whereas 15% (n=106) reported mild difficulties. Boys were reported to have higher rates of moderate-severe difficulties than girls however, this was not to a significant degree. Similar estimates have been reported cross culturally in the literature with Dutch (Koot & Verhulst, 1991) and American (Lavigne et al., 1996) samples.

Comparable prevalence rates have been reported in three year old preschoolers from different heritages in the UK. Newth & Corbett (1993) examined the prevalence of externalising difficulties and other problem behaviours in White and Asian heritage children living in Birmingham. They reported that 13.8% of White heritage children reported moderate to severe externalising difficulties in comparison to 7.8% of Asian heritage children. Given the number of participants in both groups, this does not equate to a significant difference in prevalence across groups (n=65 and n=129 respectively), however a significant difference was found between parent heritage and complaints of difficulty managing behaviour. These findings suggest that parent heritage may play a role in the perceived management of difficulties and subsequently in the help seeking behaviours exhibited. heritage may impact whether support is sought and when.

Whilst accumulating evidence reports the prevalence of difficulties in children aged 1-3 years, epidemiological studies are not without limitation. For example, the prevalence literature is complicated by the identification of preschool difficulties using two different conceptual approaches, namely categorical and dimensional measurement approaches. Both approaches are of relative utility and report similar

results, but are not without weakness. For example, categorical approaches do not typically consider the frequency, pervasiveness and severity of behaviour and dimensional approaches may lack developmentally appropriate anchors/lead to normative behaviours being endorsed as symptoms (Keenan & Wakschlag, 2000; Moreland & Dumas, 2008).

Furthermore, the prevalence of internalising and externalising difficulties are most typically measured using parent report measures. Parent report measures of internalising and externalising difficulties may be considered problematic as they solely rely on the impression of the parent. Firstly, parents arguably have limited knowledge of infant development in the context of what differentiates normative developmental difficulties from clinically significant ones. Secondly, parents may be biased by their own thoughts and assumptions about infant development (Carter, Godrey, Marakovitz, & Briggs-Gowan, 2009). Thirdly, in the absence of advanced language competencies, parents may be unaware of an infant's internalising difficulties (Edelbrock, Costello, Dulcan, Conover, & Kala, 1986). Fourthly, differentiations have been found between parental reports of difficulties and reports given by other caregivers/informants (e.g. Miner & Clarke-Stewart, 2008). Lastly, internal processes or other developmental factors may influence parents perceptions of normative/challenging child behaviour (Richters, 1992). Increased parental reports of childhood difficulties have been associated with maternal depression and anxiety (Briggs-Gowan et al., 1996) and organised/secure attachment (Lyons-Ruth et al., 1997).

Despite the limitations of epidemiological studies, the literature consistently demonstrates the prevalence of internalising and externalising difficulties in community samples of preschool children. The identification of difficulties, using

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psychometrically robust measurement tools (e.g. the CBCL) provides empirical support for the validity and reliability of difficulties identified in this age group (Egger & Angold, 2006). There is debate in the literature regarding the significance of internalising and externalising difficulties in children aged 1-3 years old. The prevalence literature fails to demonstrate the negative implications of difficulties that reach clinical thresholds in this age group, that is, it fails to highlight the longevity of these difficulties and/or the effects of these difficulties on child outcomes. As such, it may be suggested that the measurement of difficulties in this age group is unnecessary. However, some researchers suggest that difficulties in the preschool years represent indicators of emerging psychopathology and therefore the continuity of internalising and externalising difficulties from the preschool years into childhood and adolescence is of interest (Campbell, 1995; Carter et al., 2004).

1.5   The continuity of internalising and externalising difficulties

Following the identification that a small percentage of preschool children aged 1-3 years old present with internalising and externalising difficulties that fall within the subclinical/clinical range, researchers have focused on the continuity/discontinuity of these difficulties over time. In a longitudinal study, Rose, Rose, & Feldman (1989) examined the continuity of difficulties in children from 2-5 years old. Parents were asked to complete the CBCL when their children were 2,4 and 5 years old. Correlational analyses revealed that internalising and externalising scores were highly correlated across ages and the authors reported continuity of externalising difficulties from age 2 to 5 years. Additionally, early externalising difficulties were found to predict internalising scores in later years. Internalising difficulties were only found to be stable between 4-5 years old.

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Fischer, Rolf, Hasazi, & Cummings (1984) examined the continuity of internalising and externalising difficulties from preschool (two years old) through to elementary and junior high school (15 years old) using behaviour checklist data. The authors reported that preschool externalising difficulties were positively correlated with later internalising and externalising difficulties. Internalising difficulties were predictive of later internalising symptoms for 2 year old girls and 5 and 6 year old boys only. These findings highlight the continuity of externalising difficulties over time and the somewhat inconsistent continuity of internalising difficulties. This fact is not lost in the literature with the majority of studies focusing on the continuity of externalising difficulties only (Bufferd, Dougherty, Carlson, & Klein, 2011; Cicchetti & Toth, 1991).

Continuity at the lower end of the 1-3 year age range has also been established. Mathiesen & Sanson (2000) reported a significant stability of externalising difficulties from 18 months to 30 months old. It was reported that 37% of children who scored above the sample mean for difficulties at 18 months were classified into the same problem group at 30 months. van Zeijl and colleagues (Van Zeijl, Mesman, Stolk, et al., 2006) reported stability coefficients of externalising difficulties for one year old children, ranging from .36-.48. More recently, researchers have been interested in the co-development of internalising and externalising difficulties over time. Gilliom & Shaw (2004) investigated the co-development of difficulties in a longitudinal analysis of preschool boys (n=303) from the age of 2-6 years. They reported a reciprocal relationship between internalising and externalising difficulties in that changes in one set of difficulties resembled changes in another. Additionally, it was reported that high externalising difficulties at age 2 were associated with greater internalising difficulties over time.

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Longitudinal evidence demonstrates the continuity of externalising difficulties from the preschool years into childhood (Campbell & Ewing, 1990; Richman, Stevenson, & Graham, 1982) and adolescence (McGee et al., 1991; Moffitt, 1990). However, the continuity of internalising difficulties appears to demonstrate a more inconsistent picture. The use of longitudinal methodology in the examination of internalising and externalising difficulties provides compelling evidence that difficulties identified in infancy and toddlerhood do not always represent transient developmental behaviours, and instead may reflect stable, early indicators of emerging difficulties. Additionally, investigation into the co-development of difficulties suggests that internalising and externalising difficulties are inter-related and that the presence of, for example, externalising difficulties in infancy may represent emerging externalising and/or internalising difficulties. As such, the continuity literature demonstrates that the identification of difficulties in the preschool years, may allow for the identification of difficulties which may warrant early intervention, at a time when difficulties may be more receptive to change (Keenan & Wakschlag, 2000).

However, the continuity literature is not without limitation, with some studies reporting important methodological flaws. For example, some studies report small sample sizes (e.g. Rose et al., 1989) and participant attrition (e.g. McGee et al., 1991). Despite this, the literature is consistent in its reports of the persistence of difficulties from the preschool years into childhood and in some cases adolescence. It must be noted that despite reports of significant correlation and stability coefficients within the literature, discontinuity is still likely to be the norm, with the majority of preschool children's difficulties desisting before reaching school age. Thus, there are likely mediating factors which determine the continuity of difficulties over time (Fischer et

al., 1984). Few studies have established what, if any, factors likely contribute to the stability and/or instability of internalising and externalising difficulties. In a longitudinal analysis of a community sample of children (n=921), over 13 years from the age of 18 months, family stress and maternal age were found to predict increased externalising difficulties (Kjeldsen, Janson, Stoolmiller, Torgersen, & Mathiesen, 2014). Similarly, Briggs-Gowan et al. (2006) found that, co-occurring problems, high family disruption and parenting distress because of child behaviour were related to the persistence of internalising and externalising difficulties over a 6-15 month period.

1.6   The effects of internalising and externalising difficulties on cognitive, social and emotional development

When considering the potential effects of internalising and externalising difficulties on developmental outcomes, one must consider potential transactional effects (i.e. the reciprocal effect on the parent-infant relationship) and the long-term effects of difficulties on cognitive, social and emotional development. Difficulties in the preschool years may threaten the parent-infant relationship and prevent the development of cognitive, social and emotional competencies required for the adaptive transition from preschool into the school years (Allen, 2011; Campbell, 1995).

1.6.1   Transactional effects

Transactional models of development (Lewis, 2000; Sameroff & Chandler, 1975; Sameroff & Fiese, 2000), describe transactional relationships between the child and the environment (parenting and other risk factors) in which they mutually alter each other. The child and primary caregiver(s) are postulated to create, modify and change behaviour reciprocally (Lewis, 2000). In the context of infant development, the

prevalence of internalising and externalising difficulties in children aged 1-3 years

must be considered in line with its environmental context (Zeanah et al., 1997).

A key facet of transactional models is that the parent and child continue to influence

each other over time. Parental behaviours are likely to impact on child behaviour and

parental behaviour is likely influenced by past and current child behaviours (Eiden,

Leonard, Hoyle, & Chavez, 2004; Lewis, 2000). For example, parental anxiety during

the first year of an infant's life may result in uncertain and inappropriate interactions

between parent and infant. In response to this inconsistency, an infant may develop

irregularities in feeding and sleeping patterns which present themselves as

externalising difficulties. These difficulties may decrease the pleasure a parent

attributes to their child, which in turn may reduce the amount of time a parent spends

interacting with their child. Additionally, child behaviour perceived as

challenging/negative may be met with parental criticism and expressions of stress

(Hunter & Hemmeter, 2009).

From this perspective, exploring the potential impact of internalising

and externalising difficulties in isolation is reductionist. In an attempt to understand

the impact of internalising and externalising difficulties inclusively, the impact of

internalising and externalising difficulties on the development/maintenance of

relationships with caregivers and peers must be considered (Hunter & Hemmeter,

2009). Difficulties in infancy may evoke negative emotions and behavioural

responses in parents. Mills & Rubin (1990) examined parents' beliefs about

preschoolers' displays of aggression and social withdrawal. It was reported that

aggression evoked negative emotions such as anger, disappointment and

embarrassment in parents. Parents reported confusion about social withdrawal. These

findings suggest that the impact of difficulties in infancy should not be considered in

isolation and instead should be considered in the context of the maintenance of the parent-infant relationship.

In an exploration of discipline practices in parents of 10-20 month olds, Zahn-Waxler & Chapman (1982) reported that externalising difficulties such as aggression and low impulse control were associated with unhelpful discipline strategies. Infant transgressions against people (e.g. pinching, snatching, evoking negative emotional responses in others etc.) were linked to psychological forms of discipline such as over-exaggerated displays of distress, whereas transgressions against property and lapses in impulse control (e.g. temper tantrums, emotional outbursts etc.) were associated with power focused discipline strategies such as physical punishment and withdrawal of love. These displays of discipline in response to externalising difficulties may impact on an infant's ongoing relationships and attachment. The way parents interact with infants lays the foundation for ongoing relationships and thus if an infant does not feel cared for, both emotionally and physically, they may develop a propensity to mistrust and fear other people (Balbernie, 2002; Golding, 2007).

The transaction between the child and the environment may also have negative personal outcomes. Caretaking adults (e.g. parents, nursery staff) may become increasingly frustrated by an infant's behaviour resulting in high levels of criticism. This may lead an infant to perceive relationships as stressful and problematic. Additionally, the infant may develop a view of the world as an unsatisfying place where they do not fit in and subsequently develop negative thoughts about themselves (Hunter & Hemmeter, 2009). Hyperactivity and aggression in infancy and/or toddlerhood may result in peers refusing to play with the infant/toddler due to their destructiveness, minimising opportunities for the development of social competencies (Keenan & Wakschlag, 2000). The environment provided by primary caregivers and

social relationships with peers can have substantial effects on early development and therefore good caregiving and socially inclusive environments are preferred (Balbernie, 2002).

1.6.2   Long term cognitive, social and emotional outcomes

Longitudinal research findings demonstrate that internalising and externalising difficulties in the preschool years may impede the development of skills which influence educational outcomes and attainment (Spira & Fischel, 2005). Washbrook, Propper, & Sayal (2013) investigated associations between parent reported externalising difficulties at age 3 and educational outcomes at 16 years old. It was reported that behavioural difficulties prevalent at age 3, impacted on academic attainment, as measured by GCSE results. For boys, hyperactivity/inattention and behavioural difficulties were associated with academic attainment. Similarly, McGee et al. (1991) completed a twelve year follow up of children identified as non-hyperactive and extremely hyperactive from the age of 3 years old. It was reported that children identified as extremely hyperactive at age 3 demonstrated poor cognitive skills, reading ability and emotion dysregulation at home and school in preadolescence and adolescence.

Olson and colleagues (Olson, Bates, Sandy, & Lanthier, 2000) examined the infant-toddler age precursors of children's later externalising difficulties. It was reported that children considered at risk of later difficulties during the school years and at age 17, were observed as difficult and resistant from as young as 6 months old. In a longitudinal analysis of preschool children, Mesman & Koot (2001) reported that preschool internalising and externalising difficulties at age two-three were predictive of their DSM-IV counterparts eight years later. Similarly, in a multivariate analysis of

internalising and externalising difficulties in preschoolers aged 12-36 months, Briggs-Gowan & Carter (2008) reported that high internalising and externalising difficulties scores significantly predicted psychiatric problems at school age.

Whilst none of the above studies allow for causation to be exacted, they demonstrate a relationship between internalising and externalising difficulties in the preschool years and reduced developmental competencies/educational outcomes, highlighting the importance of the infant-toddler period. It is known that once a child falls behind normative developmental trajectories the likelihood of ongoing developmental difficulties is increased (Leadsom et al., 2013) and thus the identification and prevention of internalising and externalising difficulties may be warranted.

1.7   Summary of the literature on internalising and externalising difficulties in preschool samples

The literature demonstrates that internalising and externalising difficulties in children aged 1-3 years old are of interest for three reasons. Firstly, a small proportion of preschool children aged 1-3 years present with internalising and externalising difficulties which meet subclinical/clinical thresholds. Secondly, internalising and externalising difficulties which present in the first three years of life persist into childhood and in some cases adolescence. Thirdly, internalising and externalising difficulties in the first three years of life may hinder an infant's social, emotional and cognitive development and threaten parent-infant attachment security. When taken together, the literature suggests that internalising and externalising difficulties in preschool children may pose potential threats to adaptive infant development. Therefore, the literature suggests that there may be clinical utility in the early

identification and intervention of difficulties in the preschool years. In line with the literature alluding to the importance of difficulties in the preschool years, recent government manifestos and health reports/reviews draw attention to the importance of the early years.

1.8   Health policy and service provision

1.8.1   Health policy and strategy

Health policy and strategy published in the last decade provide support for the identification and early intervention of difficulties in preschool children aged 1-3 years. *The National Service Framework For Children, Young people and Maternity Services* (NSF, 2004), *The Allen Review* (Allen, 2011) and *The 1001 Critical Days* manifesto (Leadsom et al., 2013) stipulate the importance of the first three years of life on an infant's social, emotional and cognitive development and the importance of parent-infant relationships. These publications note that difficulties in this critical time period may result in maladaptive variations of normative infant development and may be detrimental to the development and/or maintenance of the caregiving relationship (Allen, 2011; Leadsom et al., 2013). As such, it is unsurprising that early identification and good evidence based interventions are considered advantageous to optimal outcomes for children (Allen, 2011; Leadsom et al., 2013). This view is supported by the evidence base which demonstrates improvements in externalising difficulties and parental mental health following early years parenting groups (Parsonage et al., 2014). Early identification and intervention in the preschool years is thought to promote the skill development required on the path to school readiness and to prevent the manifestation of possible difficulties later on in life (Allen, 2011; Leadsom et al., 2013). *The Allen Review* (Allen, 2011) draws particular attention to

the positive economic implications of intervening early at a time where difficulties are less entrenched and therefore more responsive to intervention. More recently, *The Five Year Forward View for Mental Health* (Independent Mental Health Task Force, 2016) and the *Next Steps on the NHS Five Year Forward view* (NHS England, 2017) identify children and young people as a priority group for mental health promotion for some of the reasons highlighted above. Improved access to mental health care is stipulated and it is suggested that this include greater emphasis on the early identification of difficulties and preventative interventions. The importance of building on the evidence base for parenting programmes is advocated, a requirement of which is to have measurement tools available for the determinant of efficacy.

1.8.2 Service provision

National Institute for Health and Care Excellence (NICE) guidelines for the social and emotional well-being of vulnerable children under 5 years (NICE, 2012), reflects a universal service strategy in which all professionals (e.g. health visitors, psychologists, early years practitioners, GPs etc.) are responsible for the social and emotional well-being of vulnerable children under 5. In line with these guidelines, early years service provision is situated across primary care, secondary care, health and social care settings (Division of Clinical Psychology, 2015; Parsonage et al., 2014).

Child and adolescent mental health services (CAMHS) represent specialist mental health services for children aged 0-18 years old (Division of Clinical Psychology, 2015). Historically, interventions targeting children in infancy/toddlerhood were not seen as urgent and therefore deemed a low clinical priority (Pollock & Horrocks, 2010; YoungMinds, 2004). Due to a motivation to maintain short waiting lists and meet service level targets, referrals for children in infancy/toddlerhood may have been easily rejected due to little apparent symptoms

(YoungMinds, 2004). However, since attention was drawn to the importance of the first few years of life and early intervention in the *National Service Framework for Children, Young people and Maternity Services* (NSF, 2004), early years service provision promoting parent-infant relationships and early interventions is on the rise (Pollock & Horrocks, 2010).

Early infant mental health interventions put emphasis on two approaches; prevention and treatment. The first aims to target parent-infant dyads identified as at possible risk of later difficulties and/or provide universal programmes to support child development, whereas the second aims to work with referred cases where clinical difficulties have already been identified (Balbernie, 2002). What these approaches have in common is a requirement to identify children with varying levels of need. There is consensus amongst clinical psychologists that good psychological service provision for children should involve an assessment, formulation and intervention process (Division of Clinical Psychology, 2015). Thus, prior to the delivery of any infant mental health intervention, a multi-modal assessment approach geared towards developing a comprehensive understanding of a child's difficulties is necessary (Division of Clinical Psychology, 2015). A multi-modal assessment approach may include the completion of a clinical interview, the use of well validated assessment tools and the completion of clinical observations. Well-validated assessment tools available for use in preschoolers aged 1-3 years is of particular interest here, given the importance of the first three years of life (as highlighted above) and the internalising and externalising difficulties literature relating to 1-3 year olds.

1.9 The assessment of internalising and externalising difficulties in preschool children aged 1-3 years

Challenges inherent in undertaking assessment in preschool children and the risk of pathologising transient developmentally normative behaviour, has historically prevented the development and validation of assessment tools for use in children under 4 years old (Carter et al., 2004; Emde, 2001). As such, widely used and well-validated assessment tools were initially centred around internalising and externalising difficulties observed in children navigating childhood through to adolescence. For example, the Child Behaviour Checklist (Achenbach & Rescorla, 2001), the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) and the Parental account of Childhood Symptoms (PACS; (Taylor, Sandberg, & Thorley, 1991) to name a few.

However, it is now somewhat accepted that the identification of difficulties in the early years is not an attempt to pathologise infantile behaviour through exploration for diagnostic classification, but rather an attempt to facilitate the implementation of therapeutic interventions geared towards minimising distress and promoting the caregiving relationship (Emde, Bingham, & Harmon, 1993). As such, the benefits of conducting assessments in infancy are thought to outweigh the potential costs (Carr, 2006). From the perspective of transactional models, pathologising infantile behaviour is prevented through a reluctance to attribute causation of difficulties. Difficulties are not considered fixed characteristics inherent in young children, instead difficulties are thought to reflect maladaptive transactional processes between the child and the environment (Sameroff & Chandler, 1975).

In line with advancements in understanding, assessment in infancy is now more widely accepted. Assessment in infancy is considered fundamentally distinct from

assessment in other age groups due to the rapidly shifting course of development in the early years. Behaviours that may be considered clinically significant in school age children, may represent manifestations of normal development when observed in younger children (Carter et al., 2004; Gleason & Zeanah, 2005). As such, when conducting assessments in very young children, clinicians and researchers are advised to include multiple approaches when learning about a child's behaviour and development. In order to maximise thought regarding the child's developmental stage, environmental and relationship factors and parental perceptions of the child (Gleason & Zeanah, 2005).

When a measure is developed or adapted for use in preschool samples, the psychometric properties of the new measure, that is, the reliability and validity of the measure, need to be established. Measurement tools should report good psychometric properties prior to their use in the measurement of difficulties in clinical and research settings and therefore reliability and validity will be operationalised prior to a consideration of measurement tools available for use in the identification of internalising and externalising difficulties.

1.9.1   Establishing the psychometric properties of a measurement tool

1.9.1.1   Validity

A measurement tool is considered valid if it measures what it intends to measure, that is, if it successfully measures the construct that it proposes to (Carmines & Zeller, 1979). There are four different types of validity, relevant to the validation of measurement tools in the social sciences, these are; content validity, concurrent validity, predictive validity, and construct validity (Carmines & Zeller, 1979;

Cronbach & Meehl, 1955). Each type of validity considers the extent to which a measurement tool measures the construct that it proposes to, but differentiation can be found in the ways in which they do this.

Content validity concerns the degree to which the individual items, which make up a measurement tool, apply to the construct being measured. A measurement tool would be thought to have poor content validity if it failed to measure concepts considered pertinent to a construct (Carmines & Zeller, 1979; Cronbach & Meehl, 1955). To prevent poor content validity, a thorough literature search of the measured construct may be undertaken and scale development may include piloting and consultation with experts in the field of study (Carmines & Zeller, 1979; Polit & Beck, 2006). Concurrent validity and predictive validity are both types of criterion validity, which are concerned with the degree to which a measurement tool is associated with external criteria or a 'gold standard' measure, with which it is expected to relate to. Concurrent validity is concerned with how well a measure relates to a gold standard measure, which is known to measure a construct in a reliable and valid way. Concurrent validity may be of interest if a measure is suggested as a possible alternative to another (Carmines & Zeller, 1979; Cronbach & Meehl, 1955). Predictive validity is concerned with how well a measure is able to predict future characteristics/behaviours (Carmines & Zeller, 1979). Lastly, construct validity is concerned with the degree to which a measurement tool is related to other variables as theory predicts (Carmines & Zeller, 1979).

1.9.1.2 Reliability

There are three main types of reliability which may be of interest when exploring the reliability of measurement tools, namely internal consistency, test-retest reliability and inter-rater reliability. Estimations of internal consistency refer to the extent to

which the individual items of a measurement tool mutually measure the same construct. When the individual items of a measurement tool are summed to determine a total difficulties/competencies score, the internal consistency of the tool may determine whether a researcher/clinician is able to make inferences about the total score, as a summation of all items (Henson, 2001). Internal consistency can be measured from a single time point administration and there may be considered advantageous over other types of reliability (Carmines & Zeller, 1979). The most popular estimation of internal consistency is Cronbach's alpha statistic.

Test-retest reliability refers to a method in which a measurement tool is given to the same sample at two different time points and the relationship between scores obtained examined. If a tool measures a construct that is not thought to fluctuate largely over time, a strong association between scores at different time points is to be expected (Carmines & Zeller, 1979). Interrater reliability refers to the consistency in the ratings specified by multiple raters. Interrater reliability is concerned with the likeness of ratings provided (LeBreton & Senter, 2008), if a measure is found to have good interrater reliability a strong correlation is found between rater's ratings of behaviour/characteristics. Test-retest and interrater reliability cannot be used in all situations as they are dependent on research design and availability. For example, it is impossible to determine test-retest reliability if research is cross-sectional in design and interrater reliability cannot be assessed for self-administered tools (Carmines & Zeller, 1979; Streiner, 2003).

1.9.2 Measures available for use in the measurement of internalising and externalising difficulties in children aged 1-3 years.

Parent screening and surveillance tools, standardised questionnaires and semi-structured interviews are a few of the measurement tools suggested for use in preschool samples (Carter, Goday, Marakovitz, & Briggs-Gowan, 2011). In consideration of these guidelines, a number of measurement tools have been developed or undergone a downward extension to facilitate the assessment of difficulties and/or competencies in preschool children (Achenbach & Rescorla, 2000; Carter & Briggs-Gowan, 2000; R. Goodman, 1997; Mouton-Simien, McCain, & Kelley, 1997; Squires, Bricker, & Twombly, 2002). Several instruments originally developed for the assessment of internalising and/or externalising difficulties in children have undergone a downward extension to allow for the measurement of difficulties in very young preschool children.

An overview of popular measurement tools available for use in the assessment of internalising and/or externalising difficulties in the preschool age of interest (1-3 years) is presented in Table 1. All of the measures shown in Table 1 are psychometrically robust (Szaniecki & Barnes, 2016) and utilise different methodological approaches (e.g. questionnaires, checklists and semi-structured interviews). These measures have relative strengths but also have limitations which may make them less than ideal for use in clinical and/or research settings. For example, the Brief Infant-Toddler Social Emotional Assessment (BITSEA; Briggs-Gowan, Carter, Irwin, Wachtel, & Cicchetti, 2004) is copyrighted and therefore costly if used routinely in clinical practice. The Preschool Age Psychiatric Assessment (PAPA; Egger & Angold, 2004) is not available for use in one year old children. The Toddler Behaviour Screening Inventory (TBSI; Mouton-Simien et al., 1997) fails to

address the positive characteristics of a child and therefore may have limited

acceptability to parents. A screening tool which does not include positive

characteristics may serve to stigmatise preschool difficulties and subsequently,

influence parent report.

