Do child temperament and parenting style mediate the relationship between social
competence and empathic behaviours in children with autism spectrum disorder?

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Abstract

Since social deficits are central to autism spectrum disorder (ASD), it is unsurprising that empathic dysfunction is often viewed as characteristic of this condition. Though an expanding body of research has sought to hone in on the protective factors which aid in the social development of affected children, few investigations have focussed on two of the most promising factors: child temperament and parenting style. In order to address this shortcoming, I explored three key questions: whether child temperament would predict empathic behaviours, whether parenting style would predict empathic behaviours, and whether child temperament and parenting style would mediate the relationship between social competence and empathic behaviours. $N = 71$ parent-child pairs were recruited and, since the disorder is much more prevalent amongst males than females, only male children aged 4-18 years were included. In order to reflect the spectrum, 37 (52.11%) children were verbal, and 34 (47.89%) were non-verbal. Though the protocol aimed to investigate hypotheses within the overall sample, preliminary analyses revealed that the subgroups differed in terms of social competence and empathic behaviours, which was regarded as sufficient cause for disaggregating the sample. Whilst the child temperament subscales did not predict empathic behaviours within the verbal subgroup, effortful control predicted empathic behaviours within the non-verbal subgroup. Furthermore, whilst the authoritative parenting style predicted empathic behaviours within the non-verbal subgroup, none of the parenting subscales predicted this construct within the verbal subgroup. Finally, neither child temperament nor parenting style mediated the relationship between social competence and empathic behaviours within either subgroup. Despite the limitations imposed by the small size of each subgroup, these findings emphasise the significance of further investigating the collective role of temperament and parenting style within verbal and non-verbal cohorts of the ASD population, separately.

Keywords: autism spectrum disorders; social competence; empathy; empathic behaviours; temperament; parenting style; protective factors; verbal; non-verbal; mediation

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According to the American Psychiatric Association (APA, 2013), autism spectrum disorder (ASD) consists of a number of neurodevelopmental conditions of unknown aetiology. Though the phenotype of ASD is highly heterogeneous (Geschwind, 2011), there is widespread agreement that ASD features deficits in two core domains: social relatedness and restricted, repetitive behavioural patterns (APA, 2013). With onset typically occurring before 3 years of age (Ghaziuddin, 2010), ASD was once thought to affect approximately 4 to 5 per 100 000 children (Bryson & Smith, 1998). More recent epidemiological studies suggest a prevalence rate of nearly 17 per 100 000 children (Fombonne, 2005).

Of the core impairments, individuals diagnosed with ASD encounter particular difficulty with social and affective stimuli (Menon & Uddin, 2010). In his first observation of the condition, Kanner (1943, p. 250) referred to autism as an "innate inability to form the usual, biologically provided affective contact with people." This, he proposed, arose from the phenomenon of 'autistic aloneness': that notion that from birth, affected individuals disregard or block out stimuli from the external world, resulting in social isolation. Given that social deficits present early in development and are pervasive throughout the lifespan, they are widely regarded as the central feature of ASD (Krebs et al., 2011).

Since they exert a range of benefits on social interaction, empathic behaviours are markedly implicated in successful social functioning (Smith, 2006). It is thus unsurprising that individuals with higher ASD symptom severity typically display fewer empathic behaviours (Wakabayashi et al., 2007). However, because the literature suggests that both child temperament (van der Mark, van IJzendoorn, & Bakermans-Kranenburg, 2002) and parenting style (Jensen, 2010) significantly influence the presence of empathic behaviours among neurotypical children, the proposed study endeavours to explore whether these variables mediate the relationship between social competence and empathic behaviours amongst children diagnosed with ASD.

Temperament

Initially, Thomas and Chess (1977) distinguished between nine dimensions of temperament – those constitutionally-based variations in self-regulation, reactivity, and affect which remain fairly constant over time. Subsequent works criticised these dimensions on the basis that they failed to fully account for all facets of temperament (Goldsmith & Rothbart, 1991), and that they appeared to contain conceptual overlaps (Rothbart, Ahadi, Hershey, & Fisher, 2001). In an attempt to address these limitations, Goldsmith and Rothbart (1991) expanded the nine initial dimensions to sixteen, which seem to group roughly around three overarching factors: surgency (extraversion), negative affectivity, and effortful control. Since

being proposed, these categories have garnered widespread support within the literature. Given their early presentation and long-term stability (Graziano, 2004), research suggests that temperamental profiles might be useful in understanding disorders characterised by social deficits, and may help explain the behavioural variability within ASD (Hepburn & Stone, 2006).

Broadly defined, surgency consists of approach behaviours – most notably, smiling and laughter – which appear from the age of 2-3 months (Rothbart, 2007). Studies indicate that elevated levels of surgency are related to more externalising problems ('acting out') and fewer internalising problems (fear, sadness, and diminished self-esteem). Also emerging around this age are behaviours of anger and frustration, with fear following at around 7-10 months, all of which are subsumed under the label 'negative affectivity' (Rothbart, 1988). Whilst anger is predictive of externalising difficulties, fear is strongly related to internalising difficulties. Finally, effortful control – the capacity to modulate behaviour and attention to attain certain goals – is thought to appear around the age of 1 year, stabilising at about 3 years of age (Li-Grining, 2007). According to Rothbart (2007), low effortful control is a consistent predictor of externalising problems.

Generally, perceptions of the similarities which define a diagnosis tend to overpower the recognition of symptom variation within the diagnostic category (Schwartz et al., 2009). It is thus unsurprising that little research has explored differences in temperament among individuals with ASD. Results of the limited studies conducted suggest a number of group differences in temperamental profiles between children on the spectrum and neurotypical individuals. According to Konstantareas and Stewart (2006), only effortful control seems to differentiate children with ASD from their neurotypical counterparts, with the former exhibiting diminished levels of the construct. Some studies, however, indicate that children with ASD display both diminished effortful control and greater negative affectivity (Clifford, Hudry, Elsabbagh, Charman, & Johnson, 2013). High-functioning ASD individuals specifically (that is, individuals with an ASD diagnosis and an IQ of 70 (APA, 2013)) appear to exhibit diminished surgency and increased negative affectivity when the temperamental profiles of matched controls are considered (Schwartz et al., 2009). Since temperament clearly influences the trajectory of many psychopathologies (Nigg, 2006) as well as responses to treatment interventions (Fava, 2003), there exists a strong impetus for further research within the ASD population – particularly in studies which aim to better understand social functioning in ASD.

Parenting Style

It was initially thought that the deficits characteristic of ASD either had a genetic basis, or that their onset was affected by parental behaviour (Kanner, 1943). In his 1943 paper, Kanner observed that children with ASD were fundamentally incapable of forming the usual social attachments, which later led him to attribute the development of ASD to a deficiency of maternal warmth (Kanner, 1949). Although this psychosocial 'refrigerator mother' theory has since been discarded – current research suggests a multi-faceted aetiology with a strong genetic basis (Eapen, 2011) – Kanner's idea highlighted the potential interaction between parenting styles and social development. In fact, recent evidence suggests that certain parenting styles serve as protective factors which aid in children's social development, whereas others impede such progress (Rhee, 2008).

Arguably the most well-known parenting model was proposed by Baumrind (1996). Essentially, three parenting typologies – the authoritative, authoritarian, and permissive parenting styles – were summarised as comprising two aspects: control/demandingness, and warmth/responsiveness. Baumrind (1996) suggests that the authoritative parenting style features high amounts of control and responsiveness. Authoritative parents show affection, acceptance, and approval of their child, implementing realistic rules catered to the child's needs. Whilst the authoritarian parenting style also features high control, these parents demonstrate low responsiveness to the child's behaviours. Authoritarian parents typically fail to explain rules, and are either insensitive to their child's needs, or display a negative parenting attitude. Finally, the permissive parenting style is characterised by high responsiveness, with parents providing ample positive attention. Permissive parents, however, utilise minimal control, adjusting their parenting behaviours to suit the desires of the child. Research has indicated that of these parenting typologies, both the authoritarian and permissive parenting approaches significantly increase the risk of maladaptive social and cognitive development among neurotypical children (van Steijn et al., 2013). The authoritative parenting style, by contrast, is said to exert a positive, modifying influence on such development.