Table 1. *A summary of the most promising instruments available for use in preschool children aged 1-3 years.*

	Toddler Behaviour Screening Inventory (TBSI) (Mouton-Simien et al., 1997)	Brief Infant – Toddler Social Emotional Assessment (BITSEA) (Briggs-Gowan et al., 2004)	Ages & Stages Questionnaire – Social-Emotional (ASQ-SE) (Squires et al., 2002)	Preschool Age Psychiatric Assessment (PAPA) (Egger & Angold, 2004)	Infant Toddler Symptom Checklist (ITSC) (Degangi, Poisson, Sickel, & Wiener, 1995a)	Brigance Infant and Toddler Screen-II (BITS) (Brigance & Glascoe, 2002)
Age range	12-42 months	12-36 months	3-60 months	2-5 years	7-30 months	0-11 & 12-23 months
Type of instrument	Questionnaire	Questionnaire (can be administered as an interview)	Questionnaire	Structured interview	Checklist	Versions for professional observation and parent interview/self-report
Respondent	Parent or caregiver	Parent or caregiver	Parent or caregiver	Parent or caregiver	Parent or caregiver	Parent or caregiver
Number of items	40	42	19-35 per age interval	15 diagnostic modules	58	81-85
Administration time	Not reported	10-15 mins	10-15 mins	1½ -2 hours	10-20 mins	20 mins
Skills/Domains assessed	Problem behaviours, regulatory, frequency of symptoms and maternal perception	Problem behaviours (impulsivity, aggression, defiance, depression etc.) and competencies	Social-emotional problems, behaviour problems and social competencies	DC: 0-3 symptoms and diagnoses: brief developmental assessment family	Emotional-behavioural problems and regulatory disorders	Several developmental domains and skills, including socio-emotional items, self help and language
How items are scored	3 point scale	3 point scale	3 point scale	Produces diagnosis and incapacity scores	3 point scale	Up to 15 skills are scored per developmental area
Strengths/ Weaknesses	Developmentally appropriate Does not address positive characteristics/competencies	Brief Sensitive to autistic spectrum disorders Costly as copyrighted	Further validation needed	1-2 weeks classroom training and 1-2 weeks practice required Scoring is through computerised algorithms Certification required prior to use in the field	Comes with different versions for different age groups for diagnostic and screening purposes Normative sample mainly white middle class children	Brief Flexible Time needed to familiarise self with manual/material

(Carter et al., 2004; Szaniecki & Barnes, 2016)

Three measures of internalising and/or externalising difficulties in preschool children, namely the Child Behaviour Checklist (Achenbach & Rescorla, 2001), the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) and the Parental account of Childhood Symptoms (PACS; Taylor et al., 1991), will be discussed in more detail. The CBCL was revised to include developmentally appropriate items for children ranging from 1.5-5 years (CBCL/1.5-5; Achenbach & Rescorla, 2000). The CBCL/1.5-5 represents a comprehensive 99 item parent report checklist which assesses social-emotional and behavioural difficulties across three domains; internalising, externalising and total problems. Parents are asked to rate items along a three point scale from not true to very true/often true. Likewise, a downward extension was applied to the Strengths & Difficulties Questionnaire (SDQ; Goodman, 1997) (see _www.sdqinfo.com_). The SDQ for parents/caregivers of 2-4 year olds represents a brief 25 item screening tool with items consisting of positive and negative child characteristics. Parents/caregivers are required to mark items on a three point scale from 'not true' to 'certainly true'.

A growing body of research serves to support the reliability and validity of the CBCL/1.5-5 and SDQ in the assessment of internalising and externalising difficulties in children within the 1-3 year age range. The CBCL/1.5-5 was initially validated by Achenbach & Rescorla (2000) using a sample of children involved in their National health survey and children assessed in mental health, preschool and educational settings. The CBCL was found to report good eight day test-retest reliability ($r=.85$) and cross informant agreement ($r=.61$). Since this time, the CBCL has been validated cross-culturally (Ivanova et al., 2010; Tan, Dedrick, & Marfo, 2007) and for use in different client groups (Pandolfi, Magyar, & Dill, 2009). The CBCL has been found to successfully discriminate between clinical and control groups (Achenbach &

Rescorla, 2000; Ha, Kim, Song, Kwak, & Eom, 2011). Interestingly, a recent examination of the CBCL/1.5-5 in a general population sample of 12, 24 and 36 months olds, revealed that the CBCL can be used in the measurement of externalising difficulties in 1 year old children, in a reliable and valid way (Van Zeijl, Mesman, Stolk, et al., 2006). The psychometric properties of the CBCL/1.5-5 make it the gold standard checklist for the measurement of internalising and externalising difficulties in preschool children.

The reliability and validity of the preschool SDQ has also been extensively researched cross culturally (Du, Kou, & Coghill, 2008; Ezpeleta, Granero, de la Osa, Penelo, & Domènech, 2013; Klein, Otto, Fuchs, Zenger, & von Klitzing, 2013; Sim et al., 2015; Theunissen, Vogels, de Wolff, & Reijneveld, 2013). D'Souza and colleagues (D'Souza et al., 2016) examined the psychometric properties of the preschool SDQ in a large sample of two year old children (n=5481) in New Zealand. A modified five-factor model fit and good internal consistency for four out of five SDQ subscales was reported. Croft and colleagues (2015) examined the validity of the preschool SDQ by following up a sample of preschool children at 3, 5 and 7 years old. Confirmatory factor analysis supported a five-factor model fit and internal consistency of subscales ranged from w=.66 to w=.83. Similarly, in an examination of the SDQ in a German preschool sample aged between 3 and 5 years of age, Klein et al. (2013) confirmed a five-factor model fit and the internal consistency of SDQ subscales ranged from .58-.79.

From the literature, the CBCL/1.5-5 and the SDQ for parents/caregiver of 2-4 year olds represent valid and reliable measurement tools available for use in the assessment of internalising and externalising difficulties in children aged 12 months old and above and 24 months old and above respectively. Both measures demonstrate

relative strengths (R. Goodman & Scott, 1999) and demonstrate an ability to downward extend measurement tools for use in the assessment of preschool difficulties in a reliable and valid way. However multiple methodological limitations surround the use of these instruments in the measurement of difficulties in children aged 1-2 years. These limitations do not serve to disqualify the valid measurement of internalising and externalising difficulties but it is important to note that each instrument is somewhat influenced by them. Firstly, the CBCL/1.5-5 and the SDQ represent parental report measures and are therefore open to reporting bias (Carter et al., 2004). Ratings obtained from parental report are arguably influenced by parental expectations, parental understanding of age-appropriate behaviours, and parental perceptions about what constitutes normal/abnormal preschool behaviour (Chen & Taylor, 2006). For example, parental reports of externalising behaviour may be biased by gender specific views of what problematic externalising behaviours look like in male and female infants (Sonuga-Barke et al., 1994). The literature suggests that parental bias may play a role in reporting behaviour. For example, parents' interpretations of children's behaviour have been found to be positively biased in younger samples (Dix, Ruble, Grusec, & Nixon, 1986) and parent-infant attachment configuration may influence parental report (Goldberg et al., 1995). Furthermore, parent report measures are limited by a parent's interpretation of written questions (Taylor et al., 1991).

Secondly, the CBCL/1.5-5 is an exhaustive checklist which only measures problem behaviours (Carter et al., 2004). This limitation may impact on the acceptability and use of the CBCL/1.5-5 in clinical and research settings, over brief measures with similar discriminant validity and sensitivity (e.g. the SDQ) (R. Goodman & Scott, 1999; Warnick, Weersing, Scahill, & Woolston, 2009). This

notion is supported by a previous comparison of the SDQ and the CBCL in an older sample of 4-7 year olds. Goodman & Scott (1999) found that the majority of a sample of low risk mothers preferred the SDQ over the CBCL. The authors concluded that the SDQ and CBCL both have strengths but the SDQ may have superiority in clinical/research settings where participation/engagement may be influenced by the length and partiality of a questionnaire. Additionally, the SDQ is available at no cost making it a more cost effective measurement tool (Warnick et al., 2009).

Thirdly, checklist measures, such as the SDQ and CBCL, do not include enough information about symptom specificity (e.g. frequency, onset and duration) to allow for a comprehensive understanding of difficulties (Egger & Angold, 2006). Lastly, the psychometric properties of the SDQ in children in the one-two year age range is relatively unknown. To the authors knowledge there is only one study which has explored the psychometric properties of the SDQ in two year old children. However, this study involved an examination of a sample of preschool children in New Zealand, a sample qualitatively different from the UK. The psychometric properties of the SDQ are reported to vary across diverse groups and therefore the psychometric properties of the SDQ in a UK sample of two year old children is of interest (D′Souza et al., 2016; Stone, Otten, Engels, Vermulst, & Janssens, 2010). Additionally, the SDQ is not validated for use in one year old children. Given the reported prevalence and continuity of difficulties from the age of one (Briggs-Gowan et al., 2001; Carter, Briggs-Gowan, Jones, & Little, 2003; Tremblay et al., 1999; Van Zeijl, Mesman, Stolk, et al., 2006), this may be considered an oversight and represents a research consideration. The SDQ is used routinely in clinical and research settings to assess difficulties in school age children (Warnick et al., 2009) and thus the validation of the

SDQ in a UK sample of 1-2 year old children may facilitate the measurement of difficulties across time points/developmental stages.

Despite the growing interest in assessment in preschool children and the continuity literature which elucidates the significance of externalising difficulties, relative to internalising difficulties, in the early years, there are few readily available measurement tools which allow for a detailed exploration of externalising difficulties in preschool children (see Table 1). Semi-structured interview methodology allows clinicians and researchers, alike, to gain a more comprehensive understanding of difficulties observed in children aged 1-3 years and provides an appropriate format for the discussion of what parents may deem as sensitive topics (Carter et al., 2011; Miles & Gilbert, 2005). Semi-structured interview methodology is advantageous as it can counteract parental reporting biases. Interview methodology allows researchers to surpass the limitations of parental report measures as it allows for clarification of expression and allows for the elicitation of specific examples of potential difficulties (Carter et al., 2011; Gleason & Zeanah, 2005; Miles & Gilbert, 2005). As such, interview methodology may increase the likelihood of an accurate interpretation of questions and allow for a more accurate distinction between clinically significant difficulties and normative developmental behaviours (Bufferd et al., 2011).

In older children, the Parental Account of Childhood Symptoms (PACS; Taylor et al., 1991) is an example of a semi-structured interview assessment of internalising and externalising difficulties. The PACS represents a standardised semi-structured interview which aims to provide a detailed account of behaviours observed inside and outside of the home. Parents are asked to give descriptions of their child's behaviour and a trained interviewer elicits details about externalising difficulties in a range of settings. Subsequently, the interviewer uses their clinical judgement to rate the

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frequency and severity of difficulties (Taylor et al., 1991; Taylor, Schachar, Thorley, & Wieselberg, 1986). The 44 item PACS interviews enquires about behaviours related to hyperactivity (attention span, restlessness, fidgetiness and activity level), conduct/defiance (temper tantrums, lying, stealing, defiance, disobedience, truanting and destructiveness) and emotional disorders (misery, worry, fears, obsessionality and hypochondriasis). The PACS reports good internal consistency of behaviour scales (Cronbach's alpha value of .89 for hyperactivity and .87 for defiance/conduct), factorial validity, and minimises the effects of reporting bias (Taylor et al., 1986).

In line with previous measurement tools (e.g. the CBCL and SDQ), researchers have made adaptations to the PACS in order to facilitate its use in preschool samples aged three years old and above, for research purposes. For example, in an examination of behaviour problems and intellectual attainment in a sample of three year old children, Sonuga-Barke and colleagues (Sonuga-Barke et al., 1994) used the hyperactivity and conduct problems subscales of the PACS to measure levels of behaviour. The authors used a principal component factor analysis of parental reports of activity, attentiveness, disruptive behaviours and aggression. Externalising difficulties reported infrequently amongst the children in the study (e.g. stealing, destructive episodes and problems at bedtime), were determined to threaten the reliability of the PACS, when used in three year olds, and thus were removed prior to analysis. The authors reported a two factor structure for this revision of the PACS, namely a hyperactivity factor and a conduct problems factor. The use of the PACS in this way was attributed to its advantage of being less susceptible to bias regarding what constitutes problematic behaviour, compared to screening questionnaires (Sonuga-Barke et al., 1994).

Since that time, the PACS has been used as an outcome measure of treatment effectiveness and/or a measurement tool in preschool samples of children (3-6.5 years) with preschool attention deficit hyperactivity symptoms (Sonuga-Barke, Dalen, & Remington, 2003; Sonuga-Barke, Daley, & Thompson, 2002; Thompson et al., 2009). However, the authors are unclear as to whether the PACS used in the study reflects the empirically driven modification of the PACS by Sonuga-Barke and colleagues (Sonuga-Barke et al., 1994) or the PACS in its original form. To the authors knowledge, no researchers have attempted to adapt the empirically modified version of the PACS, otherwise termed the Preschool Parental Account of Childhood Symptoms (PPACS), for use in a preschool sample of 1-3 year olds nor reported on its psychometric properties. This is an area of interest given the PACS' focus on externalising difficulties and the importance of externalising difficulties in the first three years, as outlined in this review. Additionally, the PACS may serve as an advantageous assessment tool if/when clinicians or researchers require a detailed understanding of difficulties, which cannot be obtained through the use of parental self-report measures.

1.10 Conclusion

The literature demonstrates that internalising and externalising difficulties that meet subclinical and clinical thresholds are prevalent in children aged 1-3 years old. In some cases, these difficulties have been found to continue into middle childhood and adolescence. The prevalence of difficulties in the preschool years may negatively affect the parent-infant relationship and may have negative implications for a child's cognitive, emotional, behavioural and social development. As such, the first three years of life is identified as a critical period in which optimal environments are sought.

Early/preventative interventions for preschool children are suggested due to the emerging nature of difficulties and the potential advantages of introducing interventions at a time when emotion regulation and behavioural competencies are still being developed. The identification of difficulties in preschool children is supported by the availability of validated measurement tools for use in this age group. Whilst there are several popular psychometrically robust measurement tools available for use in this age group, they are not without practical limitations which may make them unattractive in some clinical and research settings. An investigation of the psychometric properties of two measurement tools, which have advantageous methodological characteristics, may circumvent some of these limitations and have implications for the measurement of internalising and externalising difficulties in preschool children aged 1-3 years.

1.11 The present study

The present study aimed to address the need for appropriate and validated assessment tools in the measurement of internalising and externalising difficulties in the infant-toddler period. The study aimed to determine whether internalising and externalising difficulties in preschool children, aged 1-3 years, could be measured in a reliable and valid way using parent self-report and semi-structured interview methodology. The present study was novel in its attempt to validate the preschool SDQ in a UK sample of preschoolers aged 12-30 months and in its exploration of the psychometric properties of a newly adapted version of the PPACS in a preschool sample of children aged 1-3 years. The decision was made to establish the psychometric properties of the SDQ and the PPACS-A in young preschool children, due to the strengths offered by the different methodological approaches, the psychometric properties reported in

older preschool samples and the utility of these measures in older children in both clinical and research settings. The research objectives designed to fulfil the study aims were to: 1) confirm/determine the factor structure of the SDQ in 12-30 month olds and the adapted PPACS in 1-3 year olds; 2) to determine the internal consistency of the SDQ and the adapted PPACS; and 3) to determine the concurrent validity of the SDQ and the adapted PPACS with the CBCL/1.5-5.

The present study was broken down into two studies. Study one involved an investigation of the psychometric properties of the preschool SDQ in a community sample of 12-30 month olds using confirmatory factor analysis. It was hypothesised that a five factor first order and five factor second order model fit would be confirmed, based on previous findings in slightly older preschool children. Study 2 involved an investigation of the psychometric properties of an adapted version of the PPACS in a high risk sample of 1-3 year old children who reported an increased level of externalising difficulties on the SDQ. The PPACS was adapted for use in the Healthy Start, Happy Start study, a National Institute of Health Research funded randomised controlled trial aimed at investigating the effectiveness of a brief video-feedback parenting intervention designed to prevent enduring externalising difficulties in young children aged 1-3 years. The factor structure of the adapted PPACs was explored using exploratory factor analysis. No hypotheses were generated regarding the factor structure of the adapted PPACS due to the exploratory nature of the analyses. The concurrent validity of the preschool SDQ and the adapted PPACS was established by examining whether the SDQ and adapted PPACS correlated with a gold standard measurement tool, the CBCL/1.5-5. It was hypothesised that higher scores on the CBCL would be associated with higher scores on the SDQ and the adapted PPACS.

2   Method

2.1   Overview

The present study used data collected as part of the Healthy Start, Happy Start (HSHS) randomised controlled trial. The study used a cross sectional design, as it aimed to establish the psychometric properties of two measures of internalising and/or externalising difficulties in a sample of preschool children aged 1-3 years. The work comprised two studies, examining the psychometric properties of a screening parent-report questionnaire and a semi-structured interview. Study one involved defining bandings for normative, marginal and atypical ranges across the SDQ subscales in a community sample of 12-30 month old infants (n=1112). Then, the factor structure of the SDQ for parents/carers of 2-4 year olds was confirmed. Lastly, reliability was determined through the measurement of the questionnaire's internal consistency. Study two involved an exploration of the factor structure of the PPACS-A in a sample of parents of children aged 1-3 years, who reported high levels of externalising difficulties (n=143). Then, the reliability of the measure was established by measuring its internal consistency. Lastly, the concurrent validity of the SDQ and PPACS-A with an established scale, namely the Child Behaviour Checklist (CBCL/1.5-5; Achenbach & Rescorla, 2000), was determined.

2.2   Setting

The study took place in the broader context of the HSHS trial. HSHS (Ramchandani et al., submitted) is a randomised controlled trial which aims to investigate the effectiveness of a brief video-feedback intervention, designed for parents of preschool children aged 1-3 years considered at risk of behavioural difficulties. At the screening stage of recruitment, parents were recruited through health visitors, GP surgeries,

children's centres, Child & Adolescent Mental Health services and Perinatal and Infant Mental Health services across North London, East London, Oxfordshire and Cambridgeshire & Peterborough NHS Trusts. At each study site, parents were informed that the research team was interested in understanding child development and behaviour in children aged 1-3 years and were invited to complete a measure of child behaviour (the SDQ) by professionals involved in the HSHS study. Parents were given a screening pack which included an invitation letter, an information sheet, a consent form regarding participation in the screening phase, a basic demographic questionnaire, the SDQ and a freepost envelope (see Appendix 1).

Parents were given an opportunity to complete the screening pack immediately and return its contents to the research team/other clinicians, to take the pack home and return it using the freepost envelope enclosed, or complete the forms electronically via the HSHS website. Following completion of the screening pack, participants were followed up by a HSHS research assistant based on SDQ population norms. Population norms were identified based on a two year old preschool sample through personal correspondence with Robert Goodman (2015). Participants who scored within the top 20% of population norms for externalising difficulties were contacted by a HSHS research assistant by telephone. During the telephone call, eligibility for the full HSHS trial was assessed and if eligible, participants were invited to participate in the full study. If verbal consent was obtained, a baseline assessment was arranged with a member of the HSHS research team at the participant's home. During the baseline assessment eligibility for the trial was confirmed and written consent for the full trial obtained.

Parents were included in the full HSHS trial if; the parent(s) were aged 18 years or above and had a child aged 12-36months who scored within the top 20% of

population norms for externalising difficulties on the SDQ and provided written informed consent. Parents whose children scored in the top 20% of population norms for externalising difficulties on the SDQ and were eligible, were invited to progress into the intervention phase. Parents were excluded if; their child had severe sensory impairment, a learning disability or neurodevelopmental disorder, the parent had insufficient English language to complete questionnaire assessments, their child had another sibling participating in the trial, the family were participating in active family court proceedings and/or if the parent/carer was participating in another closely related research trial or were receiving another video-feedback intervention.

Parents who progressed into the intervention phase were randomised into one of two groups; a Video-feedback intervention to Promote Positive Parenting and Sensitive Discipline (VIPP-SD; Juffer, Bakermans-Kranenburg, & Van IJzendoorn, in press, 2015; Van Zeijl, Mesman, Van IJzendoorn, et al., 2006) and a control group receiving treatment as usual. VIPP-SD is a manualised parent-infant intervention which aims to improve parental sensitivity and sensitive discipline. Parents in the VIPP-SD group were offered 6 home visits by trained VIPP intervenors (Juffer et al., in press), which consisted of four core sessions aimed at improving the identification of an infant's attachment and exploratory behaviours, parental sensitivity and sensitive management of challenging behaviour and two booster sessions where key messages from previous sessions were reinforced. Treatment as usual refers to a range of local early years service provision e.g. health visitor services, parenting support services and GP appointments.

Members of the research team visit HSHS families at baseline (prior to randomisation), 5 months and 24 months' post randomisation to complete a range of assessment measures. HSHS data collection focuses on various parent focused, child

focused and parent-child focused domains. A variety of primary and secondary outcome measures are used in the trial. The CBCL 1.5-5/5(Achenbach & Rescorla, 2001), SDQ and the PPACS-A interview were used to assess child behaviour. The 7-item Generalized Anxiety Disorder Scale (GAD-7; Spitzer, Kroenke, Williams, & Löwe, 2006), the Patient Health Questionnaire-9 (PHQ-9; Kroencke, Spitzer, & Williams, 2001), the Parenting Scale (Arnold, O'Leary, Wolff, & Acker, 1993) and the Revised Dyadic Adjustment Scale (Spanier, 1976) are used to assess parent functioning and parenting behaviours. The researcher's involvement in the HSHS trial and the present study were as follows. The researcher completed the training required to become an accredited VIPP-SD intervenor and delivered the trial intervention to several families in line with the trial protocol. Research duties included involvement in baseline and follow up assessments, engagement in recruitment drives, double scoring where appropriate and attendance at trial meetings.

2.2.1   Ethical considerations

Ethical approval for the HSHS trial was approved by the Riverside Research Ethics Committee (see Appendix 2). To monitor risk, a risk management protocol was employed whereby any indications of distress, mental health difficulties and/or safeguarding concerns were discussed with senior clinicians within the research team. Where appropriate contact was made with healthcare/social care provisions. Participants were given an information sheet and consent form which detailed the potential risks/distress associated with measure completion and taking part in the study (see Appendix 3). Participants were given information after each assessment which detailed local activities and support services which could be accessed in the community. Consent was obtained to inform participants' GP and health visitor of their involvement in the study.

Procedures for protecting the anonymity of research participants were employed in the study. All participants were given a unique participant number to anonymise study documents. Participant number and corresponding name and contact details were stored securely on a password protected database which could only be accessed by certain members of the research team. All participant data will be stored securely for 10 years after the HSHS trial has finished, as per Imperial College policy. All information was treated confidentially with the exception of information that highlighted a risk or safeguarding concern.

2.3   The present study

Data presented here were collected during the initial screening stage and at baseline home visits of the HSHS trial. Ethical approval for the present study was obtained from Royal Holloway University of London Ethics Committee (See Appendix 2).

2.3.1   Study one: inclusion criteria and sample profile

Study one data were taken from the screening stage; parents were included if infant age was reported as between 12-30 months old and no more than three item scores were missing from the SDQ. 94% of parents were included resulting in a final sample size of 1112. Of the 1112 parents included in the study, 912 (82%) returned the SDQ at site, 54 (4.9%) by post and 144 (12.9%) completed the SDQ online. The mean age of parents was 34 years old (SD=6.05) and 690 (62.1%) of completers were mothers, 92 (8.3%) fathers and 4 (.4%) identified themselves as other caregivers (e.g. adoptive parents/step parents).

Regarding education, 295 (26.5%) had a postgraduate qualification, 190 (17.1%) had an undergraduate qualification, 188 (16.9%) were educated until college and 78 (7%) were educated until 16 or below. In terms of ethnicity, 500 (45%) parents

identified themselves as a White subgroup, 128 (11.5%) as an Asian subgroup, 68 (6.1%) as a Black subgroup, 38 (3.3%) as Mixed race and 24 (2.2%) as Other. Regarding the study infants, 565 (50.8%) were male, 510 (45.9%) female and 37 (3.3%) unknown. The mean age of the study infants was 21.11 months old (SD=5.66).

2.3.2 Study two: inclusion criteria and sample profile

Study two data were taken from the baseline home visit; parents were included if at least 80% of the PPACS-A was complete, SDQ data had no more than three item scores missing and CBCL data had no greater than 8 items missing (Achenbach & Rescorla, 2000), and their children were aged between 1-3 years old. This resulted in a final sample size of 143. Of the 143 parents included in the study, 135 (94.4%) were mothers and 8 (5.6%) were fathers. The mean age of parents was 35 years old (SD=5.81). The relationship status of parents varied, 87 (60.8%) were married, 34 (23.8%) were cohabiting, 15 (10.5%) were single, 5 (3.5%) were in a relationship but not cohabiting, 1 (.7%) identified themselves as widowed, and 1 (0.7%) identified themselves as legally separated.

Regarding education and employment status, 53 (37.1%) had a postgraduate qualification, 39 (27.3%) had an undergraduate qualification, 39 (27.3%) were educated until college, and 12 (8.4%) were educated until 16 or below. 60 (42%) parents reported that they were unemployed, looking after the family at home, 54 (37.8%) were working for an employer, 16 (11.2%) were self-employed, 9 (6.3%) were on maternity/paternity leave and 4 (2.8%) were full time students. In terms of ethnicity, 95 (66.5%) parents identified themselves as a White subgroup, 18 (12.6%) as an Asian subgroup, 12 (8.4%) as Mixed race, 10 (7%) as a Black subgroup and 8 (5.6%) as Other. 77 (53.8%) parents identified the study infant as their first child and 86 (60.1%) reported the presence of a second caregiver. Regarding the infant being

informed upon, 79 (55.2%) were male and 64 (44.8%) female. The mean age of the sample was 22.57 months.

2.4   Measures

2.4.1   An adapted version of The Preschool Parental Account of Child Symptoms (PPACS-A)

The PPACS-A was completed by parents of eligible children at the baseline assessment of the HSHS trial (See Appendix 4). The PPACS-A is a semi-structured investigator led interview administered by trained interviewers. Parents are asked to give descriptions of their child's behaviour in specific situations in the last week, in the first instance, and then over a four month period. Questions centred around externalising difficulties, with the first half of the interview focusing on attention and activity and the second half on behaviour/conduct. Interviewers use their clinical judgement to rate behaviour on the basis of their formal training and written descriptions. Behaviour is rated on a four point likert scale of severity and frequency. Frequency and severity scores are averaged to yield individual item scores. (Taylor, Chadwick, Heptinstall, & Danckaerts, 1996; Taylor et al., 1986). The PPACS-A takes approximately 45 minutes to 1 hour to complete. All interviewers received two day classroom training and in field training with three to six cases to facilitate skill development.

The PPACS-A was adapted from the Preschool Parental Account of Childhood Symptoms (PPACS; Sonuga-Barke, Lamparelli, Stevenson, Thompson, & Henry, 1994), for use in the HSHS trial by the research team and Professor David Daley, University of Nottingham, through piloting and discussion. Adaptations include a reduction in the time frame of behaviours from six months to four months,

the deletion of three developmentally inappropriate items and the modification of scoring descriptions to reflect age appropriate behaviours. The PPACS represents an empirically driven revision of the Parental Account of Child Symptoms (Taylor, Schachar, Thorley, & Wieselberg, 1986), validated for use in community samples of three year old children (Sonuga-Barke et al., 1994).

The decision was made to adapt the PPACS to facilitate its utility in the measurement of attentional and behavioural difficulties in children aged 1-3 years. Also, the original Parental Account of Childhood Symptoms interview reports good psychometric properties and therefore the measure is considered advantageous when detailed descriptions of behaviour are sought (Chen & Taylor, 2006). The original Parental Account of Childhood Symptoms reports good internal consistency of behaviour scales (Cronbach's alpha value of .89 for hyperactivity and .87 for defiance/conduct), inter-rater reliability and factorial validity (Taylor et al., 1986). Lastly, the use of semi-structured methodology has several advantages over methodology that rely on parental report e.g. questionnaires. For example, semi-structured methodology allows the interview to be adapted to meet the needs of the individual being interviewed. The interviewer may seek additional information where further exploration is required. Additionally, it may reduce the influence of parental expectations, understanding of age-appropriate behaviours and their judgements of normal/abnormal behaviours (Chen & Taylor, 2006).