Since emotional and behavioural difficulties occur more regularly within the ASD group than among neurotypical individuals, parenting a child on the spectrum can be particularly stressful (Pisula, 2011). Although few studies have explored parenting styles within the ASD group explicitly, those conducted generally concur that parents of affected children more frequently exhibit an authoritarian parenting style than an authoritative one (Deater-Deckard, 2006; Douglas, 2010; Rutgers et al., 2007). Little – if any – findings have suggested that parents of affected children tend to adopt a permissive style of parenting. This

is congruent with a body of research which suggests that increased parental stress is correlated with authoritarian parental discipline (Crnic, Gaze, & Hoffman, 2005; Halpern, Brand, & Malone, 2001). It is also in line with research suggesting that more 'difficult' temperaments typically illicit the authoritarian parenting style (Porter et al., 2005; Zhou et al., 2008), although findings in this area are somewhat inconsistent and require further examination (Lemery & Goldsmith, 2003; Meyers, 1999).

Empathic Behaviours

It is widely agreed that empathic behaviours are decidedly beneficial for successful social interactions, and thus form an integral part of social functioning (Smith, 2006). Since social deficits are central to ASD, it is unsurprising that "[empathic] dysfunction… is also sometimes thought to characterise [ASD]" (Jones, Happé, Gilbert, Burnett, & Viding, 2010, p. 1188). Over the years, research has clearly highlighted a direct relationship between social competence and empathic behaviours, with better social competence associated with an increased presence of empathic behaviours amongst children diagnosed with ASD (Wheelwright et al., 2006).

Few works have studied temperament as a possible predictor of individual differences within the ASD population, much less examined the association between temperament and empathic behaviours (Schwartz et al., 2009). Those conducted suggest that children with high levels of effortful control generally display greater numbers of empathic behaviours (see Vohs & Baumeister, 2011 for a systematic review). Although it is uncertain whether negative affectivity and empathic behaviours are correlated within the ASD population, some studies conducted on typically-developing children suggests that high levels of negative affectivity are predictive of fewer empathic behaviours (Rothbart, Ahadi, & Hershey, 1994; van der Mark et al., 2002; Young, Fox, & Zahn-Waxler, 1999).

A slightly larger volume of work has observed the association between parenting styles and empathic behaviours within the ASD population. Generally, research has shown that, characterised by much warmth and responsiveness, the authoritative parenting style is associated with increased numbers of empathic behaviours (Brown & Rogers, 2003; Dyches, Smith, Korth, Roper, & Mandleco, 2012). Further, some studies have indicated that, given the domineering nature of authoritarian parental discipline, children of these parents also exhibit fewer empathic behaviours (Brown & Rogers, 2003). Although little to no research has explored the association between the permissive parenting style and empathic behaviours amongst children with ASD, research on neurotypical children has indicated that this

parenting style – presumably as a consequence of its restricted focus on the demands of the child – is associated with fewer empathic behaviours (Antonopoulou, Alexopoulos, & Maridaki-Kassotaki, 2012; Aunola, Stattin, & Nurmi, 2000). Whether this relationship exists within the ASD population, however, is uncertain. Given that the relationships between the two latter parenting subscales and empathic behaviours have not been investigated as rigorously as the relationship between the authoritative style and empathic behaviours within the ASD population, additional research is required.

Research Aim and Question

Within the ASD population, there is a paucity of knowledge regarding the impact of child temperament and parenting styles on empathic behaviours. Given that empathic behaviours are critical to social functioning and adaptability, a more detailed exploration of the factors which might mediate the relationship between social competence and empathic behaviours ought to be conducted.

In order to address this shortcoming, I endeavoured to explore three key questions:

1. Does child temperament predict empathic behaviours amongst children diagnosed with ASD?

H_1: High levels of effortful control will predict increased numbers of empathic behaviours.

2. Does parenting style predict empathic behaviours amongst children diagnosed with ASD?

H_1: The authoritative parenting style will predict increased numbers of empathic behaviours, and the authoritarian and permissive parenting styles *might* predict diminished numbers of empathic behaviours.

3. Do child temperament and parenting style mediate the relationship between social competence and empathic behaviours amongst children diagnosed with ASD?

H_1: Both effortful control and authoritative parenting will mediate the relationship between social competence and empathic behaviours.

Method

Research Design

This study formed part of a broader protocol undertaken by the University of Cape Town's Autism Research Group. The overarching project sought to investigate the

relationships between ASD, social deficits, and two candidate genes potentially implicated in the disorder. My study considered the interactions between four variables in particular: social competence, child temperament, parenting style, and empathic behaviours in children diagnosed with ASD.

Given the nature of the research, it was decided that a quantitative paradigm would be best suited to explore the phenomena of interest. In particular a cross-sectional correlational design was employed. The protocol comprised a number of components, including an investigation of the individual effects of child temperament and parenting styles on empathic behaviours, as well as whether these variables would mediate the relationship between social competence and empathic behaviours among children diagnosed with ASD.

Participants

G*Power 3 (Faul, Erdfelder, Lang, & Buchner, 2007) was used to run an *a priori* power analysis to ascertain the sample size required. Using Cohen's (1992) effect size indices and conventional values, it was revealed that $N = 59$ would be needed for 80% power to discern a small effect of .20; $\alpha = .05$. Purposive sampling was used to recruit $N = 71$ *parent-children* pairs from autism-specific and special needs schools in the Western Cape. Given that the disorder is four times more prevalent amongst males than females throughout the world (Kogan et al., 2009) and that there is an unresolved dispute regarding whether females on the spectrum present with a different phenotype to males (Rivet & Matson, 2011), only male children were recruited.

Inclusion and exclusion criteria. In order to participate in the study, children needed an existing ASD diagnosis. Thereafter, they were codified as either verbal or non-verbal, contingent on their ability to follow two-stage verbal commands, as assessed by the Comprehension of Instruction Task outlined in the second edition of the Developmental Neuropsychological Assessment (NEPSY-II; Korkman, Kirk, & Kemp, 2007). Initially, the classification of participants as either verbal or non-verbal was to safeguard that the entire range of the autism spectrum was represented within the sample. During the analyses, however, it became evident that language ability was an important variable in this investigation.

ASD is a complex neurodevelopmental condition with a number of common comorbidities including, *inter alia*, depression and anxiety disorders, and seizures (Doshi-Velez, Ge, & Kohane, 2014). Since these comorbidities confound the relationships between the variables under investigation, children with these conditions could not participate in the

study. For similar reasons, those who had previously endured a head injury were excluded from participating. Since the emphasis of the investigation was on social abilities present until adolescence, only individuals aged between 4 and 18 years were included. Moreover, it was mandatory that parents be fluent in either English or Afrikaans to complete the demographics form, and to allow for the standardised administration of parent interviews. Given that the Autism Diagnostic Observation Schedule, Second Edition (ADOS-2) was originally designed in English and has yet to be validly translated to other South African languages (Western Psychological Services, 2016), verbal children needed to be fluent in English, and non-verbal children were required to come from homes or schools where English was the primary means of communication.

Ethical Considerations

The larger study under which the current endeavour was subsumed received ethical clearance from the Department of Psychology's Research Ethics Committee at the University of Cape Town (UCT; Appendix A). It also received ethical clearance from the Western Cape Education Department (Appendix B). Since the current study included the use of parent-report measures, it was also presented for departmental ethical approval, which was granted. Throughout the study, ethical principles for research involving human participants – as specified by the Health Professions Council of South Africa (HPCSA, 2008) and UCT (2012) – were espoused.

Informed consent and voluntary participation. Upon informing parents of the details of the research (Appendix C) and providing an opportunity to ask questions, written consent (Appendix D) was acquired from those who chose to participate in the study. Assent was also acquired from children once their parents had agreed to participate (Appendix E). All participants were told that they reserved the right to cease participation at any stage, without consequence.