2.4.2 The Strengths and Difficulties Questionnaire for parents/caregivers of 2-4 year olds

The SDQ (R. Goodman, 1997) available at www.sdqinfo.com, was initially developed for use in children aged 4-16 years and has been extensively validated cross culturally (Du et al., 2008; Hawes & Dadds, 2004; Malmberg, Rydell, & Smedje, 2003; Stone et

al., 2010). The SDQ represents a brief 25 item measure with items consisting of positive and negative child characteristics (See Appendix 1). Parents/caregiver informants are required to mark each item 'not true', 'somewhat true' or 'certainly true'. The SDQ is divided between five subscales; hyperactivity, emotional symptoms, conduct problems, peer problems and prosocial behaviours. The hyperactivity, emotional symptoms, conduct problems and peer problems subscales are summed to obtain a total difficulties score (R. Goodman, 1997).

A downward extension of the original SDQ for parents/caregivers of children aged 2-4 years was developed to account for developmental differences in toddler-infant expressions of strengths and difficulties (www.sdqinfo.com). Adaptations include a change in wording on two items on the conduct scale (item 18 and 22) and a softening of a hyperactivity item (item 21). 'Often argumentative with adults' replaces 'Often lies or cheats' and 'Can be spiteful to others' replaces 'Steals from home, school or elsewhere'. 'Thinks things out before acting' was softened to 'Can stop and think things out before acting'.

The SDQ for parents/caregivers of 2-4 year olds has been validated in European preschool samples aged 30 months and above (e.g. Croft, Stride, Maughan, & Rowe, 2015; Ezpeleta, Granero, de la Osa, Penelo, & Domènech, 2013; Klein, Otto, Fuchs, Zenger, & von Klitzing, 2013) and more recently in a sample of two year of children in New Zealand (D'Souza et al., 2016). The SDQ for parents/caregivers of 2-4 year olds reports good internal consistency across problem subscales (omega coefficient ranged from .70-.82), moderate concurrent validity, good discriminant validity (AUC ranged from .62-.87) and factorial validity (Ezpeleta et al., 2013). The SDQ was chosen due to its reported parental acceptability, conciseness and its focus

on the identification of strengths as well as difficulties (D'Souza et al., 2016; R. Goodman, 1997; R. Goodman & Scott, 1999).

2.4.3   The Child Behaviour Checklist for 1 ½ to 5 year olds (CBCL/1.5-5;Achenbach & Rescorla, 2000)

The CBCL is a 99 item checklist measure which assesses social-emotional and behavioural difficulties across three domains; internalising, externalising and total problems (See Appendix 5). The CBCL/1.5-5 has demonstrated good 8 day test-retest reliability (r=.85), cross informant agreement (r=.61) and discriminant validity (Achenbach & Rescorla, 2000; Carter et al., 2004). The study will use the CBCL with parents of children aged 1-3 years based on previous study findings which support its use in one year old children. Van Zeijl et al. (2006) reported factor structures similar to those found in older children for externalising subscales, in a sample of 1 year old children, and reported predominantly good internal consistencies. Cronbach's alpha values reported for mother and father CBCL's were as follows: externalising problems (.88/.89), oppositional (.86/.84), aggressive (.65/.68) and overactive (.55/.60). These findings demonstrate that the CBCL/1.5-5 can be used to assess 12 month old children in a psychometrically sound way. The CBCL is considered the gold standard measurement of internalising and externalising difficulties in preschool children due to its psychometric properties (Achenbach & Rescorla, 2000) and therefore it was chosen as a comparative measure – to determine concurrent validity.

2.4.4   Demographics

Demographic information of interest included infant gender, age, parent/ caregiver relationship to child, parent educational level, parent age and ethnicity. Demographic information was extracted from self-report questionnaires (e.g. the SDQ identified

child age) and a demographics questionnaire, administered by the HSHS research team at the baseline assessment (see Appendix 6).

2.5 Analytic strategy

Confirmatory Factor Analysis (CFA) and Exploratory factor analysis (EFA) were used to confirm/determine the factor structure of the SDQ and PPACS-A. CFA and EFA attempt to replicate observed relationships between a set of indicators with a smaller set of latent variables. However, each methodological approach differs in the quantity and nature of a priori restrictions made on the latent variable measurement model (Brown & Moore, 2014). EFA may be used to reduce the quantity of scaled items or to determine the number of latent variables which underlie observed variables i.e. individual items. There may be hypotheses about the underlying factor structure of a scale but no constraints are applied a priori as to how variables might load on different factors. In contrast, CFA places constraints on the expected relationship between observed variables and how they load onto different factors (Palmieri & Smith, 2007). CFA and EFA have been widely used in the analysis of the validity of measurement tools available for use in the assessment of difficulties in infancy and toddlerhood (Croft et al., 2015; Sonuga-Barke et al., 1994; Van Zeijl, Mesman, Stolk, et al., 2006).

The suitability of the data for multivariate analyses and sampling adequacy were determined prior to data analyses (Nunnally, 1978; Tabachnick & Fidell, 2007). To ensure a satisfactory factor analysis of the SDQ and PPACS-A, recommendations of participant to item ratios were considered. A participant to item ratio ranging from 5:1 to 10:1 is recommended in the literature (e.g. Nunnally, 1978; Tabachnick & Fidell, 2001), and therefore this was sought in the first instance. As the SDQ includes

25 items a minimum sample size of 250 was sought in line with the higher participant to item recommendations. The PPACS-A includes 11 items and therefore a minimum sample size of 110 was sought. The sample size achieved for study one and study two surpassed the participant to item recommendations.

To ensure that the sample size projections, as determined by participant to item ratio recommendations, were adequate enough for concurrent validity analyses, power calculations were made in line with recommendations in the literature (Cohen, 1992). The expected effect size for the relationship between the SDQ and CBCL subscales were based on those observed in other preschool SDQ studies with older preschool children (Ezpeleta et al., 2013; Theunissen et al., 2013) as no information exists on the age group studied here. There is no literature on the PPACS-A and therefore expected effect size could not be hypothesised based on previous findings. As such, power calculations for a moderate effect were followed. Sample size calculations revealed that a minimum of 28 and 84 participants were required for the SDQ and the PPACS-A respectively. Thus, participant to item sample size projections surpassed the requirement for the detection of any relationships between the SDQ/PPACS-A and the CBCL.

2.5.1 Study one

The factor structure of the SDQ was established using structural equation modelling for CFA using AMOS Graphics, Version 23 (Arbuckle, 2014) using a weighted least squares estimation method. Multiple model fit indices were reported including the Root Mean Square Error of Approximation (RMSEA), the Goodness of Fit Index (GFI), Standardised Root Mean Square Residual (SRMR) and the Comparative Fit Index (CFI). To determine adequate model fit a CFI greater than .90; RMSEA less

than .08; SRMR less than .10; and GFI greater than .90 were required. To determine good model fit a CFI greater than .95; RMSEA less than .5; a CFI and GFI above .95; and an SRMR value less than .08 (Brown, 2006; Browne & Cudeck, 1993; Harrington, 2008) were required.

Previous examinations of the factor structure of the SDQ in preschool samples (e.g. Croft et al., 2015; Klein et al., 2013; Theunissen, Vogels, de Wolff, & Reijneveld, 2013) have confirmed the five factor first order measurement model initially proposed by Goodman (1997) and a five factor second order model which accounts for broader internalising (a summation of peer problems and emotional symptoms) and externalising (a summation of hyperactivity/inattention and conduct problems) subscales (A. Goodman, Lamping, & Ploubidis, 2010). As such, a five factor first order (Model 1) and five factor second order (Model 2) model fit were hypothesised. Where models showed acceptable fit on multiple indices but not on others, correlations between the unique variances of homogenous items were allowed. Correlations were not allowed between the unique variance of dissimilar items in line with recommendations in the literature (Hermida, 2015). The researcher had no theoretical rationale for the correlation of the unique variance of dissimilar items. Allowing correlation between dissimilar items may serve to improve model fit, but it would not improve empirical understanding of the latent variables in question. Also, allowing unique variance to correlate in a non-theoretically driven way is arguably taking advantage of chance, resulting in a more exploratory model of testing (Hermida, 2015). Possible item pairs for correlation were determined using AMOS modification indices output.

The internal consistency of the SDQ was determined using Cronbach's alpha statistic, with a value above .70 taken to indicate good internal consistency. Internal

consistency was established for the five proposed subscales of the SDQ. To define bandings for normative, marginal and atypical ranges for the SDQ subscales and total difficulties score, procedures set out elsewhere in the literature were used (D'Souza et al., 2016; R. Goodman, 1997). Bandings were selected whereby 10% of children with the highest scores were placed in the atypical range, the next 10% placed in the marginal range and the remaining 80% placed in the normative range.

2.5.2 Study two

The factor structure of the PPACS-A was established using EFA as no previous investigations of the psychometric properties of the PPACS-A exist. No a priori fit was assumed, despite the factor structure of the PPACS reported in a previous examination of three year old children (Sonuga-Barke et al., 1994), because it was felt that the adaptations made to the PPACS to accommodate its use in a younger sample, were considerable and therefore warranted exploratory analyses. The use of an exploratory data technique allowed for the determination of the number of underlying factors and determined which measured variables were reasonable indicators of each latent dimension (Brown & Moore, 2014). Number of underlying factors were identified using Kaiser's criterion and an examination of the scree plot (Field, 2009). The internal consistency of the PPACS-A was determined using Cronbach's alpha statistic. The internal consistency of subscales was established following the identification of latent variables using EFA. Pearson's product moment correlation was used to examine the concurrent validity of the SDQ and PPACS-A with the CBCL.

3   Results

3.1   Study 1: SDQ Validation

Study one involved an investigation of the psychometric properties of the SDQ in infants aged 12-30 months. Prior to analyses data were checked and cleaned in line with recommendations outlined in the literature (Tabachnick & Fidell, 2007). Missing data were examined and dealt with using case deletion and imputation methods (Klein et al., 2013; Tabachnick & Fidell, 2007). The normality of the data was analysed and transformation methods explored in an attempt to adhere to multivariate testing assumptions. Descriptive statistics and normative bandings of the SDQ were examined, the internal consistency of the SDQ, its individual and broader subscales explored and confirmatory factor analysis carried out.

3.1.1   Data preparation

Prior to analysis, the data were screened and prepared in line with procedures outlined in the literature (Brown, 2006; Harrington, 2008; Tabachnick & Fidell, 2007). Erroneous values, missing data, normality, outliers, sampling adequacy and multicollinearity were explored and dealt with prior to multivariate analyses.

3.1.2   Erroneous values

The precision of data entry was checked as they were entered into the data file by members of the Healthy Start Happy Start research team. Inputted data were checked, by the researcher, in SPSS to ensure that erroneous values were not inputted in error. The individual items on the SDQ may achieve a score of 0, 1 or 2 and therefore any values greater than 2 were identified using the SPSS maximum and minimum value

function. No erroneous values were subsequently identified in the dataset. Positively

phrased problem items were reverse scored, in line with the SDQ scoring procedure

(www.sdqinfo.org), to ensure that an elevated total score was indicative of a greater

level of difficulty within the study population. The SDQ total difficulties score was

calculated by collating scores achieved on the hyperactivity/inattention, conduct,

emotional and peer problems subscales. Subscale scores were calculated by summing

scores from five items (as identified in the scoring procedure). Broader externalising

and internalising subscale scores were produced by summing the

hyperactivity/inattention and conduct and emotional and peer problems scales

respectively.

3.1.3   Missing data

97 participants were excluded from the analyses due to missing demographic

information pertaining to the age of the infant reported on. 182 SDQ questionnaires

were identified with missing values and dealt with using the following procedures.

Cases with less than 5% of SDQ values missing (n=74) were replaced using a

prorating method. Prorating was undertaken using the homogenous item scores

available as recommended in the SDQ scoring procedure (www.sdqinfo.org). SDQ

subscale and total difficulties scores were then recalculated. Cases with more than 5%

of SDQ values missing (n=108) were explored further.

Cases with more than 5% missing values were coded to create two dummy

variables, a group with missing and non-missing values (Tabachnick & Fidell, 2007).

The distribution of missing values per SDQ item is displayed in Table 2. Independent

samples t-tests and chi-square tests were used to examine whether missingness was

random or could be explained by the available data (Harrington, 2008; Tabachnick &

Fidell, 2007). An independent samples t-test was used to compare the infants' age of missing and non-missing cases. Equal variance were assumed as homogeneity of variance assumptions were met (F=.60, ns). There was a higher incidence of missing values when parents were reporting on younger children (t(1172) = 6.15, p< 0.001). An independent samples t-test was used to compare parents age of missing and non-missing cases. No parental age difference was found between missing and non-missing cases.

Chi-square tests were used to compare demographic and other available information of missing and non-missing cases. Comparisons were made between cases on; informant ethnicity, informant's relationship to the infant, method of SDQ return, highest qualification of informant and geographical location. Mothers who completed the SDQ questionnaire were significantly more likely to leave items unanswered than fathers or other caregivers who completed the questionnaire (χ^2(2) = 6.95, p=0.031). Additionally, informants who completed the questionnaire by post were less likely to leave items unanswered compared to online completers and at site completers respectively (χ^2(2) = 6.80, p=0.033). No other significant differences were found.

Having considered the relationship between missing items and available demographic information, procedures for managing missing data were considered. All procedures for managing missing data are not without limitation (e.g. they distort the distribution of the data) and therefore the procedure employed for cases with more than 5% of values missing was determined using the SDQ scoring guidelines. SDQ scoring guidelines stipulate that more than three missing items on any of the five subscales of the SDQ, render that subscale invalid. The summation of four subscale scores allow for the determination of a total difficulties score and therefore the

invalidation of one or more of these subscales would be prohibitive. To prevent this, cases with more than three missing values were deleted from the dataset (n=61). The remaining missing values were replaced using a prorating method. The subscale and total scores were recalculated to include the replaced data.

3.1.4   Normality

The present study aimed to confirm the factor structure of the SDQ using confirmatory factor analysis. Confirmatory factor analysis represents a multivariate statistical test which assumes that data are normally distributed. To determine whether normality assumptions were met, the data were examined. Histograms were produced for the 25 items of the SDQ to compare the distribution of scores with what might be expected if the distribution were normal. Visual inspections of the histograms suggested that multiple SDQ items were positively skewed in that scores were observed to cluster to the left. To establish a more reliable estimation of the normality of the data, statistics for skewness and kurtosis were examined. The statistics for each item are presented in Table 3.

Items with standardised skewness and kurtosis statistics (z-scores) which surpassed the critical value of 3.29 were considered significantly non-normal. 20 SDQ items had skewness z scores which exceeded 3.29. Six SDQ items had kurtosis z scores which exceeded 3.29. Square root transformations were carried out on items identified as non-normal, however the standardised z scores for skewness and/or kurtosis on non-normal variables deteriorated following transformation (see Appendix 7). A constant of one was added to item data to allow for Log10 transformation. Log10 transformation produced a normal distribution in three of the skewed variables, namely items 2 ('Restless'),5 ('Temper tantrums') and 11 ('One good friend'). The

remaining variables skew and/or kurtosis z scores were observed to deteriorate

following transformation (See Appendix 8). As the majority of the SDQ items were

not improved by transformation methods the decision was made to retain the original

dataset and to account for the non-normality of the data through the estimation

method used for confirmatory factor analysis (Tabachnick & Fidell, 2007).

Table 2. *The distribution of missing values per SDQ item for the whole sample*

Item no.	Phrasing	N missing	% missing
1	Considerate of other people's feelings	23	2
2	Restless, overactive, cannot stay still for long	9	.8
3	Often complains of headaches, stomach-aches or sickness	20	1.7
4	Shares readily with other children (treats, toys, pencils etc.)	7	.6
5	Often has temper tantrums or hot tempers	9	.8
6	Rather solitary, tends to play alone	13	1.1
7	Generally obedient, usually does what adults request	11	.9
8	Many worries, often seems worried	22	1.9
9	Helpful if someone is hurt, upset or feeling ill	35	3
10	Constantly fidgeting or squirming	17	1.4
11	Has at least one good friend	30	2.6
12	Often fights with other children or bullies them	25	2.1
13	Often unhappy, down-hearted or tearful	10	.9
14	Generally liked by other children	12	1
15	Easily distracted, concentration wanders	8	.7
16	Nervous or clingy in new situations, easily loses confidence	8	.7
17	Kind to younger children	23	2
18	Often argumentative with adults	47	4
19	Picked on or bullied by other children	40	3.4
20	Often volunteers to help others (parents, teachers, other children)	57	4.9
21	Can stop and think things out before acting	50	4.3
22	Can be spiteful to others	46	3.9
23	Gets on better with adults than with other children	41	3.5
24	Many fears, easily scared	21	1.8
25	Sees tasks through to the end, good attention span	33	2.8

Table 3. *Descriptive statistics of the SDQ items*

SDQ Item	N	Mean	S.E. of mean	S.D. of mean	Variance	Skew	S.E. of skew	Z score of skew	Kurtosis	S.E. of kurtosis	Z score of kurtosis
1	1112	1.34	.02	.62	.38	-.38	.07	**-5.13**	-.67	.15	-2.13
2	1112	.84	.02	.75	.56	.28	.07	**3.79**	-1.19	.15	-2.84
3	1112	.10	.01	.36	.13	3.89	.07	**53.08**	15.17	.15	**10.17**
4	1112	1.20	.02	.60	.36	-.10	.07	-1.41	-.42	.15	-1.70
5	1112	.74	.02	.70	.49	.41	.07	**5.55**	-.92	.15	-2.50
6	1112	.54	.02	.64	.41	.80	.07	**10.88**	-.42	.15	-1.69
7	1112	.79	.02	.61	.37	.14	.07	1.95	-.50	.15	-1.85
8	1112	.11	.01	.36	.13	3.50	.07	**47.66**	12.33	.15	**9.17**
9	1112	1.19	.02	.74	.55	-.33	.07	**-4.46**	-1.13	.15	-2.77
10	1112	.57	.02	.69	.48	.80	.07	**10.97**	-.56	.15	-1.96
11	1112	.76	.02	.80	.64	.46	.07	**6.28**	-1.29	.15	-2.97
12	1112	.17	.01	.43	.18	2.54	.07	**34.68**	5.99	.15	**6.39**
13	1112	.27	.01	.49	.24	1.57	.07	**21.35**	1.52	.15	3.22
14	1112	.33	.02	.51	.27	1.18	.07	**16.13**	.33	.15	1.50
15	1112	.76	.02	.66	.44	.31	.07	**4.18**	-.79	.15	-2.31
16	1112	.60	.02	.69	.47	.71	.07	**9.71**	-.65	.15	-2.10
17	1112	1.48	.02	.62	.38	-.77	.07	**-10.53**	-.40	.15	-1.65
18	1112	.37	.02	.59	.35	1.38	.07	**18.76**	.85	.15	2.41
19	1112	.15	.01	.42	.18	2.95	.07	**40.20**	8.26	.15	**7.51**
20	1112	1.03	.02	.75	.56	-.05	.07	-0.72	-1.22	.15	-2.89
21	1112	1.16	.02	.68	.47	-.21	.07	-2.89	-.87	.15	-2.44
22	1112	.24	.01	.49	.24	1.96	.07	**26.74**	3.06	.15	**4.57**
23	1112	.54	.02	.67	.45	.87	.07	**11.91**	-.40	.15	-1.66
24	1112	.29	.02	.53	.28	1.71	.07	**23.26**	2.00	.15	**3.70**
25	1112	.98	.02	.67	.45	.03	.07	.38	-.77	.15	-2.29

Note. Items in bold are significantly skewed (*z*-score >3.29). Positively phrased items were reverse scored.

3.1.5 Outliers

Outliers represent abnormally large or small values within a dataset or an unusual pattern of scores, which may exert effects on the data (e.g. cause non-normality). To identify the presence of possible outliers, frequency output and boxplots for total scale and subscale scores were observed. Scores highlighted as extreme on the boxplots were examined further. In this case, scores were defined as outliers if they fell more than three standard deviations from the mean (Kline, 2011). 16 (1.4%) scores were identified as outliers above the mean and winsorized to reduce their impact on the data. Winsorization (Dixon & Yuen, 1974) involved replacing the outlying scores by the value of the next score plus one unit of measurement. The unit of measurement was scaled upwards to reflect the ascension of outlying scores. This process was then balanced at the other end of the distribution.

3.1.6 Multicollinearity

The correlation matrix of the 25 item SDQ was visually inspected for inter-item correlations above .90, which may be considered indicative of multicollinearity between variables (Field, 2009). As displayed in Table 4, correlations between variables ranged from .01 to .49, no correlations were observed equal or greater than .90. This suggest that multicollinearity was not a problem in the data set.

Table 4. *Correlation matrix of SDQ items*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	1																								
2	-.11	1																							
3	.04	.10	1																						
4	.26	-.04	.03	1																					
5	-.11	.24	.09	-.10	1																				
6	-.04	.09	.11	-.10	.17	1																			
7	-.25	.18	.05	-.21	.16	-.04	1																		
8	-.02	.09	.33	-.05	.17	.18	.05	1																	
9	.50	-.08	.06	.18	-.03	-.02	-.24	.01	1																
10	-.11	.45	.11	-.02	.24	.11	.17	.13	-.06	1															
11	-.28	.05	-.08	-.18	.02	.15	.20	-.03	-.34	.02	1														
12	-.08	.15	.10	-.08	.27	.12	.10	.17	.03	.18	-.04	1													
13	.01	.04	.12	-.02	.07	.12	.04	.17	.01	.09	.01	.19	1												
14	-.25	.09	-.01	-.25	.10	.12	.26	.07	-.24	.11	.35	.12	.11	1											
15	-.18	.37	.10	-.10	.23	.14	.18	.10	-.10	.37	.09	.18	.06	.11	1										
16	-.09	.08	.11	-.11	.25	.18	.04	.20	-.05	.12	.05	.13	.10	.09	.21	1									
17	.35	-.05	-.02	.28	-.08	-.04	-.25	-.03	.38	-.07	-.32	-.07	-.00	-.36	-.12	-.06	1								
18	-.03	.20	.05	-.04	.26	.09	.10	.11	.07	.21	-.04	.20	.02	.04	.21	.08	.03	1							
19	-.01	.02	.09	-.01	.11	.14	-.05	.23	.06	.07	-.01	.13	.13	.03	.06	.12	.04	.15	1						
20	.33	-.11	.08	.23	-.04	-.05	-.29	.06	.49	-.10	-.32	.03	.02	-.22	-.17	-.07	.37	.11	.11	1					
21	-.28	.13	-.02	-.16	.09	.01	.28	-.00	-.36	.14	.23	.02	.00	.23	.19	.06	-.28	-.03	-.07	-.39	1				
22	-.02	.12	.14	-.01	.21	.05	.04	.19	.05	.15	-.07	.37	.14	.06	.10	.09	-.03	.29	.14	.12	-.02	1			
23	-.01	.10	.10	-.12	.11	.29	.02	.16	-.02	.12	.07	.13	.13	.10	.15	.15	-.01	.15	.21	.04	-.07	.11	1		
24	-.01	.08	.19	-.05	.14	.21	.02	.32	-.004	.12	.04	.09	.23	.08	.14	.29	.01	.13	.23	.06	-.02	.10	.24	1	
25	-.29	.22	-.04	-.16	.10	.01	.31	-.06	-.33	.20	.27	.05	-.01	.25	.29	.09	-.31	.00	-.06	-.40	.42	-.01	-.03	-.08	1

3.1.7 Reliability

The reliability of the SDQ total and subscale scores were explored using Cronbach's alpha statistic of internal consistency. Table 5 displays Cronbach alpha values for the overall sample, one year old infants and two year old infants. The SDQ total difficulties subscale for the whole sample was found to have good reliability, with Cronbach's alpha falling within acceptable bounds. Internal consistency for the 5 subscales ranged from adequate to poor. Internal consistency of SDQ total and subscale scores were disaggregated by age, revealing that internal consistency were slightly better for infants aged 24-30 months. The SDQ total score was also found to have good internal consistency for male (.71) and female (.75) infants (See Appendix 9).

Table 5. *The internal consistency of SDQ subscales for the whole sample, one year olds and two year olds, analysed using Cronbach's alpha statistic.*

SDQ scales	Whole sample	One year olds (12-23 months)	Two year olds (24-30 months)
Total difficulties	**.73**	.69	**.77**
Emotional symptoms	.53	.51	.56
Conduct problems	.54	.51	.58
Hyperactivity	.66	.63	.67
Peer problems	.46	.41	.54
Prosocial	**.72**	**.70**	.67
Internalising difficulties	.59	.53	.66
Externalising difficulties	**.70**	.67	**.73**

Note. Bold items indicate Cronbach's alpha statistics which falls within acceptable bounds.

3.1.8   Confirmatory factor analysis (CFA)

3.1.8.1   Model specification and Estimation

Previous literature examining the SDQ's factor structure in preschool samples have

subjected two or three models to CFA in structural equation modelling (e.g. Croft,

Stride, Maughan, & Rowe, 2015; Ezpeleta, Granero, de la Osa, Penelo, & Domènech,

2013; Theunissen, Vogels, de Wolff, & Reijneveld, 2013). This study subjected two

pretested models to CFA in structural equation modelling to confirm/disconfirm the

underlying/latent factor structure of the 25 item SDQ in children aged 12-30 months.

Model 1, shown in Figure 1, assumes a five factor, first order, model which portrays

the five subscales of the SDQ (emotional, peer, conduct, hyperactivity/inattention and

prosocial). This model allows the five constructs to be freely correlated. The second

model (Model 2), shown in Figure 2, assumes a five factor, second order, model, in

which four subscales (emotion, peer, conduct and hyperactivity) are correlated to

measure two higher order constructs (internalising and externalising difficulties).

SDQ items had their own related error terms for both models as shown in Figure 1

and Figure 2.

Data were entered into AMOS version 23 (Arbuckle, 2014) using a weighted

least squares (WLS) estimation method and AMOS Graphic was used to construct the

measurement models. A WLS estimation method was used due to the distribution and

type of data. As SDQ items are ranked on a likert scale, with three response options

(not true, somewhat true and certainly true), it is difficult to argue that the scores

assigned to the three responses make up a scale with equal intervals (Kline, 2011).