Confidentiality and anonymity. All data gathered was utilised strictly for research purposes, and remains stored in both a password-protected computer and a locked filing cabinet. Confidentiality was, and continues to be, maintained. Moreover, each parent-child pair was assigned a unique participant number, such that the final research project would not contain any identifying information.

Harm to subjects. Minimal risk was associated with this study. However, particularly since the sample belonged to a vulnerable population, due care was taken to minimise the potential risks and discomforts that children and parents might have faced. The most salient risks were that children might become anxious because of changes to their routine, or due to

their interaction with an unfamiliar person. In order to mitigate these, sessions were planned well in advance, and children were given advance notice of this schedule. In addition, an experienced clinician assumed responsibility for administering the ADOS-2. Since tasks on the ADOS-2 are designed to appear as games, the clinician asked, before each session, whether child participants were willing to play games with her. Only when children answered in the affirmative were sessions conducted.

In addition, parents might have felt uncomfortable answering certain questions during the interview, although due care was taken in order to ensure that they were made to feel comfortable with disclosing personal information. Where parents preferred not to answer particular questions, they could choose to omit these without consequence.

Benefits. The ADOS-2 is a gold standard diagnostic tool for ASD, but many families cannot afford to send their children for private assessment, and many facilities have long waiting lists. The ADOS-2 was administered free of charge by a doctoral student who has received clinical training to administer the instrument, and who has achieved research reliability accreditation subsequent to further training. Information obtained during these sessions was compiled in the form of an individualised behaviour report by the doctoral student, and then forwarded to each child's parent, who could utilise the report in conjunction with clinicians and educators involved in the child's care.

Measures

Demographics form. Demographic information pertaining to age, sex, race, and socio-economic status were collected for each parent-child pair (Appendix F). Parents were also asked to specify whether their children were adopted. Additional questions established whether the child had a history of head injury or any neurological conditions, as well as psychiatric conditions.

Social competence. The ADOS-2 – a standardised observation tool widely utilised in the diagnosis and research of ASD (Lord et al., 2012) – was used to ascertain the social competence of each participant. Given that the ADOS-2 is a measure of social deficits – with higher scores indicative of greater social deficits – Social Affect scores were reversed, such that a higher scores reflected better social ability, or greater *social competence*.

The ADOS-2 is comprised of five modules adapted for individuals ranging from 12 months to adulthood. Although module 4 is generally used to assess adolescents, older participants in this cohort were too low-functioning; thus, modules 1-3 were used for assessment purposes within the entire sample. Overall, the instrument has demonstrated acceptable validity, as well as sensitivity ratings in the upper region of 90% (Lord, Rutter,

DiLavore, & Risi, 2008). Additionally, it has an internal consistency of .47–.97 (with lower scores for non-social domains) and high test-retest reliability. Though no formal validation has been done in the South African context, preliminary appropriateness of the Afrikaans translation has been demonstrated (Smith, Malcolm-Smith, & de Vries, 2016). Since the ADOS-2 may only be administered by one person in a single language, no translators were permitted, and the measure was therefore only administered in English. Moreover, since the ADOS-2 may only be administered by qualified clinicians who have undergone extensive training (Le Couteur, Haden, Hammal, & McConachie, 2008), a doctoral student who oversees the larger study assumed responsibility for its administration.

Verbal ability. The Developmental Neuropsychological Assessment, Second Edition (NEPSY-II; Korkman et al., 2007) Comprehension of Instructions subtest was used to assess verbal ability. Though this instrument is intended to be administered to children aged between the aged 3 to 16 years, the developmental delays of older participants made it suitable for assessment in these cases, too. Participants who were able to follow two-stage verbal commands were codified as 'verbal,' whilst those who were unable to do so were classified as 'non-verbal.' Children with little to no language use, such as those who did not have flexible phrase speech on the ADOS-2, were also classified as 'non-verbal.' Research conducted in Canada has indicated and that the Comprehension of Instructions subtest has an internal reliability of between .80 and .82 for children between 5 and 12 years, and a test-retest reliability of between .71 and .84 (Brooks, Sherman, & Strauss, 2010). Although little research has indicated the psychometric properties of this subtest in non-Western nations, a Zambian study indicated that a few of the instrument's other subtests are sensitive to cultural context (Matafwali & Serpell, 2014). It is, however, the best existing diagnostic tool, and was therefore used.