When this is taken collectively with the distribution of the data, the popular/default

estimation method, maximum likelihood, was not appropriate. The use of maximum

likelihood may have led to an inflated model chi-square value, an underestimation of

fit indices and an underestimation of standard errors (Brown, 2006).
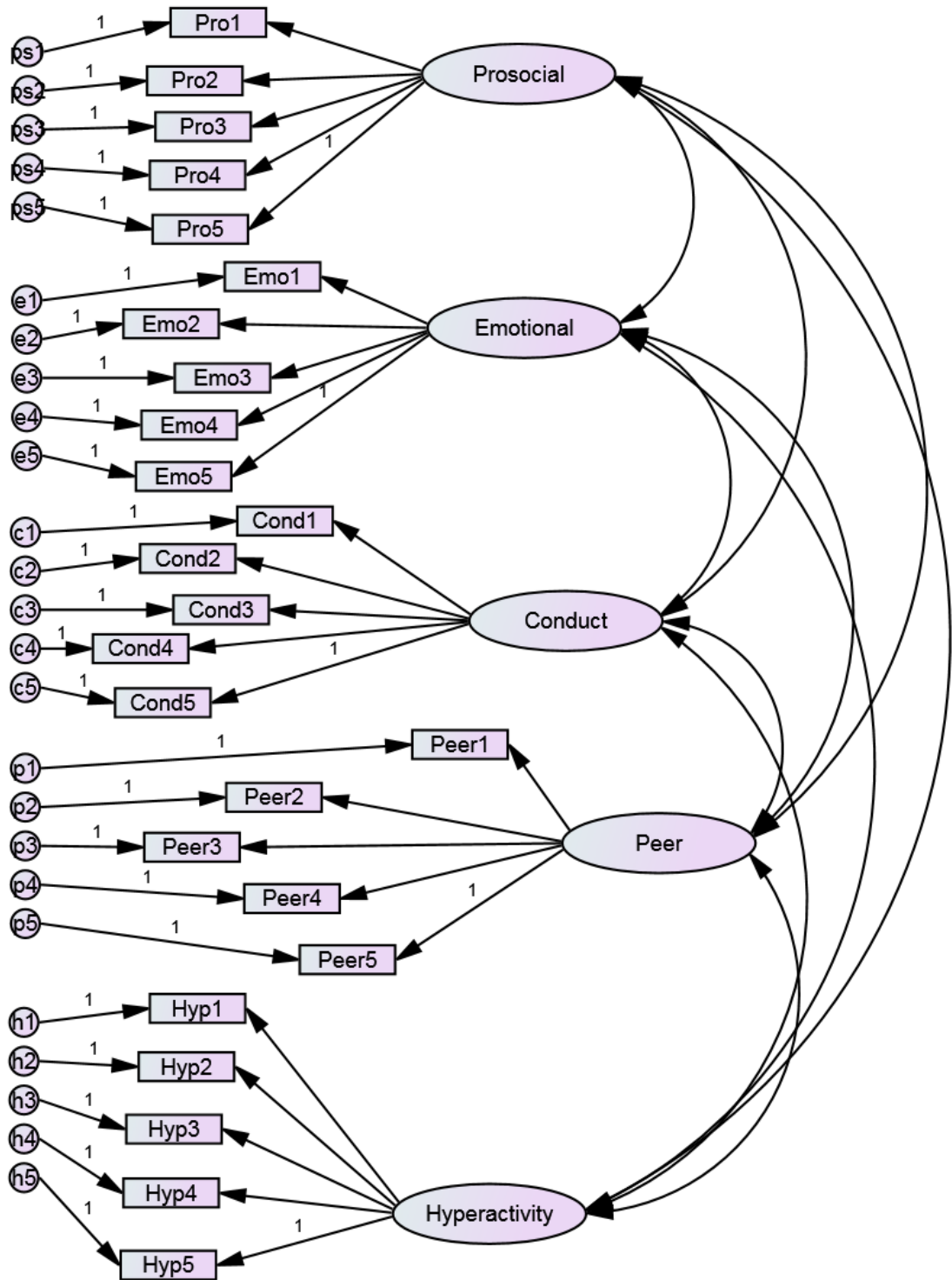

Figure 1. *Model 1, a five factor first order model of the Strengths and Difficulties*
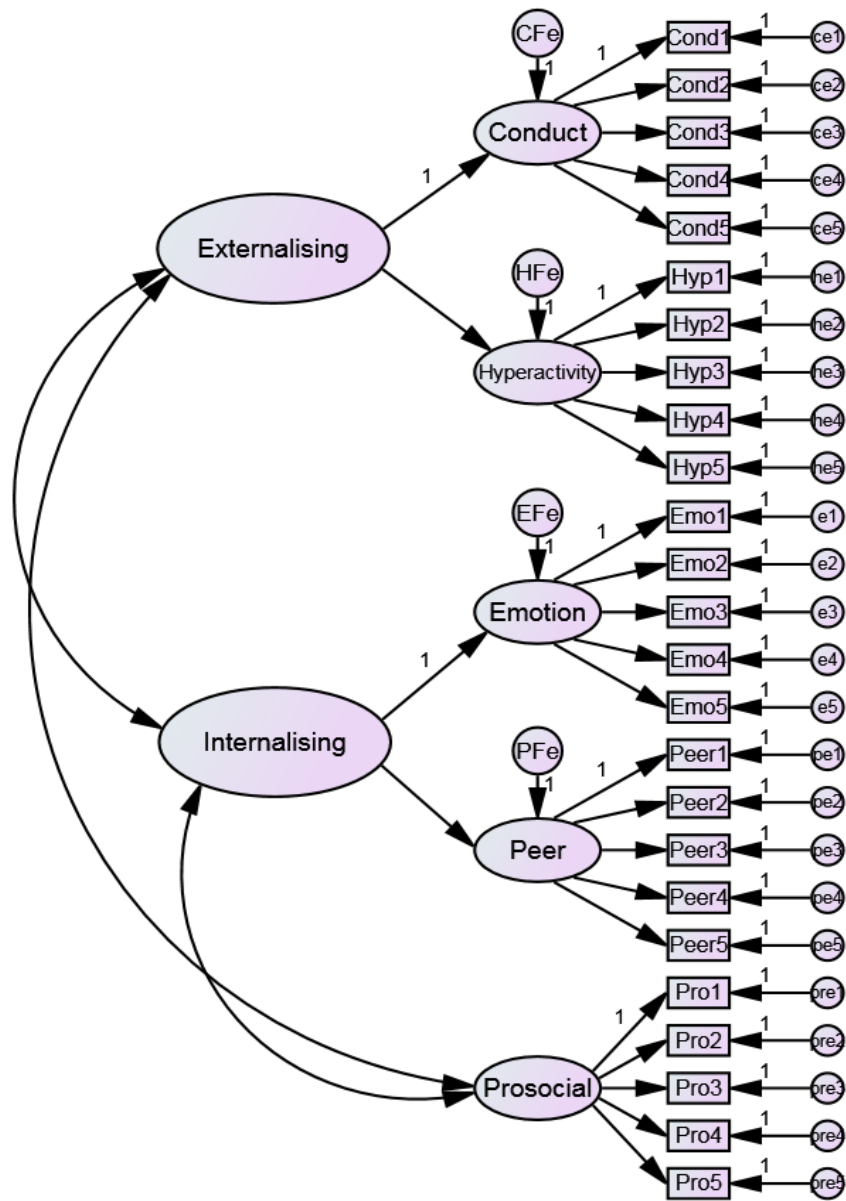
Questionnaire

Figure 2. *Model 2, a five factor second order model of the Strengths and Difficulties Questionnaire.*

3.1.8.2 *Model evaluation*

3.1.8.2.1 **Standardised factor loadings**

In CFA, a good model fit is the result of variables loading on to predetermined factors in expected ways. Table 6 displays the standardised factor loadings of the five factor first order (Model 1) and five factor second order (Model 2) models of the hypothesised SDQ factors. Standardised factor loadings represent the correlation between individual items and the latent factor. High standardised factor loadings are considered advantageous with loadings above .71 considered excellent, .63 considered very good, .55 considered good, .45 considered fair, and .32 considered poor (Brown, 2006; Harrington, 2008; Kline, 2011; Tabachnick & Fidell, 2007).

Standardised factor loadings for the five factor first order model (Model 1) ranged from .08-.69. Of the 25 standardised loadings, none were excellent, two were very good, 10 were good, four were fair, and nine considered poor. Table 7 displays correlations between latent variables. High positive correlations between emotional and peer latent variables and conduct and hyperactivity latent variables were found. These correlations suggest that these latent variables are somewhat associated, as might be expected given the proposed summation of these SDQ subscales to obtain broader internalising difficulties and externalising difficulties subscales. These correlations provide support for the examination of the five factor second order model that includes internalising and externalising factors. The correlations found are not too high as to suggest that the different latent variables are measuring the same construct. High negative correlations were found between hyperactivity/inattention and prosocial latent variables and prosocial and peer latent scores suggesting that these variables are somewhat related. This would be expected given that the hyperactivity/inattention and peer problems subscales identify negative characteristics

whereas the prosocial behaviour subscale identifies positive characteristics and therefore theoretically you would expect a negative relationship in which prosocial behaviours decrease as problem behaviours increase. Standardised factor loadings for the five factor second order model (Model 2) ranged from .09-.93. Of the 29 standardised factor loadings (25 items + 4 loadings for the second order factors), three were excellent, three were very good, 10 were good, four were fair, and nine were poor (See Table 6).

3.1.8.2.2 Goodness of fit metrics

The fit of each model to the data were determined by an examination of goodness of fit statistics, namely the chi-square statistic and root mean square error of approximation (RMSEA). Other fit indices such as the goodness of fit index (GFI), the comparative fit index (CFI) and standardised root mean square residual (SRMR) were used to determine model fit. Adequate model fit was determined by an RMSEA value below .08, a CFI and GFI above .90 and an SRMR value less than .10. Good model fit was determined by an RMSEA value below .5, a CFI and GFI above .95 and an SRMR value less than .08 (Brown, 2006; Browne & Cudeck, 1993; Harrington, 2008). The chi-square statistic is reported but was not used in the determination of model fit due to its vulnerability to large samples in that it is likely to be significant when used to test fit in large samples (Brown, 2006).

Fit indices for both initial models tested are displayed in Table 8. In both models, the chi-square statistic demonstrated poor model fit to the data, with a significant chi-square statistic (p<.001). The indices for Model 1 indicated that the fit was good/adequate (RMSEA/GFI and SRMR), however not all indices reported adequate fit, as the CFI value was poor (below .90). Similarly, indices for Model 2 indicated that the fit was good/adequate (RMSEA/GFI and SRMR), however again

the CFI was poor. As displayed in Table 8, little difference was found between the fit

indices of Model 1 and Model 2, with both models demonstrating a mixed pattern of

fit indices, with most indices demonstrating adequate, rather than good fit.

Table 6.*Confirmatory factor analysis (standardized factor loadings)*

		Model 1	Model 2
Hyperactivity	25. Good attention span	.62	.62
	21. Thinks before acting	.55	.55
	15. Distractible	.62	.62
	10. Fidgety	.53	.53
	2. Restless	.58	.58
Conduct	22. Spiteful to others	.12	.12
	18. Argumentative with adults	.37	.36
	12. Fights/bullies	.30	.30
	7. Obedient*	.58	.58
	5. Temper tantrums	.57	.56
Peer	23. Gets on better with adults	.34	.33
	19. Picked on	.13	.13
	14. Liked by others*	.57	.57
	11. One good friend*	.60	.60
	6. Solitary	.46	.46
Emotional	24. Fears-scared	.50	.49
	16. Nervous-clingy	.52	.51
	13. Unhappy	.18	.17
	8. Worries	.30	.30
	3. Somatic	.08	.09
Prosocial	20. Volunteers to help	.62	.62
	17. Kind to younger children	.57	.57
	9. Helpful	.68	.68
	4. Shares	.42	.42
	1. Considerate of others feelings	.69	.68
	Conduct - Externalising		.79
	Hyperactivity - Externalising		.89
	Peer - Internalising		.93
	Emotional - Internalising		.70

Note. *represents items that were reverse scored.

Table 7. *Correlation of SDQ subscales for Model 1*

	Model 1
Emotional with Peer	.63
Emotional with Conduct	.43
Emotional with Hyperactivity	.41
Emotional with Prosocial	-.47
Peer with Conduct	.45
Peer with Hyperactivity	.52
Peer with Prosocial	-.68
Conduct with Hyperactivity	.70
Conduct with Prosocial	-.58
Hyperactivity with Prosocial	-.67

Table 8. *Fit indices for weighted least squares confirmatory factor analysis*

Model	*df*	$\chi 2$	RMSEA (90% CI)	SRMR	CFI	GFI
1	265	933.68	.048(.044-.051)	.0985	.620	.934
1 with modifications	259	761.53	.042(.038-.045)	.0953	.714	.946
2	268	938.06	.047(.044-.051)	.0993	.619	.933
2 with modifications	262	762.89	.041(.038-.045)	.0957	.715	.946

Note. df = degrees of freedom; RMSEA = root mean square error of approximation; CI = confidence interval; SRMR = standardised root mean square residual; CFI = comparative fit index; GFI = goodness fit index.

3.1.8.3 *Model re-specification*

As Model 1 and 2 showed acceptable fit on most indices but not on the CFI, both models were respecified to improve their fit to the sample data. Model respecification was determined through an examination of the modification indices output produced by the AMOS software. Modification indices provide potential respecifications to improve model fit. Modification indices computed by AMOS were sorted in descending order to highlight the largest modification indices, that is, to identify respecifications that would make the largest improvements to the model. The largest modification indices suggested that allowing covariance between the unique variance of different items would improve model fit. Choice of which unique variances to covary were guided by the size of the modification index and the original factor structure proposed for the SDQ (Goodman, 2001). The decision was made to only allow covariance between the unique variance of homogenous content, that is, items belonging to the same factor.

In line with previous examinations of the factor structure of the SDQ, it was felt that this minor model re-specification would increase the variance explained by the models whilst maintaining the fundamental conclusions about the appropriateness of the hypothesised factor structures (e.g. Goodman et al., 2010). Model 1 was re-specified by allowing covariance between the following unique variances; volunteers to help and considerate; helpful and shares; gets on better with adults and solitary; helpful and considerate; argumentative and spiteful; and restless and fidgety. Model 2 was re-specified by allowing covariance between the following unique variances; considerate and volunteers to help; solitary and gets on better with adults; shares and helpful, considerate and helpful; argumentative with adults and spiteful to others; and restless and fidgety. The effects of re-specification on model fit indices for Model 1

and 2 are displayed in Table 8. In summary, good/adequate fit was achieved after allowing some unique variance to correlate between items belonging to the same factor. However, the CFI remained low in both respecified models.

Modification indices highlighted potential respecifications which involved allowing covariance between the unique variance of items belonging to different factors, and the unique variance of items onto another factor however, the decision was made not to endorse these respecifications due to limitations highlighted in the literature (Hermida, 2015).

3.1.9 SDQ Means, Normative bandings and group differences

SDQ mean scores and normative bandings for the five SDQ subscales and the total difficulties score are presented in Table 9. Bandings were defined with 10% of children with the highest scores placed in the atypical range, the next 10% placed in the marginal range and the remaining 80% placed in the normative range. Splits were approximate due to the nature of the data. Mann Whitney U and Kruskal Wallis tests were used to examine differences between subscale scores based on the demographic information available. Non-parametric comparison tests were used to account for the non-normal distribution of the data. Bonferroni corrections were applied as appropriate to account for number of comparisons, to prevent the likelihood of Type I error. Significant differences were found between total difficulties score and infant age (p=.005), infant gender (p=.032) and parents' educational level (p<0.001). Significant differences were found between externalising difficulties score and infant age (p=.005), infant gender (p=.006) and parents educational level (p=.001). No significant differences were found between internalising difficulties score and demographic variables. Means for the total difficulties and externalising difficulties

subscales split by infant age, infant gender and parent's educational level are

presented in Table 10. Mean scores indicate that male infants got higher externalising

and total difficulties scores than female infants. One year old infants achieved higher

total and externalising difficulties scores than two year old infants. Lastly, mean

scores indicate that as parental educational level increased the externalising and total

difficulties score achieved decreased.

Table 9. *Means and normative bandings for the SDQ subscales*

Scale	Mean	SD	Normative	Marginal	Atypical
Emotional symptoms	1.37	1.48	0-2	2	3-10
Peer problems	2.31	1.75	0-4	4	5-10
Hyperactivity/Inattention	4.30	2.25	0-6	6	7-10
Conduct problems	2.30	1.69	0-4	4	5-10
Prosocial behaviour	6.24	2.29	2-8	2	0-1
Total difficulties	10.28	4.78	0-14	14-17	17-40

Table 10. *SDQ total difficulties and externalising difficulties subscales, split by infant age, infant gender and parent's educational level.*

		Total difficulties		Externalising difficulties	
	N	Mean	SD	Mean	SD
Infant gender [a]					
Male	565	10.53	4.72	6.85	3.25
Female	510	9.95	4.87	6.32	3.27
Infant age					
12-23 months	628	10.54	4.50	6.80	3.13
24-30 months	484	9.94	5.10	6.36	3.42
Parent educational level [a]					
Pre GCSE	11	13.45	6.01	8.09	3.73
GCSE	67	11.88	4.76	7.26	3.60
College	188	11.01	4.94	7.26	3.60
Undergraduate	190	9.99	4.66	6.35	3.16
Postgraduate	295	9.64	4.61	6.07	3.05

Note. [a] total N for infant gender and parent educational level is due to the exclusion of infants with missing data.

3.2   PPACS Validation

Study two involved an exploration of the psychometric properties of an adapted version of the Preschool Parental Account of Childhood Symptoms (PPACS-A) in children aged 1-3 years. Prior to analyses, data were checked and cleaned in line with recommendations in the literature (Tabachnick & Fidell, 2007). The distribution of the data was examined and transformation considered as appropriate. The internal consistency of the PPACS-A was explored and exploratory factor analysis (EFA)

carried out. Lastly, the concurrent validity of the PPACS-A and the SDQ was established using the Child Behaviour Checklist.

3.2.1   Data cleaning

The precision of data entry was checked as it was entered by a member of the HSHS research team. The data were checked for erroneous values by observing the maximum and minimum values for each variable in SPSS. PPACS-A item scores were calculated for attention and behaviour items by averaging the frequency and severity scores for each item. The six hyperactivity/inattention items consisted of: difficulty sleeping, attention and activity when watching television, attention and activity during individual activity, attention and activity during play with others, activity at meal time, and activity when shopping. The five behaviour items consisted of: resistance going to bed, temper tantrums, refusal to comply with requests, destructive behaviour, and aggression. The PPACS-A total score was calculated by summing item scores for attention and behaviour over the last four months. CBCL 1.5-5 and SDQ subscale scores were calculated in line with published scoring procedures (Achenbach & Rescorla, 2000; www.sdqinfo.org)

3.2.2   Missing data

44 (31%) PPACS-A interviews were identified with missing values relevant to scoring. The distribution of missing values per PPACS-A items for the study population is displayed in Table 11. The PPACS-A is a semi-structured interview and therefore missing items represent items deemed 'unrateable' or 'situation not arisen'. Cases with less than 5% of values missing (n=7) were replaced through a prorating method. Prorating was undertaken using the most homogenous items available. Thus,

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missing values on the attention items were prorated using the participant's responses on other questions measuring attention. The same approach was employed for missing values on behaviour items. This imputation method was chosen due to its widespread use in the scoring procedure of various standardised scales (e.g. the SDQ, the Wechsler scales etc.). Cases with more than 5% missing values (n=37) were subject to missing value analyses.

Independent samples t-tests and chi-square tests were used to examine whether missingness was random or could be explained by the available data (Harrington, 2008; Tabachnick & Fidell, 2007). An independent samples t-test was used to compare the infants age of missing and non-missing cases. Equal variance was assumed as homogeneity of variance assumptions were met (F=.738, *ns*). Infant age, as reported at time of measure completion, was significantly lower in missing than non-missing cases, t(139) = 4.38, p<.001. An independent samples t-test comparing parent age of missing and non-missing cases did not reveal a significant difference between groups.

Chi-square tests were used to determine whether missingness could be explained by the available categorical data. Comparisons were made between missing and non-missing groups and parent ethnicity, respondents relationship to the infant, site of recruitment and respondents qualification level. No significant differences were found between missing and non-missing groups across the demographic variables explored. Following the missing value analysis, the management of cases with more than 5% missing values were considered. Due to the number of PPACS interviews with missing values (n=38), listwise deletion was ruled out due to the significant impact on the study sample size and subsequent interpretability of the EFA (Tabachnick & Fidell, 2007). The decision was made to retain cases with at least 80%

of PPACS items completed (18 items and above – see Appendix 4), thus resulted in the deletion of nine cases from the dataset. An 80% cut-off point was chosen to prevent more than 50% missing items for the attention and behaviour items. Missing values were replaced using the prorating method described above. Total scores were recalculated to include the replaced data.

Data were missing from the SDQ and CBCL questionnaires; five participants omitted items from the SDQ and 21 participants omitted items from the CBCL. Most participants omitted one item (less than 5%), with only two participants failing to rate more than one item, and therefore it was not necessary to subject the SDQ and CBCL data to missing value analyses. SDQ missing values were replaced as per the prorating procedure outlined in the SDQ scoring guidelines ([www.sdqinfo.org)](www.sdqinfo.org). CBCL missing values were replaced with the whole group mean for that item (Tabachnick & Fidell, 2007).

Table 11. *The distribution of missing PPACS-A items*

	Item	Phrasing	N missing	% missing
Attention				
	1H2	Difficulty sleeping	2	1.4
	1H4	Frequency of sleeping difficulties	2	1.4
	2H2	Time spent doing something they enjoy	22	15.4
	2H4	Rate of getting up and down whilst doing something they enjoy	23	16.1
	2H6	Fidgeting whilst doing something they enjoy	23	16.1
	3H2	Time spent playing alone	3	2.1
	3H4	Rate of getting up and down whilst playing alone	6	4.2
	3H6	Fidgeting whilst playing alone	6	4.2
	4H2	Time playing with other children	19	13.3
	4H4	Times child moved away from playing with other children	19	13.3
	5H2	Getting up at meal time	6	4.2
	6H2	Running away when shopping	8	5.6
Behaviour				
	1CD2	Resistance when going to bed	3	2.1
	1CD4	Number of times refused to go to bed per week	3	2.1
	2CD2	Temper tantrums	2	1.4
	2CD4	Number of temper tantrums per week	2	1.4
	3CD2	Refusal of requests	2	1.4
	3CD4	Number of days refuses per week	2	1.4
	4CD2	Deliberately broken or dirtied objects	2	1.4
	4CD4	Number of days broken or dirtied objects per week	2	1.4
	5CD2	Aggressive towards others	2	1.4
	5CD4	Number of days aggressive towards others per week	2	1.4

Note. Two participants did not complete any PPACS-A items. H2, H4 and H6 refer to severity and frequency scores of behaviours.

3.2.3   Normality

To determine whether the assumptions of multivariate analyses were met, the data were examined for skewness and kurtosis. Histograms were produced for the 11 attention and behaviour items of the PPACS-A to compare the distribution of scores with what might be expected if the distribution were normal. Initial examinations of the histograms suggested that most of the PPACS items were normally distributed. To gain a more reliable estimation of the normality of the data, statistics for skewness and kurtosis were examined. The statistics for each item are presented in Table 12. Items with standardised skewness and kurtosis statistics (z-scores) greater than 3.29 (p>.001) were considered significantly non-normal. One behaviour item ('oppositionality') was negatively skewed. This item only just violated normality assumptions and therefore the decision was made to retain the original item (See Table 12).

Skewness and kurtosis z scores were calculated for the total and subscale scores of the SDQ and CBCL. Skewness and kurtosis z-scores of the SDQ did not exceed the critical value of 3.29 and therefore can be considered reasonably normally distributed. The CBCL total problem Score and the CBCL internalising difficulties score had skewness and kurtosis z-scores which exceeded 3.29 and therefore square root transformations were successfully carried out (See Table 13).

3.2.4   Outliers

Frequency output and boxplots were observed, for the PPACS, CBCL and SDQ, to determine the presence of possible outliers. Total and subscale scores identified as extreme in boxplots were examined further. Scores were identified as being outliers if they fell more than three standard deviations from the mean (Kline, 2011). One CBCL

total externalising score was identified as an outlier and winsorized to reduce its impact on the data. Winsorization (Dixon & Yuen, 1974), involved replacing the outlying score by the value of the next score plus one unit of measurement. This process was balanced at the other end of the distribution.

3.2.5   Multicollinearity

Multicollinearity and singularity represent difficulties with a correlation matrix that arise when two or more variables are too highly correlated (at .90 or above) or when variables are redundant i.e. one of the variables is an amalgamation of two or more of the other variables. Extreme multicollinearity is troublesome due to its effects on the determination of highly correlated variables contribution to a factor (Field, 2009; Tabachnick & Fidell, 2007). The correlation matrix of the 11 item PPACS-A was examined for inter-item correlations above .90 (See Table 14). No correlations were identified above .90 which suggests that extreme multicollinearity was not present within the data set.

Table 12. *Descriptive statistics of the 11 item PPACS-A*

PPACS Item	N	Mean	S.E of Mean	S.D of Mean	Variance	Skew	S.E. of Skew	Skew Z score	Kurtosis	S.E. of Kurtosis	Kurtosis Z score
Attention											
1	134	1.12	.10	1.13	1.28	.36	0.21	1.74	-1.37	.42	-1.82
2	134	1.28	.08	.93	.87	.25	0.21	1.22	-0.77	.42	-1.36
3	134	1.49	.06	.74	.55	.25	0.21	1.19	-0.27	.42	-.80
4	134	2.01	.07	.78	.61	-.21	0.21	-0.98	-0.83	.42	-1.42
5	134	1.37	.10	1.20	1.44	.04	0.21	0.19	-1.57	.42	-1.94
6	134	1.98	.11	1.27	1.60	-.66	0.21	-3.15	-1.32	.42	-1.78
Behaviour											
7	134	1.28	.10	1.21	1.45	.14	.21	.68	-1.59	.42	-1.96
8	134	2.31	.09	.99	.98	-.10	.21	-.49	-.45	.42	-1.04
9	134	2.41	.09	1.08	1.16	-.70	.21	**-3.34**	.02	.42	.20
10	134	1.01	.09	1.00	1.01	.38	.21	1.80	-1.22	.42	-1.71
11	134	1.75	.11	1.24	1.54	.10	.21	.46	-.94	.42	-1.50
Total Difficulties	134	15.68	.42	4.91	24.05	.13	.21	.62	-.29	.42	-.84

Note. Items in bold are significantly skewed (z-score>3.29)

Table 13. *Descriptive statistics of standardised and transformed scales*

Scale or Subscale		N	Mean	S.E. of mean	S.D. of mean	Variance	Skew	S.E. of skew	Skew Z score	Kurtosis	S.E. of kurtosis	Kurtosis Z score
SDQ	Total	143	13.66	.40	4.78	22.83	.25	.20	1.25	-.44	.40	-1.05
SDQ	Internalising	143	4.27	.22	2.58	6.65	.52	.20	2.58	-.12	.40	-.54
SDQ	Externalising	143	9.40	.28	3.34	11.14	.38	.20	1.88	-.29	.40	-.85
CBCL	Total	143	41.57	1.73	20.68	427.73	.91	.20	**4.49**	.70	.40	1.32
CBCL	Internalising	143	9.34	.64	7.66	58.68	1.44	.20	**7.08**	1.75	.40	2.09
CBCL	Externalising	143	16.97	.67	8.05	64.82	.50	.20	2.49	.17	.40	.65
SR CBCL	Total	143	2.82	.10	1.19	1.43	.50	.20	2.48	.00	.40	.04
SR CBCL	Internalising	143	6.25	.13	1.59	2.52	.22	.20	1.08	.03	.40	.29

Note. Items in bold are significantly skewed (z-score > 3.29). SRCBCL Total difficulties = Square root transformed CBCL total difficulties score. SRCBCL Internalising = Square root transformed CBCL internalising difficulties

Table 14. *Correlation matrix of PPACS-A items*

Itemno.	1	2	3	4	5	6	7	8	9	10	11
1	1										
2	.12	1									
3	-.04	.21	1								
4	.13	.27	.37	1							
5	-.11	.22	.10	.24	1						
6	.18	.05	.05	.13	.02	1					
7	.21	.05	.13	.17	.17	.06	1				
8	.09	.01	.02	.10	.12	.25	.23	1			
9	.15	-.07	-.09	.12	.01	.08	.28	.47	1		
10	.13	.20	.03	.14	.23	.21	.21	.43	.29	1	
11	.03	.08	-.01	-.04	.19	.15	.04	.51	.35	.46	1

Note. Itemno. = PPACS-A item number

3.2.6 Reliability

The reliability of the PPACS-A was explored using Cronbach's alpha statistic of internal consistency. The 11 item PPACS-A was found to have less than adequate reliability, with Cronbach's alpha at .65. Corrected item-total correlations and Cronbach's alpha if item deleted for the 11 item PPACS-A is displayed in Table 15. Five attention items were identified with corrected item-total correlations below .3 which suggest that they are weakly correlated with the rest of the scale (Field, 2009). Item 1 ('Sleeping difficulties') and Item 3 ('Attention and activity during individual activity') had particularly low correlations with the rest of the scale, however examination of the statistics output suggested that deletion of these items would not improve Cronbach's alpha statistic and therefore the decision was made to retain them. The Attention items were found to have poor reliability, with Cronbach's alpha at .42. Behaviour items were found to have acceptable reliability, with Cronbach's alpha at .70.