Child temperament. Two equivalent but age-specific measures – namely, the Children's Behavior Questionnaire (CBQ) and the Early Adolescent Temperament Questionnaire, Revised (EATQ-R) – were selected to assess child temperament (Appendix G). Both measures yield mean scores for the various components of temperament, although they differ with respect to the ages they cater for. Whilst the CBQ is an accepted parent-report measure of temperament for individuals aged between 3 and 8 years (Putnam & Rothbart, 2006), the EATQ-R is targeted at individuals aged 9 to 15 years old (Capaldi & Rothbart, 1992). Although a few participants were between 16 and 18 years, none had yet completed high school. Given their developmental delay, an instrument developed for older neurotypical children would not have been appropriate, with the result that the EATQ-R was

also used to assess temperament in these cases.

Regarding the CBQ, Putnam and Rothbart (2006) noted that the subscales each had an alpha of between .72 and .75. The measure also exhibited high test-retest and inter-rater reliability. Though such information is not readily available in non-Western contexts, Richard, Davis, and Bums (2008) indicated that the CBQ is also a suitable measure of temperament among low-income families. Whilst Capaldi and Rothbart (1992) estimated an internal consistency of between .65 and .86 for the EATQ-R, another study successfully translated and adapted the instrument to Catalan, with internal consistency levels of between .56 and .71 for the subscales (Poch, Carrasco, Pérez, Ballabriga, & Aznar, 2015).

Parenting styles. A shortened form of the Parenting Style and Dimension Questionnaire (PSDQ-S; Robinson, Mandleco, Olsen, & Hart, 1995), which is based on Baumrind's (1996) three parenting typologies, was selected for the purposes of this study (Appendix H). Comprising Likert-type items, the PSDQ produces scores for each parenting style. Each of these styles consist of a number of dimensions: the authoritative subscale comprises, *inter alia*, warmth, involvement, reasoning, clear communication, and good nurturing; the authoritarian subscale includes verbal hostility, physical coercion, non-reasoning, and low nurturing; and the permissive subscale comprises lack of follow-through, overlooking misbehaviour, and confidence in one's parenting abilities (Robinson, et al., 1995). Local studies suggest that the measure has an alpha value of between .79 and .82, indicating high reliability (Latouf, 2008; Pretorius, 2000). Item analysis has further revealed good face and structural validity in a Turkish sample (Önder & Gülay, 2008).

Empathic behaviours. Given that earlier measures of empathy only tapped into parts of the construct, the Empathy Quotient (EQ; Appendix H) was developed in an attempt to elicit a more encompassing measurement of empathy (Baron-Cohen & Wheelwright, 2004). Since the parent-reported measure primarily considers children's actions towards others, however, it is more accurate to interpret scores as an indication of the presence of empathic *behaviours*, rather than empathy, *per se* (Yamada & Decety, 2009). The shorter version of the EQ, which consists of a number of forced-choice items, yields a composite score that is indicative of an individual's social and emotional functioning. Research in the United Kingdom has indicated a test-retest reliability of .84 for the measure, as well as acceptable construct and concurrent validity (Lawrence, Shaw, Baker, Baron-Cohen, & David, 2004). Moreover, a Dutch translation of the instrument revealed high cross-cultural validity in the US and Europe, but not in Asia (Groen, Fuermaier, Den Heijer, Tucha, & Althaus, 2015).

Procedure

Screening and recruitment. Children at the selected special needs schools were provided with letters consisting of an information sheet and consent form (Appendices E and F), as well as a demographics survey, to take home. Families recruited from the Autism Research Group's data base were contacted telephonically or via e-mail. Interested parents were required to complete and return these forms to their respective schools for collection.