Table 15. *Internal consistency of the PPACS-A*

Item	Scale mean if item deleted	Scale Variance if item deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item deleted
1	16.91	27.18	**.18**	.65
2	16.75	27.63	**.21**	.64
3	16.54	28.94	**.13**	.65
4	16.02	27.38	.32	.63
5	16.66	26.33	**.23**	.65
6	16.05	25.90	**.24**	.64
7	16.75	25.30	.32	.63
8	15.72	24.60	.51	.59
9	15.62	25.59	.35	.62
10	17.01	24.39	.52	.59
11	16.28	24.38	.38	.61

Note. Correlations below .3 are highlighted in bold.

3.2.7   Exploratory factor analysis

To explore the latent factor structure of the PPACS-A, factor analysis was used.

Factor analysis aimed to capture patterns of correlations among observed variables

and reduce observed variables into a smaller set of factors, through an analysis of

covariance (Tabachnick & Fidell, 2007). Despite the use of principal components

analysis in previous examinations of the PACS/PPACS in older children (Sonuga-

Barke et al., 1994; Taylor et al., 1986), factor analysis was used due to the study aims.

The literature suggests that when an analysis aims to identify latent constructs, it is

more sensible to use exploratory factor analysis than principal components analysis

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(Fabrigar, Wegener, MacCallum, & Strahan, 1999). Maximum-Likelihood factor analysis was used as it permits significance testing of factor loadings and correlations among factors (Cudeck & O′dell, 1994; Fabrigar et al., 1999). Following extraction, factors were rotated using an oblique rotation. An oblique rotation of factors was selected to allow factors to correlate. The alternative, orthogonal rotation was avoided as there was nothing to suggest that factors were independent of one another (Tabachnick & Fidell, 2007).

The suitability of the 11 PPACS-A items for factor analysis was examined. The correlation matrix, displayed in Table 14, was visually examined to check the pattern of relationships. The correlation matrix was scanned for variables with few correlations greater than .3 and any correlations greater than .9. Four items were identified with no correlations with other variables above .3. Although there is no clear recommendation for the minimum size of correlation needed for a variable to be retained for analyses, it was felt that factor analysis would benefit from the removal of item 1 ('sleeping difficulties'). Item 1 had only one correlation above .20 and thus this item did not appear to represent any underlying factor (Field, 2009; Hutcheson & Sofroniou, 1999; Tabachnick & Fidell, 2007). No variables were observed with correlations greater than .9. The largest correlation identified in the correlation matrix was .51 between item 8 ('temper tantrums') and item 11 ('aggression'). Following the deletion of one item from the scale, the analyses were re-run and suitability checks continued.

3.2.8 Factor analysis: The 10 item PPACS-A

A measure of sampling adequacy, the Kaiser-Meyer-Olkin (KMO) statistic, was examined on the remaining 10 PPACS-A items. A bare minimum of a KMO statistic

of .5 is reported in the literature, with values of .5-.7 considered mediocre, between .7

and .8 good and .9 and above great (Field, 2009; Hutcheson & Sofroniou, 1999). The

KMO statistic for the PPACS-10 was .68, which surpasses acceptable bounds of .50,

suggesting that the sample size is adequate for factor analysis (Tabachnick & Fidell,

2007). Bartlett's test of sphericity revealed that correlations between PPACS-A items

were significantly different from zero, $\chi^2(45) = 216.15$, p<.001, and therefore

confirmed the appropriateness of the items for factor analysis. The anti-image

correlation matrix was scanned to ensure that all diagonal elements were above .5

(Field, 2009). Factor analysis was considered suitable given the aforementioned

indicators. A maximum-likelihood factor analysis was conducted to obtain eigen

values for each factor. Three factors had eigen values greater than Kaiser's criterion

of 1.0, explaining 21%, 11%, and 5% of the variance respectively (See Table 16).

Table 16. *Eigen values of PPACS-10 factors*

		Initial Eigenvalues			Extraction Sums of Squared Loadings		Rotation Sums of Squared Loadings
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	2.614	26.138	26.138	2.059	20.591	20.591	1.841
2	1.673	16.732	42.87	1.082	10.821	31.412	1.181
3	1.089	10.894	53.764	.514	5.141	36.553	1.120
4	.999	9.992	63.755				
5	.814	8.143	71.899				
6	.74	7.396	79.294				
7	.693	6.934	86.229				
8	.546	5.458	91.687				
9	.441	4.406	96.093				
10	.391	3.907	100				

A graph of each eigen value against the factor with which it is associated was examined to supplement Kaiser's criterion. The scree plot was examined for a factor cut off point, typically at the point of inflexion of the curve (Field, 2009). Figure 3 displays a scree plot which supports the extraction of three factors.
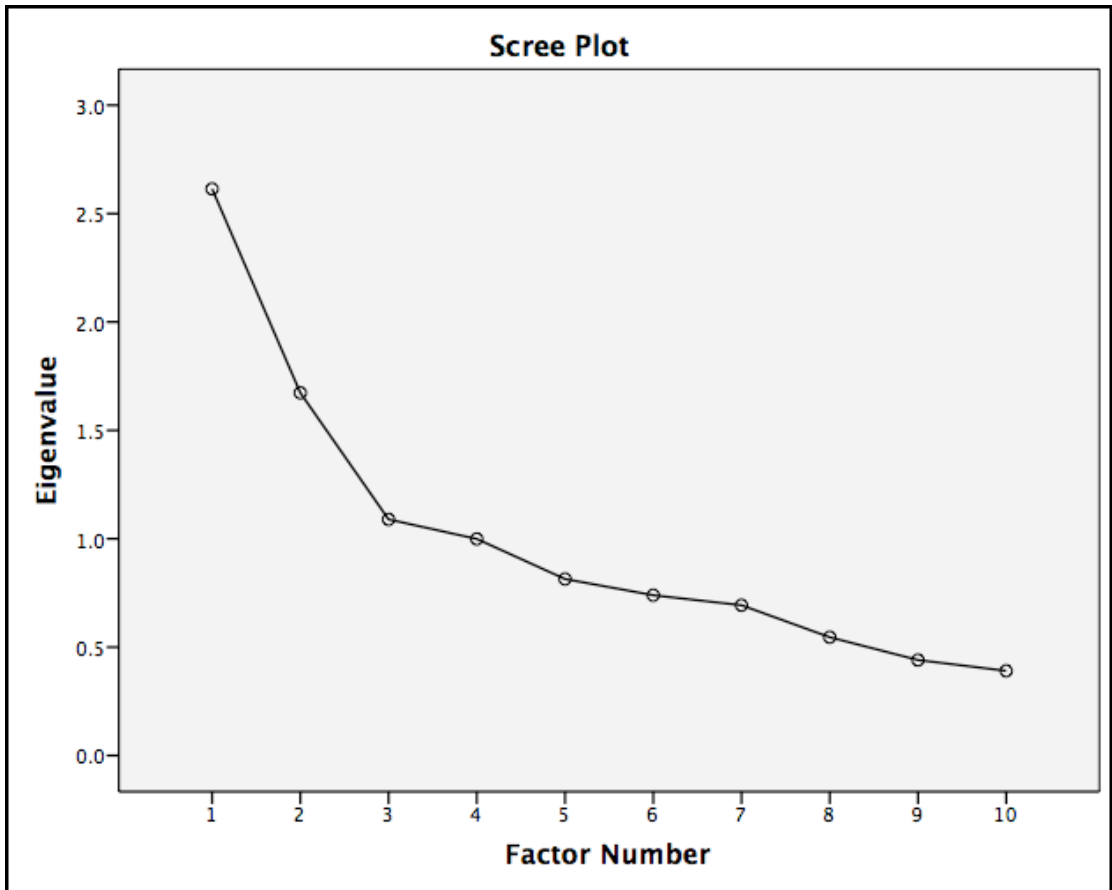
Figure 3. *The scree plot of factor eigenvalues for the 10 item PPACS-A*

The three factors found were further examined using an oblique rotation of the component loading matrix. The factor loading matrix for the final solution is presented in Table 17. Loadings that fell below .4 are omitted from the table in line with the critical value of significant factor loadings, given the sample size (Field, 2009; Tabachnick & Fidell, 2007). The factor loading matrix for the final solution with factor loadings above .10 can be found in Appendix 10.

Table 17. *Summary of exploratory factor analysis of the 10 item PPACS-A*

		Rotated factor loadings		
Item	Item phrasing	1	2	3
2	Attention and restlessness watching TV		.47	
3	Attention and restlessness during individual activity		.50	
4	Attention and restlessness during play with others		.66	
5	Activity at mealtime			
6	Activity when shopping			
7	Resistance to request to sleep			
8	Temper tantrums	.58		
9	Refusal to comply with requests			-.62
10	Destructive behaviour	.59		
11	Aggression	.82		

The collection of items on the same factor suggests that factor one represents disruptive behaviours. Factor two represents inattention and restlessness and factor three represents oppositionality. The relationship between factors were examined

using the factor correlation matrix. All factors were found to interrelate to some

degree (r=.12-.23) and therefore independence between factors was not assumed.

3.2.9   Reliability: the 10 item PPACS-A

The reliability of the 10 item PPACS-A was explored using Cronbach's alpha statistic

of internal consistency. The 10 item PPACS was found to have less than adequate

reliability, with Cronbach's alpha statistic of .65. Five items were identified with

corrected item-total correlations below .3 suggesting that they weekly correlate with

the rest of the scale (see Appendix 11). The internal consistency of the first two

observed factors of the PPACS-A were examined. Disruptive behaviours (factor 1)

reported good internal consistency, with a Cronbach's alpha value of .74, in contrast,

inattention/restlessness (factor 2) was found to have poor internal consistency with a

Cronbach's alpha statistic of .53. The internal consistency of the third factor was not

examined as only one item was found to load strongly on to this factor.

3.2.10 PPACS-A Group differences

The mean PPACS-A total difficulties score for the sample was 15.68 (SD=4.91).

Independent samples t-tests and One way ANOVAs were used to examine differences

in PPACS-A total score based on the demographic information available. Bonferroni

corrections were applied as appropriate to prevent the likelihood of Type I error. An

independent samples t-test revealed a significant difference between PPACS-A total

score and infant birth order. Separate variance estimates were not used because

homogeneity of variance assumptions were met (F=2.70, p=.103). Parents who were

reporting on their first child scored them significantly lower than parents reporting on

other children on the PPACS-A (t(132) = 3.39, p=.001). No significant differences were found between PPACS-A total score and infant age, infant gender, parental employment status, parental education level and parent ethnicity.

3.2.11 Concurrent validity

The concurrent validity of the PPACS-A and the SDQ were established using the CBCL. Pearson's correlation coefficient was used to establish concurrent validity. As correlations can be unduly influenced by outliers and restricted spread, data was prepared prior to analyses (see sections 3.2.1-3.24). To examine, the variance between variables, scatterplots were examined. None of the variables appeared to have restricted variance among the scores.

3.2.11.1 PPACS-A

To explore the concurrent validity of the PPACS-A in preschool children aged 1-3 years, the relationship between the PPACS-A total score and the CBCL/1.5-5 subscale scores were examined. An indication of concurrent validity would be if CBCL scores demonstrated significant associations with the PPACS-A total score. The hypothesis was that the PPACS-A would be positively associated with the CBCL. A significant positive correlation was found between the CBCL total problem score and the PPACS-A total score, that is, a higher CBCL total problem score was associated with a higher PPACS-A total score (r(132)=.40, p<.001). Pearson's correlation coefficient indicated a moderate effect size. The relationship between the PPACS-A total score and the CBCL total problem score is displayed in Figure 4. A significant positive correlation was also found between the CBCL total externalising difficulties score and the PPACS-A total score, that is, a higher CBCL externalising

score was associated with a higher PPACS-A total score. (r(132)=.49, p<0.001). Pearson's correlation coefficient indicated a moderate-large effect size. A significant positive relationship was also found between the CBCL total internalising score and the PPACS-A total score, that is, a higher CBCL internalising score was associated with a higher PPACS-A total score (r(132)=.19, p=.027).

The relationship between the observed factors of the PPACS-A and the CBCL were then explored. Significant positive correlations were found between inattention and restlessness (factor two) and the CBCL total problem score (r(132)=.32, p<.001) and the CBCL externalising difficulties score (r(132)=.45, p<.001), that is, higher scores on PPACS-A items representing inattention and restlessness were associated with higher CBCL total problem and externalising difficulties scores. A significant positive correlation was also found between disruptive behaviour (factor one) and the CBCL total problem score (r(132)=.18, p<.05), that is, higher scores on PPACS-A items representing disruptive behaviours were associated with higher CBCL total problem scores. No significant correlations were found between the CBCL and factor three or between the observed factors and the CBCL internalising difficulties score.
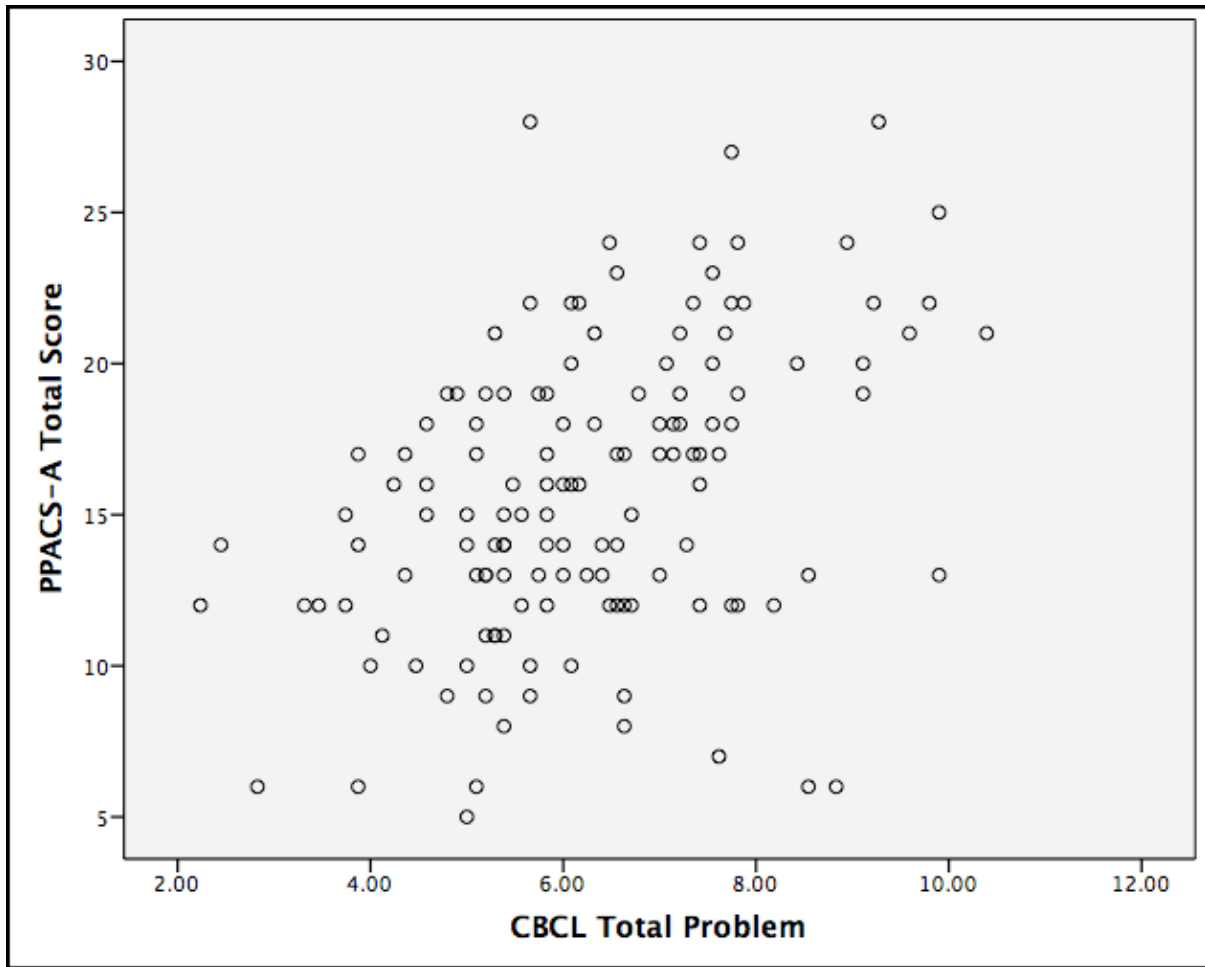
Figure 4. *A scatterplot of the relationship between the PPACS-A total score and the*

CBCL total problem score

3.2.11.2 SDQ

The available CBCL and SDQ data from study two were used to explore the concurrent validity of the SDQ in children aged 12-30 months. The relationship between the SDQ total difficulties and broader internalising and externalising difficulties subscales and the CBCL/1.5-5 subscales was explored. It was hypothesised that the SDQ subscales would positively correlate with the CBCL subscales. Significant positive correlations were found between the CBCL total problem score and the SDQ Total difficulties (r(115)=.61, p<.001), internalising (r(115)=.53, p<.001) and externalising r(115)=.43, p<.001) difficulties score. This indicates that higher scores on the SDQ total difficulties, internalising and externalising difficulties subscales were associated with a higher CBCL total problem score. Pearson's correlation coefficient indicated moderate-large effect sizes. The strongest relationship, the relationship between the SDQ total difficulties score and the CBCL total problem score, is displayed in Figure 5.

Significant positive correlations were found between the CBCL internalising score and the SDQ total difficulties (r(115)=47, p<.001), and internalising difficulties score (r(115)=.61, p<.001). This indicates that higher scores on the SDQ total difficulties and internalising subscales were associated with higher scores on the CBCL internalising subscale. Pearson's correlation coefficient indicated a moderate effect size. No significant correlation was found between the CBCL internalising score and the SDQ externalising difficulties score. Significant positive correlations were found between the CBCL externalising score and the SDQ total difficulties (r(115)=.57, p<.001), internalising difficulties (r(115)=.23, p=.009) and externalising difficulties (r(115)=.63, p<.001) score. This indicates that higher scores on the SDQ total difficulties, internalising and externalising difficulties subscales were associated

with a higher score on the CBCL externalising subscale. The relationship between the SDQ externalising difficulties score and the CBCL externalising score is displayed in Figure 6.
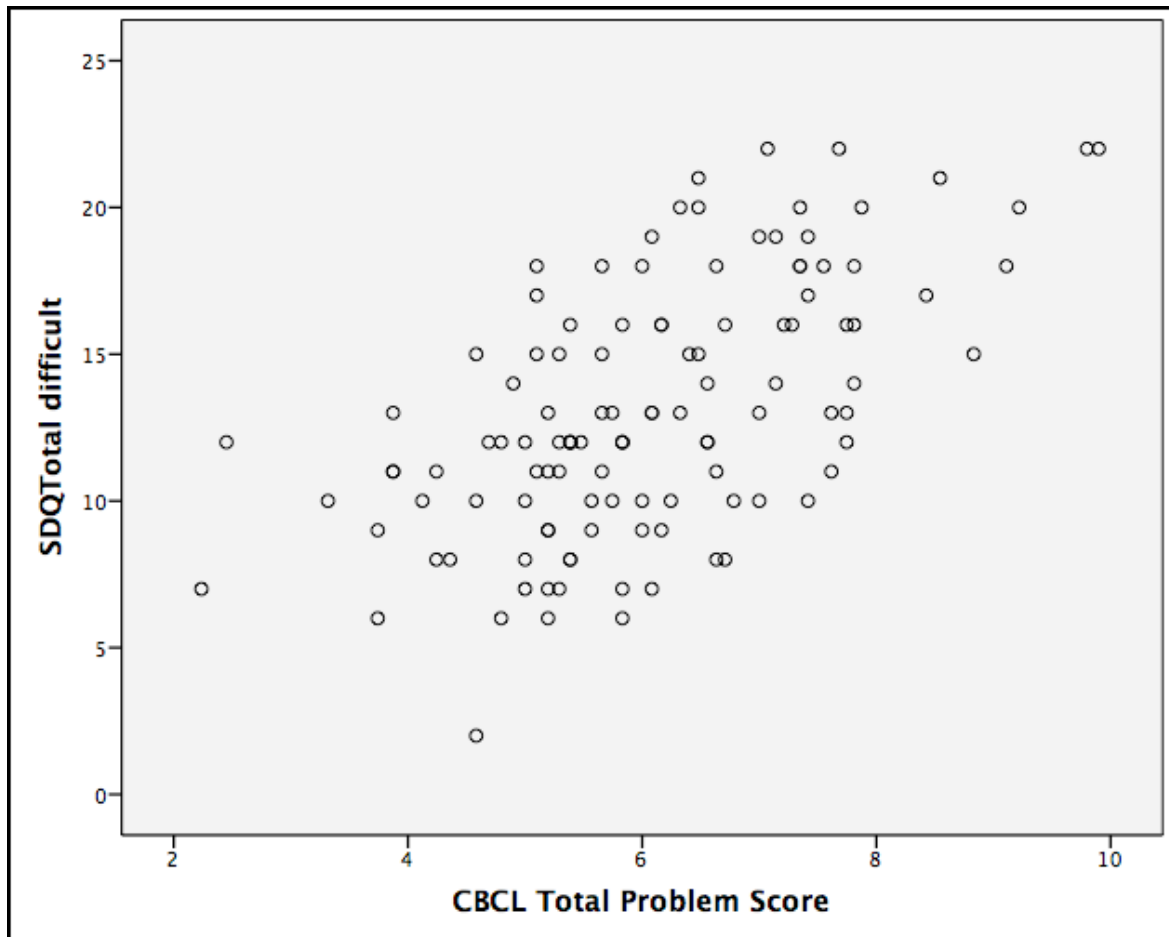
Figure 5. *A scatterplot of the relationship between the SDQ total difficulties score and the CBCL total problem score*
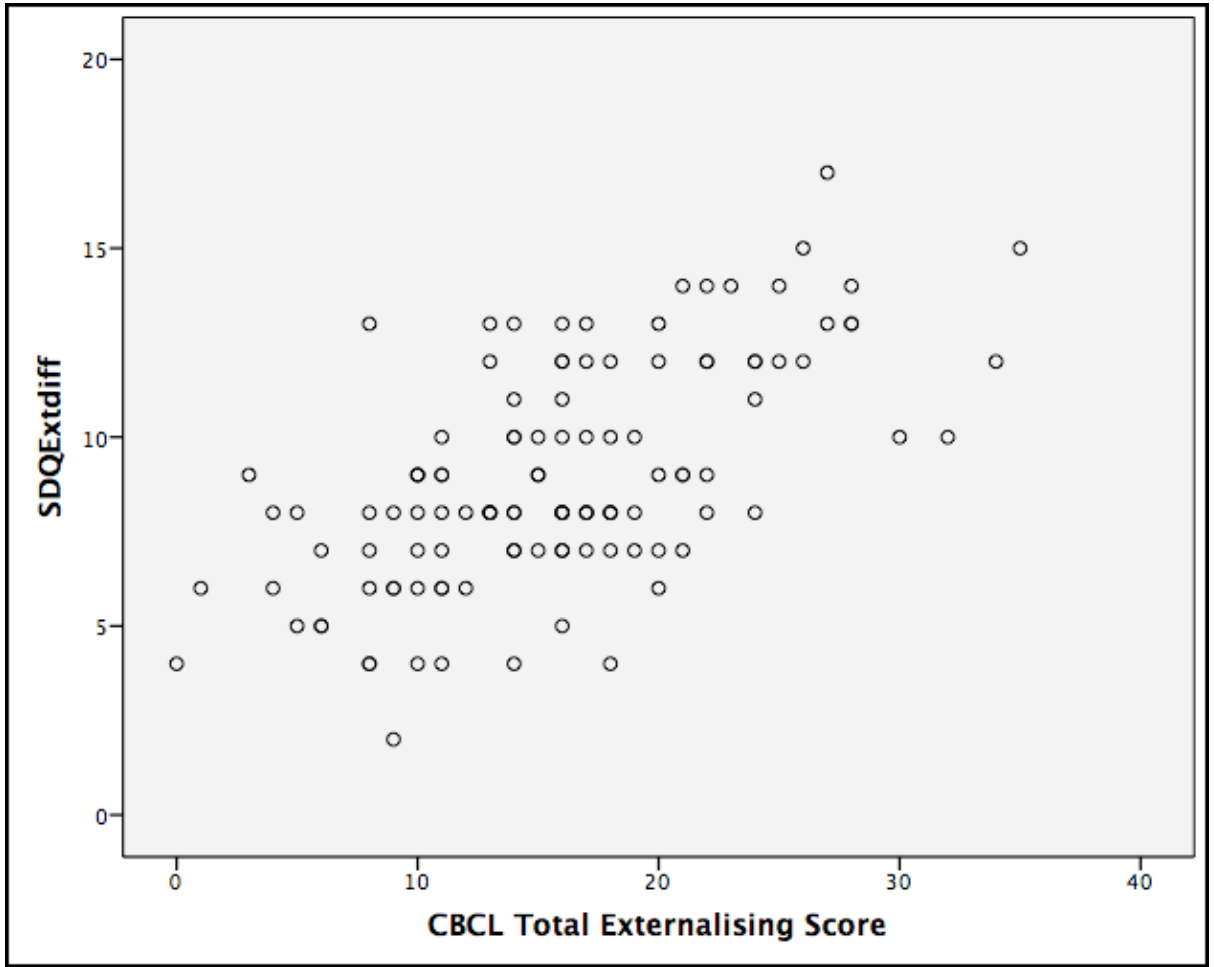
Figure 6. *A scatterplot of the relationship between the SDQ externalising difficulties*

score and the CBCL externalising score

4   Discussion

The present study aimed to establish the psychometric properties of two measures of internalising and/or externalising difficulties in a preschool sample of children aged 12-36 months. Study one involved an examination of the psychometric properties of the SDQ in a community sample of preschool children aged 12-30 months. Study two involved an examination of the psychometric properties of the PPACS-A in a high risk sample of preschool children aged 1-3 years. The psychometric properties of the two measures will be considered and situated within the literature. Some of the limitations of the present study will be considered, and the implications of the study highlighted. Directions for future research will be considered throughout.