Data from parents. Following this, parents were contacted to schedule two interviews, both of which were conducted telephonically. The first interview comprised both the EQ and the PSDQ, and lasted approximately 20 to 30 minutes. Contingent upon the child's age and verbal ability, the second interview comprised either the CBQ or the EATQ-R, also lasting roughly 20 to 30 minutes.

Data from children. After obtaining written consent from caregivers, and child assent, children were assessed using the age-appropriate module of the ADOS-2. This assessment was done on a one-on-one basis with the doctoral student at the child's school in a quiet, distraction-free area. The session lasted between 40 and 60 minutes.

Data Analysis

Data were documented and analysed using IBM SPSS Statistics, Version 23.0 (SPSS Incorporated, 2015). All variables under consideration were continuous.

Preliminary analyses determined, using hierarchical regression analysis, whether social competence would predict empathic behaviours over and above the effects of potentially influential demographic variables (age, race, home language, total household income, and the highest level of education obtained by the primary caregiver). It was hypothesised that social competence would predict empathic behaviours within the sample. Potentially influential demographic variables were inserted into the first block of the regression model, and social competence in the second.

In order to address the first key question of the study, a hierarchical regression analysis was conducted to determine whether, beyond the effects of potentially influential demographic variables, child temperament would predict empathic behaviours within the sample. It was conjectured that there would be a linear relationship between effortful control and empathic behaviours, and that surgency and negative affectivity would not predict empathic behaviours. Potentially influential demographic variables were inserted into the first block of the regression model, and all three child temperament subscales into the second block. Inspection of the coefficients table indicated which of these three subscales, if any, significantly predicted empathic behaviours.

To address the second key question of the study, a hierarchical regression

analysis was run to ascertain whether, over and above the influence of potentially influential demographic variables, parenting style would predict empathic behaviours within the sample. It was hypothesised that there would be a direct relationship between the authoritative subscale and empathic behaviours, and that there *might* be inverse relationships between the authoritarian subscale and empathic behaviours, and the permissive subscale and empathic behaviours. Potentially influential demographic variables were inserted into the first block of the regression model, and all three of the parenting subscales into the second block. Inspection of the coefficients table indicated which of these three subscales, if any, significantly predicted empathic behaviours.

In order to address the third key question, the preliminary analyses were consulted to determine whether social competence predicted empathic behaviours. This would satisfy the first of Baron and Kenny's (1986) criteria for determining a mediation effect. Where it was confirmed that social competence predicted empathic behaviours, subsequent analyses sought to determine whether social competence predicted each of the parenting and temperament subscales – in other words, the potential mediating variables. Where social competence was found to predict a particular subscale, model building occurred as follows: block 1 – potential influential demographic variables; block 2 – social competence; block 3 – [potential mediator]; dependent variable – empathic behaviours. It was then assessed whether the β-value of social competence reduced when the potential mediator was included in the regression model, which would support a mediation effect. Where this was the case, a Sobel test was conducted to confirm whether a mediation was truly occurring.

For each model, diagnostics were inspected to ascertain whether the assumptions of hierarchical regression were upheld. There were no major issues within any of the statisticaly analyses.

Results

Participant Information

The final sample comprised $N = 71$ male participants with a confirmed diagnosis of ASD. The participants had a range of social and verbal abilities in order to reflect the spectrum: 37 children were regarded as verbal, and 34 as non-verbal. Inspection of the descriptive statistics (presented in greater detail in Table 1) revealed that most participants identified as Coloured, and slightly fewer as White. Only a small number of participants identified as 'Black,' 'Asian,' or 'Other.' The vast majority of participants identified English as their home language, whilst only a few identified Afrikaans or Xhosa as their home

language. Finally, the verbal and the non-verbal cohorts were comparable in terms of total household income, and most primary caregivers had attained at least Grade 12 education. All participants had complete datasets.