4.1   Research findings

4.1.1   Study One

Study one involved an examination of the psychometric properties of the SDQ in a community sample of preschool children aged 12-30 months. The psychometric properties of the SDQ were established using structural equation modelling for CFA and Cronbach's alpha statistic of internal consistency. Mean scores and bandings for the parent-rated preschool SDQ were also reported. The study examined the original five factor structural model proposed by Goodman (2001) and the implementation of the broader internalising and externalising difficulties subscales supported in older samples (A. Goodman et al., 2010). Adequate model fit was found for the original five factor model and the second order five factor model, accounting for broader internalising and externalising subscales. This indicates that the SDQ subscales and broader internalising and externalising difficulties subscales can be used in community samples of preschool children aged 12-30 months in a valid way. High

positive correlations were revealed between scores on the emotional and peer; and conduct and hyperactivity subscales which lends further support to the use of the broader internalising and externalising subscales. However, it is important to note that the comparative fit index did not meet the criteria for acceptable fit for both models tested, and thus indicated some departure of the proposed measurement models from the data. Slight modification of the two measurement models tested did not improve the model fit significantly.

These findings are somewhat consistent with previous literature aiming to confirm the factor structure of the SDQ in preschool samples. For example, in an examination of the psychometric properties of the SDQ in a Dutch sample of 3-5 year old preschoolers, Klein and colleagues (Klein et al., 2013) reported an acceptable five factor model fit but reported similar discrepancies in model fit statistic as found in the present study. This suggests that the five subscales proposed in the original SDQ may fail to explain characteristics in infancy and toddlerhood in their entirety and/or suggests that characteristics reported in infancy and toddlerhood do not map on to characteristics seen in older children so easily. However, it is important to note that other studies, examining preschool samples aged three years and above, report consistent fit indices (Croft et al., 2015; Ezpeleta et al., 2013; Theunissen et al., 2013) and therefore the discrepancy reported in model fit statistics cannot be consistently explained in this way.

To the researcher's knowledge, this is the first study to report the psychometric properties of the SDQ in a UK sample of preschool children aged 12-30 months old. However, findings are inconsistent with the closest age-matched study of the psychometric properties of the SDQ available in the literature to date. D'Souza and colleagues (D'Souza et al., 2016), examined the psychometric properties of the

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SDQ in a community sample of two year old children in New Zealand. They reported poor model fit for the original five factor model outlined in the literature. Instead, they report a 'more promising' model fit when using a positive construal factor in which positively worded, reverse scored SDQ items are allowed to cross-load onto the prosocial factor. An examination of this suggested model was beyond the scope of the present study, but may represent a future research consideration. The literature suggests that parents are positively biased towards younger samples (Dix et al., 1986) in that they make progressively more dispositional inferences about externalising difficulties as a child increases in age. It is then possible that in very young preschool samples, parents do not feel comfortable attributing negative characteristics to infants/toddlers and as such are less likely to make assumptions about the intentionality of internalising and externalising difficulties. Parents of very young preschool children may therefore be more agreeable to the attribution of positive characteristics. Given the above, model fit, when using a positive construal factor, in a UK community sample of very young preschool children represents a future research consideration.

It is important to note that some of the SDQ items had unacceptably low loadings onto their proposed factors, which is not consistent with previous research in older preschool samples (e.g. Ezpeleta, Granero, de la Osa, Penelo, & Domènech, 2013). Two items on the emotional subscale ('unhappy' and 'somatic complaints'), one item on the peer subscale ('picked on') and one item from the conduct problems subscale ('spiteful to others') had particularly low loadings. This could relate to parental assumptions about intentionality as described above, however it is also possible that these items do not adequately identify the constructs that they were originally intended to relate to in older children (D'Souza et al., 2016). The SDQ was

not designed for use in preschool children aged 12-23 months and therefore one could argue that some items are not developmentally appropriate for use in this age range. For example, asking a parent to decipher an internal state and the subsequent action on to others (e.g. 'spiteful to others') may increase the likelihood of a guess response. It may be argued that the act of being spiteful relies on higher order cognitive abilities which one year old children have not developed yet (D'Souza et al., 2016). Furthermore, very young preschool children may have had few opportunities to display some of the behaviours asked about at this age, in comparison to older children. For example, pre-mobile infants/infants who have not had access to any early years child care provision (e.g. nursery) may have had little opportunity to interact independently with other infants and therefore demonstrate the behaviours enquired about.

This study, is not the first in the literature to report low loadings on items in young preschool samples and therefore future research should consider the appropriateness of some SDQ problem items in young preschool samples (D'Souza et al., 2016). An examination of the factor loadings reported in this study suggest that the emotional symptoms, conduct problems, and peer subscale may benefit from the removal of one/two items. However, an analysis of the psychometric properties of the SDQ following an adaptation of items/item deletion was beyond the scope of the present study. The SDQ is a parent report questionnaire and therefore any adaptation should be done in consultation with parents to ensure acceptability and ease of interpretation. It would also be appropriate to consult a panel of experts to obtain ratings regarding the appropriateness/relevance of items for the measurement of internalising and externalising difficulties in this age group, prior to piloting the adapted scale (Polit & Beck, 2006).

Cronbach's alpha was used to determine the internal consistency of SDQ subscales. Cronbach's alpha statistic suggested that SDQ subscales for the whole sample generally showed poor internal consistency, with Cronbach's alpha predominantly falling below the acceptable cut-off. One of the five subscales (prosocial) and the broader total difficulties and externalising difficulties subscales achieved an alpha value equal to or greater than the recommended cut off of .70. The broader internalising subscale did not report adequate internal consistency. When taken together, this indicates that only the prosocial and broader externalising difficulties subscale can be used reliably in preschool children aged 12-30 months. As such, the assessment of general externalising difficulties and strengths, as measured by a single score, may be the most appropriate use of the SDQ in very young preschool children (McAloney-Kocaman & McPherson, 2017). As the total difficulties score is a summation of the internalising and externalising subscales, caution is warranted in its interpretation.

When the sample was split by infant age, a slightly better Cronbach's alpha was achieved across all SDQ subscales for the two year olds in the sample, except for the prosocial subscale. However, this did not result in any additional SDQ subscales reaching the threshold for good internal consistency. Splitting the sample by age, suggested that the broader externalising difficulties subscale cannot be used as a reliable indicator of low risk difficulties in one year old children, as has been suggested in older children (A. Goodman et al., 2010). It is important to note that low Cronbach's alpha values across SDQ subscales may be somewhat explained by the low factor loadings highlighted above. There are large inconsistencies in the internal consistency of SDQ subscales reported in the five SDQ studies conducted with preschool children in the 2-3 year age range to date (Croft et al., 2015; D'Souza et al.,

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2016; Ezpeleta et al., 2013; Klein et al., 2013; Theunissen et al., 2013). The variation of SDQ subscales reported across preschool samples appears reflective of inconsistencies reported elsewhere in samples of older children (Stone et al., 2010).

Significant differences were found between SDQ total difficulties score and infant age, gender and parent educational level. Mean scores indicated that males achieved significantly higher total difficulties and externalising difficulties scores than females, within the study sample. These gender effects are consistent with findings from previous examinations of the SDQ in preschool samples (e.g. D'Souza et al., 2016; Klein et al., 2013). This finding may be explained by gender differences found in direct aggression in childhood, with boys demonstrating more direct aggression than girls (Card, Stucky, Sawalani, & Little, 2008). It is also possible that factors which have been found to influence parental reports of difficulties (e.g. parental psychopathology and stress) may interact with child gender (Kaiser, Hancock, Cai, Foster, & Hester, 2000; Webster-Stratton & Hammond, 1998). Alternatively, these differences may be explained by gender differences in parental attention to emotional expression, that is, that emotional expression is not more prominent in one sex than the other, but rather that parents are more attentive to the expression of emotions such as anger in boys (Chaplin, Cole, & Zahn-Waxler, 2005).

Mean scores indicated that younger preschool children achieved significantly higher total difficulties and externalising difficulties scores than the older preschoolers in the sample. These findings appear inconsistent with previous research examining developmental trajectories, which suggest that externalising difficulties peak at 24 months (Achenbach, 1992; Tremblay et al., 1999). Mean scores indicate that parents with a higher educational level rated their children lower on the total difficulties and externalising difficulties SDQ subscales. It is possible that these

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findings reflect a rating bias. Parents with a low education level may have applied stricter conditions when considering what constitutes challenging behaviour (Klein et al., 2013). On the other hand, contextual stressors of parents with a low education level (e.g. low socioeconomic status, longer work hours) may have influenced parental ratings.

4.1.2 Study two

Study two involved an examination of the psychometric properties of the PPACS-A in a preschool sample of 1-3 year old children considered at risk of behavioural difficulties. The psychometric properties of the PPACS-A were established using EFA, Cronbach's alpha statistic of internal consistency and Pearson's correlation with the CBCL/1.5-5. Following an examination of the factorability of the PPACS-A items, 10 items were subjected to EFA. Exploratory factor analysis of the 10 item PPACS-A revealed a three factor structure, identified through Kaiser's criterion and the scree plot diagram.

The first factor was labelled 'disruptive behaviour' because the items loading on to it seemed to relate to conduct problems and destructiveness (e.g. temper tantrums, destructiveness, aggression). The second factor was labelled 'inattention and restlessness' because the items loading on to it were related to expressions of inattention (e.g. restlessness, fidgeting and low maintenance of attention). The third factor which emerged was labelled 'oppositionality' because only one item ('Refusal') loaded strongly on to this factor. The factor identified as representing disruptive behaviour explained the greatest amount of variance within the data, followed by the factor identified as inattention and restlessness and then the factor identified as oppositionality.

The three factor structure reported for the 10 item PPACS-A is inconsistent with a previous report of the factor structure of the Preschool Parental Account of Childhood Symptoms. Sonuga-Barke and colleagues (Sonuga-Barke et al., 1994), reported a two factor structure which included a hyperactivity factor and a conduct factor. The identification of a third factor may be explained by the adaptations made to the PPACS to form the PPACS-A in order to facilitate its use in younger preschool children. It is possible that oppositionality represents an individual construct in very young children but that overtime this difficulty manifests itself into universal disruptive behaviours and/or difficulties with inattention or impulse control over time. This may explain the interrelationship identified in the factor correlation matrix. Alternatively, given that only one item ('Refusal') was found to strongly correlate on to 'oppositionality' (the third factor), item nine arguably represents an item for deletion from the PPACS-A. From a face validity perspective, the third factor does not appear to be adding anything of pertinent importance to the measure. Despite differences in the number of factors reported in the current study, the current findings are consistent with previous reports that inattention and restlessness represent a relatively distinct construct from disruptive behaviours. This supports the findings of the original PACS and the PPACS (Sonuga-Barke et al., 1994; Taylor et al., 1986).

Cronbach's alpha suggested that the 10 item PPACS-A had poor internal consistency, with the Cronbach's alpha value achieved failing to meet the recommended cut off of .70. Good internal consistency was reported for the items observed to load on to the disruptive behaviours factor but not the inattention and restlessness factor. The internal consistency of the third factor was not examined as only one item loaded strongly on to that factor. Findings suggest that the frequency and severity scores of items belonging to the disruptive behaviours factor may be

averaged to identify preschool children with behavioural difficulties who may warrant further attention, in a somewhat reliable way. However, the items belonging to the inattention/restlessness factor cannot be used in the same way. The poor internal consistency found for the inattention/restlessness items may be explained by the variable nature of attention in the preschool years (Mahone, 2005). Alternatively, it may be explained by difficulties in rating inattention in such a young sample. For example, parents may struggle to identify difficulties with inattention if clear/exaggerated external indicators are not present.

A significant difference was found in the PPACS-A total score of parents who were reporting on their first or subsequent children. Mean scores indicated that parents who were reporting on their first child scored significantly lower on the PPACS-A than parents who were reporting on subsequent children. This finding may be explained by advancements in knowledge of child behaviour acquired by parents after their first child. Parents may have a clearer understanding of what constitutes difficult behaviour in subsequent children, as they have a benchmark from which to base decisions off.

The 10 item PPACS-A was validated against the CBCL/1.5-5. Significant positive relationships were found between the CBCL total problem, internalising and externalising subscales and the PPACS-A total score. Significant positive relationships were also found between disruptive behaviours (factor one) and inattention and restlessness (factor two) and the CBCL total problem and externalising subscale. This indicates that as parent scores increased on the CBCL/the externalising difficulties subscale, parents scores on the items which make up the disruptive behaviours and inattention and restlessness factors also increased. No relationship was observed between the CBCL internalising difficulties subscale and

the observed factors of the PPACS-A, however this was to be expected given that the PPACS-A does not attempt to measure internalising difficulties. The significant positive relationship identified between the PPACS-A total and CBCL internalising difficulties subscale may be explained by the suggestion that internalising and externalising difficulties co-develop (Gilliom & Shaw, 2004) and therefore parents who report high externalising difficulties on the PPACS-A are likely to report high internalising difficulties on the CBCL. The findings collectively demonstrate that the PPACS-A measures the same externalising constructs as the CBCL and therefore it is possible that the PPACS-A may represent an alternative measure for use in the identification of externalising difficulties in preschool children aged 1-3 years. However, given the limitations of the present study no definite conclusions about the validity of the PPACS-A can be provided.

The data available from study two was used to establish the concurrent validity of the SDQ in an at risk sample of children aged 12-30 months. As with other studies, the SDQ was validated against the CBCL/1.5-5 (Ezpeleta et al., 2013; Theunissen et al., 2013). Significant positive associations were found across the CBCL total problem and externalising score and the SDQ total difficulties and broader internalising and externalising subscales. Significant positive associations were also found between the CBCL internalising score and the SDQ total difficulties and internalising difficulties score. No significant association was found between the CBCL internalising score and the SDQ externalising difficulties score. These findings suggest that the preschool SDQ and the CBCL/1.5/5 are measuring the same construct and therefore aspects of the SDQ could be used as a shorter, more cost-effective alternative to the CBCL.1.5-5 in the valid measurement of internalising and externalising difficulties in preschool children aged 12-36 months. The size of

associations between the SDQ and CBCL are consistent with previous associations reported in preschool samples (Ezpeleta et al., 2013; Theunissen et al., 2013).

4.2   Strengths and limitations of the present study

The present study is novel in its examination of the psychometric properties of the SDQ and PPACS-A in a UK sample of children aged 1-3 years. The present study failed to explore all aspects of reliability and validity due to time and resource constraints. Information pertaining to the inter-rater reliability (of the PPACS-A), the discriminant validity, predictive validity and test-retest reliability of these measures remain unknown. This limitation means that categorical inferences about the reliability and validity of the SDQ and PPACS-A cannot be made, without further research. Future research may want to establish the aspects of reliability and validity overlooked in the present study in preschool samples of children aged 1-3 years.

The identification of internalising and/or externalising difficulties in very young preschool children has positive clinical and research implications (see discussion below) but it is difficult to ignore the risk associated with pathologising potentially transient developmental behaviours. However, this limitation may be circumvented by the method of identification used. Semi-structured interview methodology (e.g. the PPACS-A), which involves the use of clinical judgement and an exploration of examples given by parents, may reduce the likelihood of this happening.

4.2.1   Study One

Study One represents the first study to establish the psychometric properties of the SDQ in a UK sample of preschool children aged 12-30 months. The large sample adheres to participant to item ratio requirements outlined in the literature and

therefore should be considered a real strength of the present study (Nunnally, 1978; Tabachnick & Fidell, 2007). Prior to this study, the psychometric properties of the SDQ in children aged 1-2 years was unknown, and therefore this study is the first to establish the psychometric properties of this questionnaire in this age range.

However, the study is not without limitation. For example, the use of Cronbach's alpha to measure internal consistency may have impacted study findings. It has been highlighted elsewhere in the literature that Cronbach's alpha may not be an optimal measure of internal consistency when examining reliability on measures which are ranked on a likert scale (e.g. the SDQ), with mean inter-item correlation coefficients based on polychoric correlations suggested instead (D'Souza et al., 2016). Also, Cronbach's alpha values are reportedly affected by scale length and therefore interpretation of individual subscales may be low because of the small number of items (5) which make up the five SDQ subscales (D′Souza et al., 2016; Streiner, 2003). This was not accounted for in study one.

No attempts were made to adapt the SDQ for use in preschoolers aged 12-30 months. Adaptations may have prevented some of the low loadings seen across items. Lastly, whilst the large sample in study one represent a relative strength of the study, the sample may not be considered representative. 65% of the sample identified themselves as a White ethnic subgroup and therefore the generalisability of the current findings to other ethnic groups should be questioned.

4.2.2   Study Two

Study two is the first study to examine the psychometric properties of an adapted version of the preschool parental account of childhood symptoms (the PPACS-A) in a high risk sample of 1-3 year old children and therefore offers a unique contribution to the literature. However, the study has several limitations which mean

that results should be interpreted with caution. For example, the sample size was relatively small and consisted of high risk children and therefore the findings cannot be generalised to community samples. Future research may want to explore the psychometric properties of the PPACS-A in a large sample of preschool children aged 1-3 years. However, the high risk sample was decided in line with previous literature aiming to explore the factor structure of checklists (e.g. Achenbach & Rescorla, 2000), in order to maximise the tools potential for identifying clinically significant difficulties. Future research may want to explore the psychometric properties of the PPACS-A in a large sample of pre-school children aged 1-3 years.

The concurrent validity of the SDQ was determined using data available from study two. As such, the psychometric properties of the SDQ reported refer to an at risk sample of 12-30 month olds. Whilst this offers a novel contribution to the literature, researchers may want to consider a thorough examination of the psychometric properties of the SDQ in a specific sample.

4.3 Implications

The findings of the present study have multiple theoretical, research and clinical implications.

4.3.1 Theoretical

The present study demonstrates that internalising and externalising difficulties can be measured in preschool children aged 1-3 years but the validity and reliability of doing so was not consistently adequate across measures. Study one and Study two findings suggest that externalising difficulties, particularly those which are disruptive, can be identified in a more reliable way in preschool children than other difficulties such as hyperactivity. Findings suggest that some items may not be adequate for the

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measurement of difficulties in very young preschool children. This inadequacy may be a consequence of items being inappropriate for the developmental stage of very young preschool children. As the first three years represent a rapid developmental period, the positive and/or negative characteristics that you might expect to see in a two year old is arguably very different from what you might expect to see in a one year old. It may be that further adaptation of these measures are required prior to their use in the identification of internalising and externalising difficulties in a reliable and valid way. It is also possible that parents find it difficult to identify the presence or absence of particular characteristics in very young children, making the endorsement of items difficult. This may explain the missing data within the present study. However, the validity and reliability reported in measures currently available for use in preschool children aged 1-3 years (Szaniecki & Barnes, 2016), which use dimensional and categorical approaches, suggests that the psychometric properties reported in this study may reflect measure specific difficulties rather than difficulties in the identification of internalising and externalising difficulties in preschool children who fall within this age group.

4.3.2 Clinical

The methodological approaches employed by the SDQ and the PPACS-A make them attractive measurement tools for use in clinical/research settings. The SDQ represents a brief, inexpensive screening tool, which is used routinely in clinical services with children aged 2 years and above. If this measure could identify internalising and externalising difficulties which warrant further attention, in a reliable and valid way with very young preschool children from 12 months old, this may have implications for clinical service provision. For example, the SDQ could be

used as an assessment and/or evaluative tool for children of all ages who access

CAMH service provision. Additionally, given the current economic climate, a

screening tool that is inexpensive to service providers may be considered

advantageous. The PPACS-A represents an adapted version of the PPACS, a measure

used routinely in research settings with older preschool samples to identify

externalising difficulties and/or evaluate the effectiveness of parent-infant

interventions geared towards the management/alleviation of externalising difficulties.

Initial investigations of the psychometric properties of the PPACS-A serve as a first

step in the consideration of this measure in the identification of externalising

difficulties in preschool children aged 1-3 years. If this measure were available for

use in this age range it may facilitate the development of the evidence base for parent-

infant interventions in very young children, through its potential use as a routine

outcome measure. This role would serve to promote the strategy outlined in key

health initiatives (Independent Mental Health Task Force, 2016).

4.3.3   Research

Further investigation into the reliability and validity of these measures in preschool

samples is warranted, to ascertain whether these instruments may support the

identification, monitoring and evaluation of internalising and/or externalising

difficulties in preschool children, aged 1-3 years. Good practice guidelines and health

policies (Division of Clinical Psychology, 2015; Independent Mental Health Task

Force, 2016; Leadsom et al., 2013; NHS England, 2017; NSF, 2004) support the

assessment of the social-emotional needs of children under 5 years, the early

identification and intervention of difficulties, and the importance of evaluating

clinical work. The present study reports on initial examinations of some of the

psychometric properties of the PPACS-A and the SDQ. It is recommended that

further analyses of the psychometric properties of the SDQ and the PPACS-A are carried out in samples of very young preschool children to allow for inferences to be made about reliability and validity. With further development, these scales could enhance the instruments available for the measurement of internalising and externalising difficulties in epidemiological and longitudinal analyses of difficulties. These scales may provide opportunities for researchers to map the resilience and risk factors associated with the emergence of internalising and externalising difficulties in very young preschool children.

The findings of the current study suggest that the psychometric properties of measures may vary to a significant degree across age-bands. This may have implications for how the psychometric properties of measurement tools are established in very young preschool samples in the future. At present, it is common for psychometric studies to include children who sit within a narrow age band (e.g. 3-5 years), however the current study highlights that it is possible that the rapid developmental changes which occur across ages in this study population, may result in different psychometric reports. This may have implications for the exploration of psychometric properties in future research studies.

The findings suggest that the intentionality attributed to behaviours in very young preschool may influence how behaviour is reported on by parents. Parent reporting biases need to be conceptualised in clinician's and researcher's interpretations of distress when working with parent-infant dyads. The use of qualitative interviews in the identification of difficulties in preschool children may serve to bypass some of the difficulties that may present themselves when attempting to reliably and validity identify internalising and/or externalising difficulties.

4.4 Conclusion

4.4.1 Study One

A five factor first order and five factor second order model were found for the parent-rated SDQ in a community sample of 12-30 month old children. The total difficulties and externalising difficulties subscales were reported to have good internal consistency but other determinants of reliability and validity need to be explored before firm conclusions can be made about its appropriateness for use in clinical and research settings. Results suggest that the internal consistency of the four problem subscales (emotional symptoms, conduct problems, peer problems and hyperactivity) should not be used to determine whether difficulties warrant further attention. Differences in total difficulties and externalising difficulties score were found between infant age groups, gender and parental educational level. Research findings suggest that the SDQ may require further adaptation, to include more developmentally appropriate items, for use in children aged 12-30 months. These adaptations should be guided by consultation with parents and experts within the field of infant mental health. This may improve the psychometric properties of the SDQ for use as a screening tool in preschool children aged 12-30 months.

4.4.2 Study Two

The PPACS-A appears to have a good internal structure for the measurement of behavioural difficulties, but the internal consistency of attentional difficulties is poor. The PPACS-A consists of three correlated subscales representing disruptive behaviour, inattention and restlessness, and oppositionality. The study suggests that the PPACS-A may be used in the identification of externalising difficulties as was

established with the CBCL. Future research should aim to establish the psychometric

properties of the PPACS-A in a large community sample of 1-3 year olds.

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Appendix 1: Screening pack

Imperial College London

Central and North West London NHS NHS Foundation Trust

Healthy Start, Happy Start

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Phase 1: Participant Information Sheet
Version 3.0 dated 31 July 2015

You are being invited to fill in a questionnaire as part of a research study looking at child behaviour and development. The study is being run by Dr Paul Ramchandani and his team at Imperial College London.

Why have I been invited to take part?

We are inviting you to take part because you have an infant/child aged **approximately 12-36 months.** We are asking lots of parents to fill in this questionnaire, as we are interested in hearing from a range of parents/caregivers about their child's behaviour.

What will I have to do?

If you are interested in taking part in the study simply complete the enclosed **consent form** and short **questionnaire** (including your contact details). You can then return them both to us via your health professional (if you received this from a health professional, such as your health visitor) or send them back to us directly in the freepost envelope provided. If you would prefer, you can complete the questionnaire and consent form online by following the link to the study website: **www.happystart.org.uk**

This questionnaire is widely used either in standard care or research studies. Based on your responses to the questionnaire, there is a chance you may be asked if you would like to take part in the next phase of the research project, which involves a programme designed to help parents/caregivers to better understand and respond to their infant/child's communication and behaviour. This is done through play and interaction sessions, where a member of the study team would meet with you and your child and explore different ways of responding to common situations.

If this happens we will contact you and give you further information on the next phase of the study, and you can think about whether or not you would like to take part. If you decide to complete the screening questionnaire this does not mean you have to take part in the next phase of the study. All your responses are really valuable to us.

Do I have to take part?

Participation is entirely voluntary, so it is up to you whether or not you would like to fill in the questionnaire. If you do decide to take part in any aspect of the study and later change your mind, you are free to withdraw at any time without giving a reason. Whether or not you take part in the study will not affect your healthcare or that of your infant/child in any way.

What will happen to my information?

All your information will be kept strictly confidential. Your information will be stored securely on Imperial College London sites and computers and will only be accessible by some members of the research team. Your responses will be kept separately to your personal details so they will not be identifiable to anyone outside of the research team.

**Thank you for taking the time to read this information. If you have any questions about the study or the questionnaire please contact us, we would be delighted to talk about what the study involves.
020 8383 4167 or happystart@imperial.ac.uk**

REC Ref: 14/LO/2071   Participant Information Sheet A: Screening Version 3.0, 31-Jul-15

Imperial College London

Central and North West London **NHS**
NHS Foundation Trust

Healthy Start, [2]
Happy Start
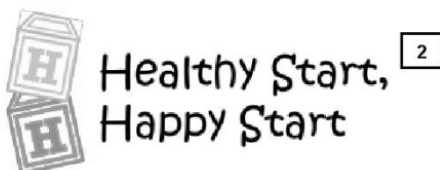
Phase 1: Consent Form

Please read the following questions carefully, by initialing the boxes below you are giving your consent to complete the screening questionnaire and to be contacted about the second phase of the study.
Version 4.0 dated 29 October 2015

Please **initial** box

I confirm that I have read and understood the Information Sheet (version 3.0, dated 31/07/2015)

I have had the opportunity to consider the information. If I have had any questions I have been able to contact the research team to discuss these, and they these have been answered satisfactorily.

At this stage of the study I am agreeing to complete the screening questionnaire.

I understand that there is a separate, second phase to the research, and I agree to being contacted about that research if I am suitable to take part.

I understand that taking part is voluntary and that I am free to withdraw from the study at any time, without having to give a reason and without it affecting my or my child's medical care.

I understand that sections of any of my research notes may be looked at by responsible individuals from the NHS Trust, Imperial College London or from regulatory authorities where it is relevant to my taking part in this research. I give permission for these individuals to access my records that are relevant to this research.

I understand that my personal data will be stored securely and may be used for future related research.

PARENT/CAREGIVER:

....
NAME SIGNATURE DATE

NHS
National Institute for Health Research *The Healthy Start, Happy Start project is funded by the National Institute for Health Research's HTA Programme*

| Site ID | | | | | | | | Screening ID | | | | | | | |

REC Ref: 14/LO/ 2071 Consent Form A: Version 4.0, 29-Oct-15

Healthy Start, Happy Start

Imperial College London

Are you interested in understanding more about your child's behaviour?

The Healthy Start, Happy Start research team are delivering a programme designed to help parents better understand and respond to their child's behaviour.

We are inviting parents who have a child aged between 12-36 months to complete a short (5 minutes) questionnaire about their child.

If you are interested in completing the questionnaire and possibly being involved in the programme please find further information on the reverse of this page.

To speak to a member of the team, please contact us on:
Email: happystart@imperial.ac.uk
Telephone: 020 8383 4167
Website: www.happystart.org.uk

Imperial College London

Healthy Start, Happy Start

You are invited to take part in the Healthy Start, Happy Start research study which aims to try to help parents with their children's behaviour and development.

The study is being run by Dr Paul Ramchandani and his team at Imperial College London.

Please find enclosed:

1 An information sheet which explains more about the study

2 A consent form

3 A copy of the 5 minute questionnaire

4 A freepost envelope

If you are interested in taking part simply:
1. Complete the consent form enclosed
2. Complete the short questionnaire enclosed
3. Return them both to us in the freepost envelope provided.

Or

Follow the link below to complete the consent form and questionnaire online:
www.happystart.org.uk

Based on your responses to the questionnaire, there is a chance you may be asked if you would like to take part in the next part of the research project. The research project involves a programme designed to help parents better understand their child's communication and behaviour.

It's up to you if you would like to take part and, you can change your mind at any time.

Thank you for taking the time to read this information. If you have any questions at all, please contact us, we would be delighted to talk more about what the study involves on 020 8383 4167 or happystart@imperial.ac.uk

Rec Ref: 14/LO/2071   Participant Invitation Letter: Version 2.0, 31-Jul-15

Thank you for your interest in taking part in the Healthy Start, Happy Start study. Please answer the questions below:

Child's date of birth: _____ / _____ / _____	**Gender of Child:** Male/Female
Your age: _____	**Area that you live in:** □ Camden □ Hillingdon □ Islington □ Oxfordshire □ Other (*please specify*) _____
Your relationship to the child: □ Biological Mother □ Biological Father □ Step Mother □ Step Father □ Other Caregiver (*please specify*) _____	
Your highest level of qualification: □ PreGCSE □ GCSE □ College (*i.e. A-Levels, NVQ, BTEC*) □ Undergraduate □ Postgraduate	**Where did you receive this information pack?** □ Health Visitor □ Children's Centre □ GP □ Other (*please specify*) _____
Your contact details:	
Telephone number: _____	
Email address: _____	
Your ethnicity: **White** □ British □ Irish □ Any other White background □ Not stated □ Any other ethnic group (*Please describe*)	**Mixed** □ White & Black Caribbean □ White & Black African □ White & Asian □ Any other Mixed background	**Asian or Asian British** □ Indian □ Pakistani □ Bangladeshi □ Chinese □ Any other Asian background	**Black or Black British** □ Caribbean □ African □ Any other Black background

The following statements form a brief questionnaire, which will provide information on your child's behaviour and well-being. For each item, please mark the box for *Not True*, *Somewhat True*, or *Certainly True*. It would help us if you answered all items as best you can, even if you are not absolutely certain or the item seems daft!

Please give your answers on the basis of the child's behaviour over the last six months.

SDQ

	Not True	Somewhat True	Certainly True
Considerate of other people's feelings	☐	☐	☐
Restless, overactive, cannot stay still for long	☐	☐	☐
Often complains of headaches, stomach-aches or sickness	☐	☐	☐
Shares readily with other children (treats, toys, pencils etc.)	☐	☐	☐
Often has temper tantrums or hot tempers	☐	☐	☐
Rather solitary, tends to play alone	☐	☐	☐
Generally obedient, usually does what adults request	☐	☐	☐
Many worries, often seems worried	☐	☐	☐
Helpful if someone is hurt, upset or feeling ill	☐	☐	☐
Constantly fidgeting or squirming	☐	☐	☐
Has at least one good friend	☐	☐	☐
Often fights with other children or bullies them	☐	☐	☐
Often unhappy, down-hearted or tearful	☐	☐	☐
Generally liked by other children	☐	☐	☐
Easily distracted, concentration wanders	☐	☐	☐
Nervous or clingy in new situations, easily loses confidence	☐	☐	☐
Kind to younger children	☐	☐	☐
Often argumentative with adults	☐	☐	☐
Picked on or bullied by other children	☐	☐	☐
Often volunteers to help others (parents, teachers, other children)	☐	☐	☐
Can stop and think things out before acting	☐	☐	☐
Can be spiteful to others	☐	☐	☐
Gets on better with adults than with other children	☐	☐	☐
Many fears, easily scared	☐	☐	☐
Sees tasks through to the end, good attention span	☐	☐	☐

Appendix 2: Ethics

NHS
Health Research Authority

NRES Committee London - Riverside
Level 3 Block B
Whitefriars
Lewins Mead
Bristol
BS1 2NT

Telephone: 0117 342 1385
Fax: 0117 342 0445

12 December 2014

Dr Paul Ramchandani
Reader in Child and Adolescent Psychiatry and Consultant Child and Adolescent Psychiatrist
Imperial College London / CNWL NHS Foundation Trust
Centre for Mental Health
Commonwealth Building, Hammersmith Hospital
London
W12 0NN

Dear Dr Ramchandani

Study title:	**Preventing enduring behavioural problems in young children through early psychological intervention: Healthy Start, Happy Start.**
REC reference:	14/LO/2071
Protocol number:	14HH2370
IRAS project ID:	160786

The Research Ethics Committee reviewed the above application at the meeting held on 01 December 2014.   Thank you for attending to discuss the application.

We plan to publish your research summary wording for the above study on the HRA website, together with your contact details, unless you expressly withhold permission to do so. Publication will be no earlier than three months from the date of this favourable opinion letter. Should you wish to provide a substitute contact point, require further information, or wish to make a request to postpone publication, please contact the REC Manager Miss Tina Cavaliere, nrescommittee.london-riverside@nhs.net

Ethical opinion

The members of the Committee present gave a favourable ethical opinion of the above research on the basis described in the application form, protocol and supporting documentation, subject to the conditions specified below. .

Conditions of the favourable opinion

Does your research involve any of the below?

Children (under the age of 16),

No

Participants with cognitive or physical impairment that may render them unable to give informed consent,

No

Participants who may be vulnerable for personal, emotional, psychological or other reasons,

No

Participants who may become vulnerable as a result of the conduct of the study (e.g. because it raises sensitive issues) or as a result of what is revealed in the study (e.g. criminal behaviour, or behaviour which is culturally or socially questionable),

Yes

Participants in unequal power relations (e.g. groups that you teach or work with, in which participants may feel coerced or unable to withdraw),

No

Participants who are likely to suffer negative consequences if identified (e.g. professional censure, exposure to stigma or abuse, damage to professional or social standing),

No

Details,

The proposed project will elicit information pertaining to any challenging behaviour they may experience with their children

The proposed project will elicit information from parents pertaining to any challenging behaviour they have experienced with their child (aged 1-3 years) within a four month period. All information will be obtained via self-report measures and one semi-structured interview.

It is thought that participants may become vulnerable as a result of the conduct of the study as it involves the elicitation of subjectively sensitive information. However, this is viewed to be ethically unproblematic as all participants will be provided with an intervention geared towards supporting them with any challenging behaviour identified as part of the study. If participants are assessed to be distressed they will be signposted to their GP, who will be able to refer them to appropriate support services. Additionally, all participants will be given a debrief form which highlights fun activities they can do with their child in the local area and signposts them to services which offer support in the local area.

Design and Data

Does your study include any of the following?

Will it be necessary for participants to take part in the study without their knowledge and/or informed consent at the time?,

No

Is there a risk that participants may be or become identifiable?,

No

Is pain or discomfort likely to result from the study?,

No

Could the study induce psychological stress or anxiety, or cause harm or negative consequences beyond the risks encountered in normal life?,

No

Does this research require approval from the NHS?,

Yes

If so what is the NHS Approval number,

Are drugs, placebos or other substances to be administered to the study participants, or will the study involve invasive, intrusive or potentially harmful procedures of any kind?,

No

Will human tissue including blood, saliva, urine, faeces, sperm or eggs be collected or used in the project?,

No

Will the research involve the use of administrative or secure data that requires permission from the appropriate authorities before use?,

No

Will financial inducements (other than reasonable expenses and compensation for time) be offered to participants?,

No

Is there a risk that any of the material, data, or outcomes to be used in this study has been derived from ethically-unsound procedures?,

No

Details,

Risks to the Environment / Society

Will the conduct of the research pose risks to the environment, site, society, or artifacts?,

No

Will the research be undertaken on private or government property without permission?,

No

Will geological or sedimentological samples be removed without permission?,

No

Will cultural or archaeological artifacts be removed without permission?,

No

Details,

Risks to Researchers/Institution

Does your research present any of the following risks to researchers or to the institution?

Is there a possibility that the researcher could be placed in a vulnerable situation either emotionally or physically (e.g. by being alone with vulnerable, or potentially aggressive participants, by entering an unsafe environment, or by working in countries in which there is unrest)?,

No

Is the topic of the research sensitive or controversial such that the researcher could be ethically or legally compromised (e.g. as a result of disclosures made during the research)?,

No

Will the research involve the investigation or observation of illegal practices, or the participation in illegal practices?,

No

Could any aspects of the research mean that the University has failed in its duty to care for researchers, participants, or the environment / society?,

No

Is there any reputational risk concerning the source of your funding?,

No

Is there any other ethical issue that may arise during the conduct of this study that could bring the institution into disrepute?,

No

Details,
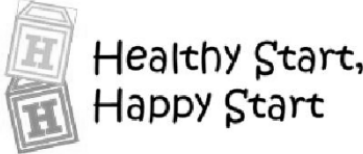
Declaration

By submitting this form, I declare that the questions above have been answered truthfully and to the best of my knowledge and belief, and that I take full responsibility for these responses. I undertake to observe ethical principles throughout the research project and to report any changes that affect the ethics of the project to the University Research Ethics Committee for review.

Certificate produced for user ID, PBVA075

Date:	26/04/2016 13:04
Signed by:	Eneberi, Annette (2014)
Digital Signature:	Annette Eneberi
Certificate dated:	4/26/2016 2:04:43 PM
Files uploaded:	Participant Information Sheet .docx Participant Info Sheet B.docx Consent Form Phase 1.doc

Appendix 3: Phase 2 information sheet and consent form

Imperial College London

Central and North West London NHS
NHS Foundation Trust

Healthy Start, Happy Start

Phase 2: Participant Information Sheet
Version 4.0 dated 20th April 2016

You are being invited to take part in a research study, which aims to help parents with their children's behaviour. The study is being run by Dr Paul Ramchandani and his team at Imperial College London, alongside your local NHS trust.

What is the study about?

We are looking at a home-based programme that aims to help parents/caregivers to better understand and respond to their child's communication and behaviour. We want to find out whether this programme is helpful for families and if so, whether it's more helpful than the support that is currently available.

Why have I been invited to take part?

You are invited to take part because you have a child aged between **12-36 months**. We would like to see families from a variety of different backgrounds and day to day family lives. Parents/caregivers can be involved with their child either on their own, or with the child's other parent/caregiver. We are interested in finding out about young children's behavior. We are particularly interested in how parents and children share every day activities together and whether our programme is helpful in thinking about both the positive and challenging moments.

Do I have to take part?

Participation is voluntary, so it is up to you whether or not you would like to take part. Before you decide if you would like to take part, it is important that you know what the study is about and what taking part would involve. We would be delighted to answer any questions you have about the study.

You may wish to discuss the study and taking part with other people such as your partner, family, friends, GP or health visitor. If you do decide to take part and later change your mind, you are free to withdraw from the study at any time and without giving a reason.

What will I have to do?

If you would like to take part you will join one of two groups: one group will receive the programme (the programme group) and the other group will continue to receive their usual care (the monitoring group). You will join one of these groups at random using a specially designed computer system to ensure that there is a 50/50 chance of joining either group. This is done so that every family has the same chance of receiving the programme or continuing to receive usual care that is already available on the NHS or from other local services, keeping things fair for all families involved. Both groups are essential to the study to really understand how, and if this programme is useful for families.

What's involved for all families?

Families in both the programme group and the monitoring group will have three research visits during the study from our research team. The first visit will be once you agree to take part in the study, the second visit will be 5 months later, and the final visit will be 2 years later.

During these research visits you will complete some questionnaires, and we will have a chat about your child's behaviour. All these questionnaires are widely used in standard care or in research studies. We will also bring along some toys and film some short clips (only a few minutes long) of you doing some activities together with your child (e.g., playing together). For both groups, if two parents/caregivers are taking part in the study, it would be important for you both to attend all the visits together. All visits will be at your home, or at another convenient and suitable location if you prefer.

What's involved if we join the programme group?

If you join the programme group you will also receive 6 home-based programme visits from the same member of our programme team, who is a trained health professional. During these visits they will film some short clips of you and your child doing everyday activities together, such as playing with toys, reading together and mealtimes. They will then look back at these clips with you at your next visit, talking about what you can notice together about your child's behaviour and communication. They will also help you to try out different ways of responding to day to day situations, as well more challenging moments. These visits will happen approximately every 2 weeks at a time that suits you. During your time on the programme, you and your family can continue to receive any other medical care that you have been receiving or wish to receive.
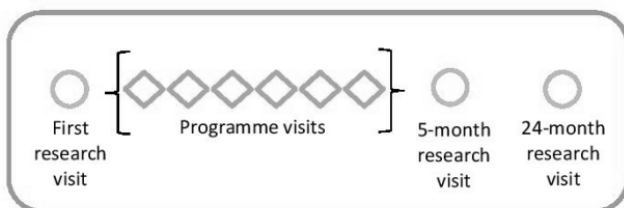
What's involved if we join the monitoring group?

If you are allocated to the monitoring group you and your child will continue to receive the standard medical care usually available to you, and we will see you at the 3 research visits that both groups receive.

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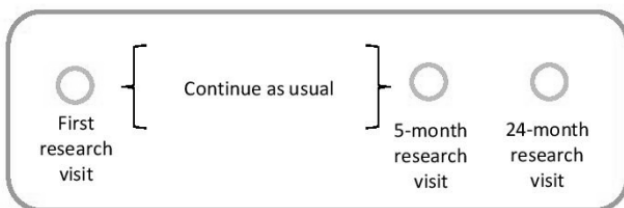
What are the possible benefits of taking part?

We cannot say for certain that taking part will be of benefit to you or your child. However, the programme has been used in many research studies previously, and parents have found it helpful. It has also been shown to help parents to learn more about their child and how to respond to their behaviour.

What are the possible disadvantages and risks of taking part?

The disadvantages of taking part are likely to be small. You would need to put aside time for the visits, for both groups the 3 research visits will take approximately 2 hours each. If you are in the programme group you will also have 6 programme visits (approximately 1 hour each). Most families enjoy both types of visits, but if for any reason you were to feel uncomfortable or wished to stop, we would of course take a break or end the session.

Will my taking part in the study be kept confidential?

All your information will be kept strictly confidential. Your information will only be accessible by certain members of the research team. We will give you a unique 'family number' so that your name and contact details are not stored with any information from the study.

If you decide to take part we will write to your GP and your health visitor with your permission, just to let them know that you are taking part in the study. Otherwise everything you say will be treated confidentially. The only exception to this would be if something you said or wrote suggested any concerns about your own or someone else's wellbeing. In this case we would be required to contact your GP or another care provider as soon as possible, to ensure you receive the support you need. Whether or not you take part will not in any way affect the healthcare you or your child receives.

What will happen to my information?

All your information will be stored securely at Imperial College London and NHS Trust sites and will only be accessible by authorised members of the research team. In accordance with Imperial College policy, we will keep your information and the recordings we make during the study for 10 years after the study has finished. All research studies like this are also checked to make sure they are being run appropriately and to a high standard. If this happens it might mean that your research notes and personal information are viewed by Imperial College staff or other research bodies, and if this occurs all information will be kept confidential.

If you give us permission, we may use some video clips or some specific quotes from your feedback, in research or training presentations. We would never use quotes in a way that would identify you or your family. While this is not possible for video clips, they would not be presented alongside any personal details. However, you can say no to this and still take part in the study, it is completely up to you.

What will happen to the results of the study?

We will publish the findings of the study in scientific journals and may present them at conferences. This is always done in a way that means families cannot be identified. We will also send all families a summary of our findings at the end of the study and keep them updated on our progress.

Who has reviewed the study?

All NHS research is reviewed by an independent group, called a Research Ethics Committee, in order to protect your wellbeing, rights and dignity. This study has been reviewed and approved by NRES Committee London – Riverside Research Ethics Committee.

Imperial College London

Central and North West London NHS
NHS Foundation Trust

Who is organising and funding the research?

The research is being organised by Imperial College London. The study is being funded by the Health Technology Assessment programme of the National Institute for Health Research.

Expenses and payments

You will be given a £20 voucher each time you complete one of the 3 research visits with the research team (i.e. at the beginning, after 5 months, and after 2 years) as a thank you for your time and effort. If you choose to have the visits somewhere other than your home, we will reimburse the cost of travel.

What if there is a problem or something goes wrong?

It is unlikely that anything will go wrong, but it is important that you have this information in case it does. If you are harmed due to someone's negligence, then you may have grounds for a legal action. Regardless of this, if you wish to complain, or have any concerns about any aspect of the way in which you have been treated during the course of this study then you should immediately inform the investigator using the contact details on this information sheet. The normal National Health Service complaints mechanisms are also available to you. If you are still not satisfied with the response, you may contact the Imperial AHSC Joint Research Compliance Office.

What happens next?

If you are happy to take part we can arrange your first home research visit at a time that suits you. At this visit we will discuss the study further with you, answering any questions you may have and check you are still happy to take part.

Further information and contact details

If you would like more information about the study or would like to discuss it with one of our researchers, please phone or email us using the contact details below.

Dr Paul Ramchandani (Principal Investigator):
Tel: 020 3313 4161   Email: p.ramchandani@imperial.ac.uk

Dr Christine O'Farrelly (Trial Manager):
Tel: 020 8383 8401   Email: c.ofarrelly@imperial.ac.uk

Thank you for your time and interest in this study

Imperial College London

Central and North West London NHS
NHS Foundation Trust

Healthy Start, Happy Start
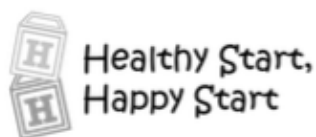
Phase 2: Consent Form

Please read the following questions carefully, by initialing the boxes below you are giving your consent to take part in the second phase of the *Healthy Start Happy Start* study.
Version 4.0 dated 20th April 2016

Please **initial** box:

I confirm that I have read and understood the Information Sheet (version 4.0 dated 20/04/16).

I have had the opportunity to consider the information and ask any questions, which have been answered satisfactorily.

I agree to take part in the second phase of the study with my child. This means I will be visited at least three times by the research team. I understand that I will then join one of two groups, which means I may or may not receive the home-based programme described in the Information Sheet.

I understand that participation is voluntary and that I am free to withdraw from the study at any time, without having to give a reason and without it affecting my or my child's medical care.

I understand that sections of any of my own and my child's research notes may be looked at by responsible individuals from the NHS Trust, Imperial College London or from regulatory authorities where it is relevant to my taking part in this research. I give permission for these individuals to access my records that are relevant to this research.

I agree to myself and my child being video and audio-recorded for the purposes of the study.

I agree that quotations and sections from my video and audio recordings may be used in publications or presentations for research purposes and agree to this.
NB: You can say no to this, and still participate in the research

I agree to my General Practitioner and Health Visitor being informed of my participation in the study.

I understand that my personal data will be stored and may be used for future related research.

I understand that all information I provide will be kept strictly confidential and will be stored securely on Imperial College London and NHS Trust computers for a minimum of 10 years.

PARENT/CAREGIVER: ....
YOUR NAME SIGNATURE DATE

RESEARCHER: ....
RESEARCHER'S NAME SIGNATURE DATE

NHS

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Appendix 4: PPACS-A

Healthy Start, Happy Start

Imperial College London
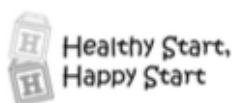
Trial ID: _____

Completer: Caregiver One/Caregiver Two

Pre-school Parental Account of Child Symptoms – Adapted

(PPACS-A)

Prompts for introduction of interview to parents:

- The interview will take around an hour to complete.
- The following questions are about your child and how things have been going in general.
- My role is to work with you and support you to answer the questions, so I may rephrase my question a few times in order to do this.
- All of the questions start off by focusing on the last week, but we are also interested to find out how typical this last week has been of the past four months.
- Before we start it might be a good idea to think back to four months ago (when X would have been ___ years ___ months.) as this will help in remembering any changes which may have taken place since then.
- Some of the questions may not apply to your child but it is important that we ask the same questions of everybody. As we will be asking about a number of different behaviours and situations I am afraid that the questions may become rather repetitive so please bear with me.
- If you want to stop at any time let me know.

Developmental milestone prompts:

- First I would like to get a sense of where X is at in terms of his/her development.
- Ask parents questions on a variety of milestones, starting at earlier milestones and progressing from there. Prompts for early questions to include:
  - Is s/he steady on his/her feet? Then, is s/he standing and walking around?
  - Is s/he saying any words? Then, is s/he linking words or making sentences?

The following questions are about behaviour patterns most children show to some extent.

Attention

I would now like to ask you a few questions about your daughter/son's behaviour.

1. I will start with sleeping

H1.   Were they a good sleeper in the last week?
- Or did they tend to wake up at night? And when they woke up did s/he easily get back to sleep?
- Did s/he have a nightmare or wake up screaming?
- Sleepwalking?
- Tired during the day before their bedtime nap?

Problems might include insomnia, nightmares, night terrors, sleepwalking, etc.

H2.   How bad have they been?

(Notes: Do not include tiredness during the day due to an unusually late night; problems about going to bed or bed wetting; or waking up at night unless it is clearly linked to distress, caused by worries or fear of the dark.)Have they had problems with her sleep in the last four months?

	H1	H2
No difficulty	0	0
Slight or dubious difficulty (little distress and no interference with daytime activities)	1	1
Definite difficulty (child either distressed or suffers moderate interference with daytime activities, e.g. late rising because of sleep loss)	2	2
Serious difficulty (child severely distressed or marked interference with daytime activities)	3	3
Situation not arisen or unrateable	9	9
Missing	99	99

H3.   On how many nights have they had such difficulties in the last week?

H4.   Would this be usual for them in the last four months?

	H3	H4
No difficulty	0	0
On one or two nights per week	1	1
On three to four nights per week	2	2
On more than 5 nights per week	3	3
Situation not arisen or unrateable	9	9
Missing	99	99

2. Now I would like to ask about some of the things they enjoy doing.

H1.   Have they watched television this week?
- Or watched a TV show or something similar on a tablet or smart phone?
- When was the last time you saw them doing this?

H2.   Would that be a typical time for them when they like the programme?

	H1	H2
More than 20 minutes	0	0
More than 15 minutes but less than 20 minutes	1	1
From 6 to 15 minutes	2	2
No more than 5 minutes	3	3
Situation not arisen or unrateable	9	9
Missing	99	99

H3.   Those particular times they were watching clip or TV show, were they up and down out of his/her seat at all? How many times during that particular period?

H4.   What would be his/her typical rate of getting up and down out of his/her seat during a programme s/he enjoys watching?

	H3	H4
Not at all/sits still	0	0
About once every 15 minutes	1	1
Once every 5 minutes	2	2
More than once a minute, but less than five times a minute	3	3
More than five times a minute	4	4
Situation not arisen or unrateable	9	9
Missing	99	99

H5.   That particular time of watching that we were talking about, were they fidgeting at all?
- Like swinging legs, tapping fingers or fiddling with an object?
- How much? *If the answer is vague:* Would it be all the time, more than half the time or less than half the time?

H6.   What would be their particular pattern during watching a Television programme they enjoy?

	H5	H6
Not at all	0	0
Less than half the time	1	1
More than half the time but not throughout	2	2
Continuous, never stopped	3	3
Situation not arisen or unrateable	9	9
Missing	99	99

3. Have they done anything which they enjoy doing on their own recently?

- Such as painting, drawing, modelling, jigsaws, blocks, playskool games etc.
- Or played educational games on a tablet or smart phone?
- When was the last time you saw them doing that?
- Was this typical of them playing on their own?
- (If not), what would be a more typical situation?
- When did you last see them doing that?

H1. That particular time, how long were they playing for?

- If the answer is vague: Could they play on his own for 30 minutes, or would it usually be less than that?

H2. How long would be typical for them to play on their own like this?

- Notes: If the attention span differs according to activity, rate the longest duration. Do not include activities shared with a parent or another child.

	H1	H2
More than 30 minutes	0	0
16 to 30 minutes	1	1
6 to 15 minutes	2	2
No more than 5 minutes	3	3
Situation not arisen or unrateable	9	9
Missing	99	99

H3. The time you have just described of them playing on their own, were they up and down out of her seat at all? How many times during that particular period?

H4. What would be his/her typical rate of getting up and down while playing on their own?

	H3	H4
Not at all	0	0
About once in every 15 minutes	1	1
More than once per 15 minutes but less than once per 5 minutes	2	2
Every 5 minutes or more	3	3
Situation not arisen or unrateable	9	9
Missing	99	99

H5. That time we have just talked about, were they fidgeting at all?
- If the answer is vague: Would it be all the time, or more/less than half?

H6. What would be their typical pattern of fidgeting during that kind of activity on their own?

	H5	H6
Not at all	0	0
Less than half the time	1	1
More than half the time but not throughout	2	2
Continuous, never stopped	3	3
Situation not arisen or unrateable	9	9
Missing	99	99

4. Have they played indoors with other children like their brothers and sisters or friends recently?

- When was the last time you saw them?
- What did they play with/ what sort of game was it? That particular time, how long were they playing for?

H1. That time they were playing with other children/someone else, how long did they stick to one activity for?

H2. Was this typical for them when playing with other children? How long would they usually spend on one activity?

	H1	H2
More than 30 minutes	0	0
16 to 30 minutes	1	1
6 to 15 minutes	2	2
No more than 5 minutes	3	3
Situation not arisen or unrateable	9	9
Missing	99	99

H3. That particular time you have just described when they were playing with another child/other children, was s/he running around unnecessarily in and out of rooms during the time they played; or was s/he staying in one place
- Or moving away from the game physically?
- How often did they do that?

H4. Would that be their typical pattern during a similar activity?

	H3	H4
Not at all	0	0
About once in every 15 minutes	1	1
More than once per 15 minutes but less than once per 5 minutes	2	2
Every 5 minutes or more	3	3
Situation not arisen or unrateable	9	9
Missing	99	99

5. **Have you seen them at a mealtime during the last week?**
   - When was the last time?
   - Was that a meal that s/he was supposed to sit down at the table with you?
   - Or are they strapped in to a highchair?
   - (Note: If not, choose a meal time during which the child was supposed to it down at the table and which is also well remembered.)

H1. That particular time, did they get up and leave the table at all? Or if they are in a high chair do they try and get out of it before the meal is finished? What would they do if they weren't in a highchair, for example at nursery?
(Note: Do not rate getting up to fetch a glass of water etc., unless parent states these are excuses to get up.)
How often did she do that?

H2. Would that be usual for them during mealtimes over the past 4 months?

	H1	H2
Not at all	0	0
Once	1	1
2X to 5X	2	2
More than 5 times	3	3
Situation not arisen or unrateable	9	9
Missing	99	99

6. **Have they been with you to the shops in the last week?**
   - When was the last time?
   - Did they go in the shopping trolley, pram or walk?
   - That particular time, did they run away from you at all? Or if they were in a pushchair or pram, did they try and get out?

H1. If so, how much of the time were they with you between running away?

H2. What would be their usual pattern when they are in a shop with you?

	H1	H2
Not running away at all	0	0
Running away every 5 mins or less	1	1
Running away every 2 to 5 mins	2	2
More than every 2 mins	3	3
Situation not arisen or unrateable	9	9
Missing	99	99

(Notes: Include disturbing other shoppers by pushing the trolley in an uncontrolled way. If parent keeps child restrained in trolley due to past experience of repeated running off, or has stopped taking the child shopping for the same reason, rate severity the last time in shops if within the last month.)

Behaviour

1. What time does she/he usually go to bed?

CD1. What time does she/he usually go to bed?
- Is that her/his regular bedtime?
- Have there been any problems with her/him going to bed at the time she/he is expected this week? Could you give me an example of what happened?

CD2. What would be usual?

	CD1	CD2
No significant difficulty	0	0
Mild resistance (grumbling, cries for a short time or token refusals but not intense or prolonged for more than a few minutes)	1	1
Strong resistance (e.g. child refuses flatly or has to be argued or coerced into going)	2	2
Strong resistance leading to tantrum (include if parent never attempts to put child to bed because severe problem in past). Or in younger children, some physical sign of resistance (e.g., arm flapping).	3	3
Unrateable	9	9
Missing	99	99

CD3. On how many nights this week has she/he refused to go to bed?

- If the answer is vague: Would it be more or less than 3 days a week?

CD4. Is that what usually happens?

- (Rate 0 if has happened but less regular than 1 x week)

	CD3	CD4
None or less than once a week	0	0
On 1 or 2 days	1	1
On 3 to 6 days	2	2
Daily	3	3
Unrateable	9	9
Missing	99	99

2. Has she/he ever had temper tantrums?

CD1. What about tempers?
- Does she/he ever have tantrums?
- Has she/he had one in the past week?
- Can you describe it?

CD2. Would that be a typical kind of tantrum for her/him?

	CD1	CD2
None	0	0
Mild (shouting, waving arms)	1	1
Moderately severe (throwing things, kicking)	2	2
Severe (breaking things, aggressive behaviour)	3	3
Unrateable	9	9
Missing	99	99

CD3. How many times has she/he had a tantrum in the past week?

- If the answer is vague: Would it be more or less than 3 days a week?

CD4. What would be the usual average in a week?

- (Rate 0 if has happened but less regular than 1 x week)

	CD3	CD4
None or less than once a week	0	0
On 1 or 2 days per week	1	1
On 3 to 6 days per week	2	2
Daily	3	3
More than once a day	4	4
Unrateable	9	9
Missing	99	99

3. Have there been times in the last week when she/he has refused to do something she/he was told to do - for instance tidying up her toys, laying the table, or to get you or your partner something?

CD1. In the last week did s/he refuse a small request, such as putting on an item of clothing, or not keep it on when asked? In the past week, for example, did she/he disobey you?
   – How strongly does she/he resist?
   – Does she/he grumble but eventually do it?
   – Or does she/he sometimes flatly refuse to do things you ask?
   – And does she/he then sometimes get rude or have a tantrum?

CD2. Is that what usually happens if she/he is asked to do something?

	CD1	CD2
No significant difficulty or less than once a week	0	0
Mild resistance (grumbling or token refusals but not intense or prolonged for more than a few minutes)	1	1
Strong resistance (e.g. child refuses flatly or has to be argued or coerced into going)	2	2
Strong resistance leading to tantrum	3	3
Unrateable	9	9
Missing	99	99

CD3. On how many days did this kind of thing happen in the past week?
   – If the answer is vague: Would it be more or less than 3 days a week?

CD4. What would be the usual average in a week?
   – (Rate 0 if has happened but less regular than 1 x week)

	CD3	CD4
No refusing	0	0
On one or two days/week	1	1
On 3 to 6 days/week	2	2
Daily	3	3
More than once a day	4	4
Unrateable	9	9
Missing	99	99

4. Have there been any times recently when she/he has broken or dirtied things deliberately?
   – Like his/her toys - (or toys or other things belong to another child) or crayoned on the wall or pulled wallpaper? Or deliberately spilled something like juice?
   – Or has she/he done damage to things outside the home?

CD1. Has this sort of thing happened in the past week?
   – What did she/he do?

CD2. What would be usual?

	CD1	CD2
No destructiveness	0	0
Deliberate destroying of the child's own things, but never anything outside home. (for example drawing on walls, spilling drinks or ripping the pages out of books)	1	1
Deliberate destroying of things such as sib's possessions in the home, or mild damage outside the home (for example forcefully breaking something such as a toy or cup)	2	2
Deliberately destructive behaviour outside the home, or or causing serious or forceful damage (for example hurling an iPad on to the floor using such force that it smashes).	3	3
Unrateable	9	9
Missing	99	99

CD3. How many times has this kind of thing occurred in the past week?
   – If the answer is vague: Would it be more or less than 3 days a week?

CD4. Would this be the average for a usual week?
   – (Rate 0 if has happened but less regular than 1 x week)

	CD3	CD4
Not occurred or less than once a week	0	0
On 1 or 2 days	1	1
On 3 to 6 days	2	2
Daily	3	3
Unrateable	9	9
Missing	99	99

5. Do they ever get really aggressive to other people or pets and try to intentionally hurt them physically?

CD1.   Or does she perhaps threaten to hit other people, for example other children while playing or grown-ups?
   − How aggressive does she get, do you sometimes have to restrain her?
   − Has she ever really hurt someone?
   − Has this sort of thing happened this week?
   − What happened?

CD2.   Would that be usual?

	CD1	CD2
No aggressiveness	0	0
Minimal aggressiveness (threatening without physical contact; <u>or</u> behaviour where uncertain whether rough play or violence; <u>or</u> momentary provoked lashing out	1	1
Mild aggressiveness (physical aggression shown but only transiently and not intensely)	2	2
Severe aggressiveness (attacking other people; hurt them or had to be restrained	3	3
Unrateable	9	9
Missing	99	99

CD3.   How many times has this sort of thing occurred in the past week?

   − If the answer is vague: Would it be more or less than 3 days a week?

CD4.   Would that be what usually happens?

   − (Rate 0 if has happened but less regular than 1 x week)

	CD3	CD4
Not occurred	0	0
On 1 or 2 days	1	1
On 3 to 6 days	2	2
Daily	3	3
More than once a day	4	4
Unrateable	9	9
Missing	99	99

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Appendix 5: CBCL

Healthy Start, Happy Start
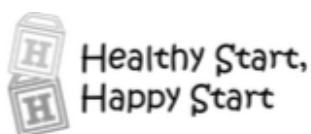
Imperial College London

Trial ID: _____

Completer: Caregiver One/Caregiver Two

Please fill out this form to reflect *your* view of the child's behavior even if other people might not agree. Feel free to write additional comments beside each item and in the space provided on the last page. **Be sure to answer all items.**

Below is a list of items that describe children. For each item that describes the child *now or within the past 2 months*, please circle the *2* if the item is *very true or often true* of the child. Circle the *1* if the item is *somewhat or sometimes true* of the child. If the item is *not true* of the child, circle the *0*. Please answer all items as well as you can, even if some do not seem to apply to the child.

0 = Not True (as far as you know)   1 = Somewhat or Sometimes True   2 = Very True or Often True

1. Aches or pains (without medical cause; *do not* include stomach or headaches)	0	1	2
2. Acts too young for age	0	1	2
3. Afraid to try new things	0	1	2
4. Avoids looking others in the eye	0	1	2
5. Can't concentrate, can't pay attention for long	0	1	2
6. Can't sit still, restless, or hyperactive	0	1	2
7. Can't stand having things out of place	0	1	2
8. Can't stand waiting; wants everything now	0	1	2
9. Chews on things that aren't edible	0	1	2
10. Clings to adults or too dependent	0	1	2
11. Constantly seeks help	0	1	2
12. Constipated, doesn't move bowels (when not sick)	0	1	2
13. Cries a lot	0	1	2
14. Cruel to animals	0	1	2
15. Defiant	0	1	2
16. Demands must be met immediately	0	1	2
17. Destroys his/her own things	0	1	2

0 = Not True (as far as you know) **1 = Somewhat or Sometimes True** **2 = Very True or Often True**

18. Destroys things belonging to his/her family or other children	0	1	2
19. Diarrhea or loose bowels (when not sick)	0	1	2
20. Disobedient	0	1	2
21. Disturbed by any change in routine	0	1	2
22. Doesn't want to sleep alone	0	1	2
23. Doesn't answer when people talk to him/her	0	1	2
24. Doesn't eat well (Describe):	0	1	2
25. Doesn't get along with other children	0	1	2
26. Doesn't know how to have fun; acts like a little adult	0	1	2
27. Doesn't seem to feel guilty after misbehaving	0	1	2
28. Doesn't want to go out of home	0	1	2
29. Easily frustrated	0	1	2
30. Easily jealous	0	1	2
31. Eats or drinks things that are not food – **don't** include sweets (Describe):	0	1	2
32. Fears certain animals, situations, or places (Describe):	0	1	2
33. Feelings are easily hurt	0	1	2
34. Gets hurt a lot, accident-prone	0	1	2
35. Gets in many fights	0	1	2
36. Gets into everything	0	1	2
37. Gets too upset when separated from parents	0	1	2
38. Has trouble getting to sleep	0	1	2
39. Headaches (without medical cause)	0	1	2
40. Hits others	0	1	2
41. Holds his/her breath	0	1	2
42. Hurts animals or people without meaning to	0	1	2
43. Looks unhappy without good reason	0	1	2
44. Angry moods	0	1	2
45. Nausea, feels sick (without medical cause)	0	1	2
46. Nervous moments or twitching: (Describe):	0	1	2
47. Nervous, highstrung, or tense	0	1	2
48. Nightmares	0	1	2
49. Overeating	0	1	2
50. Overtired	0	1	2
51. Shows panic for no good reason	0	1	2
52. Painful bowel movements (without medical cause)	0	1	2
53. Physically attacks people	0	1	2

0 = Not True (as far as you know)   **1 = Somewhat or Sometimes True**   **2 = Very True or Often True**

	0	1	2
54. Picks nose, skin, or other parts of body (Describe):	0	1	2
55. Plays with own sex parts too much	0	1	2
56. Poorly coordinated or clumsy	0	1	2
57. Problems with eyes (without medical cause) (Describe):	0	1	2
58. Punishment doesn't change his/her behavior	0	1	2
59. Quickly shifts from one activity to another	0	1	2
60. Rashes or other skin problems (without medical cause)	0	1	2
61. Refuses to eat	0	1	2
62. Refuses to play active games	0	1	2
63. Repeatedly rocks head or body	0	1	2
64. Resists going to bed at night	0	1	2
65. Resists toilet training (Describe):	0	1	2
66. Screams a lot	0	1	2
67. Seems unresponsive to affection	0	1	2
68. Self-conscious or easily embarrassed	0	1	2
69. Selfish or won't share	0	1	2
70. Shows little affection toward people	0	1	2
71. Shows little interest in things around him/her	0	1	2
72. Shows too little fear of getting hurt	0	1	2
73. Too shy or timid	0	1	2
74. Sleeps less than most kids during day and/or night (Describe):	0	1	2
75. Smears or plays with bowel movements	0	1	2
76. Speech problem (Describe):	0	1	2
77. Stares into space or seems preoccupied	0	1	2
78. Stomachaches or cramps (without medical cause)	0	1	2
79. Rapid shifts between sadness and excitement	0	1	2
80. Strange behavior (Describe):	0	1	2
81. Stubborn, sullen, or irritable	0	1	2
82. Sudden changes in mood or feelings	0	1	2
83. Sulks a lot	0	1	2
84. Talks or cries out in sleep	0	1	2

0 = Not True (as far as you know)   1 = Somewhat or Sometimes True   2 = Very True or Often True

85. Temper tantrums or hot temper	0	1	2
86. Too concerned with neatness or cleanliness	0	1	2
87. Too fearful or anxious	0	1	2
88. Uncooperative	0	1	2
89. Underactive, slow moving, or lacks energy	0	1	2
90. Unhappy, sad, or depressed	0	1	2
91. Unusually loud	0	1	2
92. Upset by new people or situations (Describe):	0	1	2
93. Vomiting, throwing up (without medical cause)	0	1	2
94. Wakes up often at night	0	1	2
95. Wanders away	0	1	2
96. Wants a lot of attention	0	1	2
97. Whining	0	1	2
98. Withdrawn, doesn't get involved with others	0	1	2
99. Worries	0	1	2
100. Please write any problems the child has that were not listed above.	0 0 0	1 1 1	2 2 2

Please be sure you have answered all items. Underline any you are concerned about.

Please describe the best things about the child:

....
....
....

Appendix 6. Demographics Questionnaire

DEMOGRAPHICS

CAREGIVER 1 | Caregiver 1 initials: | Date of birth:

Gender:

1.	Male	☐	2. Female	☐

Relationship to child:

1.	Biological mother	☐	10.	Maternal grandfather	☐
2.	Biological father	☐	11.	Paternal grandmother	☐
3.	Adoptive mother	☐	12.	Paternal grandfather	☐
4.	Adoptive father	☐	13.	Maternal sister	☐
5.	Foster mother	☐	14.	Maternal brother	☐
6.	Foster father	☐	15.	Paternal sister	☐
7.	Step mother	☐	16.	Paternal brother	☐
8.	Step father	☐	17.	Other (*please specify*):	☐
9.	Maternal grandmother	☐			

Ethnicity:

1.	White British	☐	10.	Asian or Asian British Bangladeshi	☐
2.	White Irish	☐	11.	Asian or Asian British Chinese	☐
3.	Any other White background	☐	12.	Any other Asian background	☐
4.	Mixed White & Black Caribbean	☐	13.	Black or Black British Caribbean	☐
5.	Mixed White & Black African	☐	14.	Black or Black British African	☐
6.	Mixed White & Asian	☐	15.	Any other Black background	☐
7.	Any other Mixed background	☐	16.	Any Other Ethnic Group (*Please describe*):	☐
8.	Asian or Asian British Indian	☐			
9.	Asian or Asian British Pakistani	☐	18.	Not Stated	☐

Relationship Status:

1.	Legally separated	☐	7.	Widowed	☐
2.	Married	☐	8.	Civil Partner in a legally recognised Civil Partnership	☐
3.	Remarried	☐	9.	A former Civil Partner	☐
4.	Single never married & never in a Civil Partnership	☐	10.	A surviving Civil Partner	☐
5.	Cohabiting	☐	11.	In a relationship but not cohabiting	☐
6.	Divorced	☐			

Highest qualification:

1.	Pre GCSE	☐	3.	College (i.e. A-levels, NVQ, BTEC)	☐	5.	Postgraduate		☐
2.	GCSEs	☐	4.	Undergraduate	☐				

Employment Status:

1.	Working for an employer	☐	3.	Self-employed	☐	5.	Looking after the home and family	☐
2.	Paid maternity/paternity/parental leave from an employer	☐	4.	Full-time student	☐	6.	Retired	☐

Is this your first child?

1.	Yes	☐	2. No*	☐	3.	*If 'No' number of additional children:	
4.	*If 'No' ages of additional children (*years*):						

Is there a second person involved in providing care for the child, usually in the home, that you would identify as a second caregiver?

1.	Yes	☐	2.	No	☐

CAREGIVER 2 (if applicable)   **Caregiver 2 Initials:**   **Date of birth:**

Gender:					
1.	Male	☐	2.	Female	☐

Relationship to child:					
1.	Biological mother	☐	10.	Maternal grandfather	☐
2.	Biological father	☐	11.	Paternal grandmother	☐
3.	Adoptive mother	☐	12.	Paternal grandfather	☐
4.	Adoptive father	☐	13.	Maternal sister	☐
5.	Foster mother	☐	14.	Maternal brother	☐
6.	Foster father	☐	15.	Paternal sister	☐
7.	Step mother	☐	16.	Paternal brother	☐
8.	Step father	☐	17.	Other (*please specify*):	☐
9.	Maternal grandmother	☐			

Ethnicity:					
1.	White British	☐	10.	Asian or Asian British Bangladeshi	☐
2.	White Irish	☐	11.	Asian or Asian British Chinese	☐
3.	Any other White background	☐	12.	Any other Asian background	☐
4.	Mixed White & Black Caribbean	☐	13.	Black or Black British Caribbean	☐
5.	Mixed White & Black African	☐	14.	Black or Black British African	☐
6.	Mixed White & Asian	☐	15.	Any other Black background	☐
7.	Any other Mixed background	☐	16.	Any Other Ethnic Group (*Please describe*):	☐
8.	Asian or Asian British Indian	☐			
9.	Asian or Asian British Pakistani	☐	18.	Not Stated	☐

Relationship Status:					
1.	Legally separated	☐	7.	Widowed	☐
2.	Married	☐	8.	Civil Partner in a legally recognised Civil Partnership	☐
3.	Remarried	☐	9.	A former Civil Partner	☐
4.	Single never married & never in a Civil Partnership	☐	10.	A surviving Civil Partner	☐
5.	Cohabiting	☐	11.	In a relationship but not cohabiting	☐
6.	Divorced				

Highest qualification:								
1.	Pre GCSE	☐	3.	College (i.e. A-levels, NVQ, BTEC)	☐	5.	Postgraduate	☐
2.	GCSEs	☐	4.	Undergraduate	☐			

Employment Status:								
1.	Working for an employer	☐	3.	Self-employed	☐	5.	Looking after the home and family	☐
2.	Paid maternity/paternity/parental leave from an employer	☐	4.	Full-time student	☐	6.	Retired	☐

Is this your first child?									
1.	Yes	☐	2.	No*	☐	3.	*If 'No' number of additional children:		
4.	*If 'No' ages of additional children (*years*):								

Appendix 7: Square root transformed SDQ items

SDQ Item	N	Mean	S.E. of mean	S.D. of mean	Variance	Skew	S.E. of skew	Z score of skew	Kurtosis	S.E. of kurtosis	Z score of kurtosis
1	1112	1.09	0.01	0.38	0.14	-1.69	0.07	-23.04	2.86	0.15	4.42
2	1112	.71	.02	.57	.33	-.27	.07	-3.73	-1.61	.15	-3.32
3	1112	.09	.01	.30	.09	3.32	.07	45.26	9.54	.15	8.07
5	1112	.65	.02	.56	.31	-.17	.07	-2.32	-1.67	.15	-3.38
6	1112	.49	.02	.55	.30	.32	.07	4.39	-1.68	.15	-3.39
8	1112	.10	.01	.31	.10	2.95	.07	40.24	7.13	.15	6.97
9	1112	.97	.02	.51	.26	-1.06	.07	-14.39	-.28	.15	-1.38
10	1112	.50	.02	.56	.32	.34	.07	4.61	-1.66	.15	-3.36
11	1112	.63	.02	.61	.37	.06	.07	.78	-1.78	.15	-3.48
12	1112	.16	.01	.38	.14	2.10	.07	28.58	2.66	.15	4.26
13	1112	.26	.01	.45	.21	1.22	.07	16.66	-.36	.15	-1.56
14	1112	.32	.01	.48	.23	.88	.07	12.01	-1.10	.15	-2.75
15	1112	.69	.02	.54	.29	-.34	.07	-4.64	-1.55	.15	-3.25
16	1112	.53	.02	.56	.32	.22	.07	3.03	-1.72	.15	-3.42
17	1112	1.16	.01	.37	.13	-1.95	.07	-26.63	3.80	.15	5.09
18	1112	.33	.02	.51	.26	.95	.07	12.91	-.90	.15	-2.48
19	1112	.13	.01	.36	.13	2.45	.07	33.37	4.34	.15	5.44
22	1112	.22	.01	.43	.19	1.54	.07	21.03	.59	.15	2.01
23	1112	.48	.02	.56	.31	.41	.07	5.59	-1.61	.15	-3.32
24	1112	.26	.01	.47	.22	1.28	.07	17.51	-.14	.15	-.99

Appendix 8: Log10 transformed SDQ items

SDQ Item	N	Mean	S.E. of mean	S.D. of mean	Variance	Skew	S.E. of skew	Z score of skew	Kurtosis	S.E. of kurtosis	Z score of kurtosis
1	1112	0.39	0.00	0.09	0.01	0.01	0.07	0.15	-2.00	0.15	-3.70
2	1112	.23	.01	.19	.04	-.11	.07	-1.48	-1.50	.15	-3.20
3	1112	.03	.00	.10	.01	3.47	.07	47.26	10.95	.15	8.64
5	1112	.20	.01	.18	.03	-.01	.07	-.15	-1.49	.15	-3.19
6	1112	.15	.01	.17	.03	.44	.07	6.00	-1.39	.15	-3.08
8	1112	.03	.00	.10	.01	3.08	.07	41.98	8.29	.15	7.52
9	1112	.31	.01	.17	.03	-.80	.07	-10.85	-.60	.15	-2.02
10	1112	.16	.01	.18	.03	.46	.07	6.31	-1.38	.15	-3.07
11	1112	.20	.01	.20	.04	.18	.07	2.45	-1.63	.15	-3.33
12	1112	.05	.00	.12	.01	2.20	.07	29.95	3.37	.15	4.79
13	1112	.08	.00	.14	.02	1.29	.07	17.65	.01	.15	.26
14	1112	.10	.00	.15	.02	.94	.07	12.86	-.84	.15	-2.39
15	1112	.21	.01	.17	.03	-.17	.07	-2.27	-1.38	.15	-3.07
16	1112	.17	.01	.18	.03	.35	.07	4.79	-1.45	.15	-3.15
17	1112	.38	.00	.13	.02	-1.43	.07	-19.45	1.82	.15	3.52
18	1112	.10	.00	.16	.03	1.05	.07	14.33	-.50	.15	-1.84
19	1112	.04	.00	.11	.01	2.57	.07	35.04	5.27	.15	5.99
22	1112	.07	.00	.14	.02	1.64	.07	22.33	1.12	.15	2.77
23	1112	.15	.01	.18	.03	.53	.07	7.23	-1.32	.15	-3.00
24	1112	.08	.00	.15	.02	1.38	.07	18.85	.33	.15	1.50

Appendix 9: SDQ reliability split by gender

Infant gender	Cronbach's alpha	N of items
Male	.71	20
Female	.75	29

Item-Total Statistics

Infants gender		Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Male	Hyp1	9.64	19.374	.364	.691
	Emo1	10.41	21.513	.216	.706
	Cond1	9.76	19.635	.381	.690
	Peer1	10.01	20.551	.255	.703
	Cond2	9.72	20.637	.268	.701
	Emo2	10.42	21.180	.356	.699
	Hyp2	9.94	19.367	.416	.686
	Peer2	9.76	20.595	.169	.715
	Cond3	10.34	20.952	.308	.699
	Emo3	10.26	21.374	.186	.708
	Peer3	10.18	20.879	.271	.701
	Hyp3	9.76	19.246	.468	.681
	Emo4	9.93	20.261	.289	.699
	Cond4	10.17	20.589	.274	.701
	Peer4	10.36	21.632	.150	.710
	Hyp4	9.29	20.735	.210	.707
	Cond5	10.29	20.972	.272	.701
	Peer5	9.98	20.618	.218	.707
	Emo5	10.27	20.747	.318	.698
	Hyp5	9.51	20.499	.248	.703
Female	Hyp1	9.17	21.294	.407	.730
	Emo1	9.88	23.966	.163	.748
	Cond1	9.25	21.530	.386	.732
	Peer1	9.40	22.071	.342	.736
	Cond2	9.18	22.263	.321	.738
	Emo2	9.85	23.548	.257	.743

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Hyp2	9.40	21.455	.421	.729
Peer2	9.20	22.257	.217	.750
Cond3	9.81	23.041	.359	.738
Emo3	9.68	23.154	.237	.744
Peer3	9.65	22.390	.396	.734
Hyp3	9.20	21.467	.432	.729
Emo4	9.35	21.968	.319	.738
Cond4	9.59	22.650	.294	.740
Peer4	9.83	23.524	.231	.744
Hyp4	8.87	22.459	.246	.745
Cond5	9.72	23.223	.237	.744
Peer5	9.44	22.015	.341	.736
Emo5	9.64	22.635	.297	.740
Hyp5	9.01	21.966	.343	.736

Appendix 10. Summary of exploratory factor analysis

		Rotated factor loadings		
Item	Item phrasing	1	2	3
2	Attention and restlessness watching TV	.13	.47	.15
3	Attention and restlessness during individual activity		.50	
4	Attention and restlessness during play with others	-.14	.66	-.33
5	Activity at mealtime	.23	.35	
6	Activity when shopping	.21		
7	Resistance to request to sleep		.13	-.38
8	Temper tantrums	.58		-.32
9	Refusal to comply with requests	.30	-.22	-.62
10	Destructive behaviour	.59	.13	
11	Aggression	.82	-.11	

Appendix 11: 10 item PPACS-A reliability table

Reliability Statistics	
Cronbach's Alpha	N of Items
.653	10

Item-Total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Sleepresist	15.63	22.476	.284	.636
TemperTantrums	14.60	21.415	.521	.588
Refusal	14.50	22.553	.339	.624
BrokenDirtied	15.90	21.297	.526	.586
Aggression	15.16	21.065	.401	.608
Enjoy	15.63	24.491	.198	.650
OwnActivity	15.42	25.478	.153	.654
OthersActivity	14.90	24.209	.308	.632
Mealtime	15.54	22.656	.270	.640
Outside	14.93	23.010	.212	.655