Table 1

Participant information

	Total ASD (%)	Verbal (%)	Non-verbal (%)	*t*	*p*
N	71 (100)	37 (52.11)	34 (47.89)		
Age (months)					
Mean (SD)	105.96 (42.15)	121.96 (34.11)	88.54 (43.18)	-3.61	.153
Range	39.55 – 213.40	73.25 – 213.40	39.55 – 184.24		
Race					
White	28 (39.44)	16 (43.24)	12 (35.29)		
Black	6 (8.45)	3 (8.11)	3 (8.82)		
Coloured	34 (47.89)	17 (45.95)	17 (50.00)		
Indian	1 (1.41)	0 (0.00)	1 (2.94)		
Asian	1 (1.41)	1 (2.70)	0 (0.00)		
Other	1 (1.41)	0 (0.00)	1 (2.94)		
Home language					
English	64 (90.14)	33 (89.19)	31 (91.18)		
Afrikaans	3 (4.23)	2 (5.41)	1 (2.70)		
Xhosa	4 (5.63)	2 (5.41)	2 (5.88)		
Total household income (ZAR)					
Mean (SD)	26848.56 (13510.36)	24334.74 (14025.99)	29584.19 (12560.88)	1.66	.101
Range	1499.50 – 180000.00	1499.50 – 120000.00	4649.50 – 180000.00		
Highest level of education (Primary caregiver)					
Either Grades 4 and 5	4 (5.63)	0 (0.00)	4 (11.76)		
Either Grades 8, 9, 10, or 11	9 (12.68)	4 (5.63)	5 (14.71)		
Grade 12	18 (25.35)	8 (21.62)	10 (29.41)		
Higher education certificate	5 (7.04)	3 (8.11)	3 (8.82)		
Diploma received	17 (23.94)	15 (40.54)	2 (5.88)		
Bachelor's degree received	10 (14.08)	4 (5.63)	6 (8.45)		
Postgraduate degree received	7 (9.86)	3 (8.11)	4 (11.76)		

*$p < .05$. **$p < .01$. ***$p < .001$

Preliminary Analyses

Preliminary analyses provided the backdrop for hypothesis testing later in the paper. To determine whether multicollinearity was an issue in the dataset, the relationships between variables were first considered. The intercorrelation matrix (Table 2) indicated that numerous predictor variables were significantly correlated with the outcome variable; empathic behaviours. Both social competence, $r = .43$, $p < .001$, and the authoritative parenting style, $r = .46$, $p < .001$, were moderately positively correlated with empathic behaviours. In addition, there was a small, positive correlation between effortful control and empathic behaviours, $r = .22$, $p = .030$, and a small, negative correlation between permissive parenting and empathic behaviours, $r = -.25$, $p = .030$. There were also a number of small to moderate correlations between predictor variables, although inspection of the diagnostics indicated that multicollinearity was not an issue within the dataset.

Descriptive statistics for the verbal and non-verbal subgroups (Table 3) indicated that the subgroups differed significantly in terms of social competence, $t = -6.79$, $p < .001$, and empathic behaviours, $t = -2.85$, $p = .006$. This finding was regarded as sufficient cause to address the key research questions within each of the subgroups, separately, in lieu of treating the sample as a single unit. Importantly, the smaller sample sizes associated with subgroup analyses decreased statistical power. Thus, these investigations are explorative and findings must be interpreted with caution.

Table 2

Zero order correlations between predictor and outcome variables within the entire sample

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Empathic behaviours	1.00	.07	.14	-.13	.03	-.17	**.43***	-.05	-.14	**.22***	**.46***	.16	**-.25***
2. Age (months)		1.00	-.08	-.13	.01	.05	**.24***	-.09	.10	-.02	.02	-.05	-.00
3. Race			1.00	-.19	-.07	**-.22***	.13	-.03	.07	-.05	.18	.14	-.14
4. Total household income				1.00	**.30****	.15	-.09	.07	-.10	**-.34****	-.14	**-.35****	.07
5. Highest level of education					1.00	.17	.15	.01	.04	-.21*	.13	.04	-.04
6. Language						1.00	-.08	.02	.03	-.10	-.13	-.02	.32*
7. Social competence							1.00	**-.17***	.33	**.15****	**.38***	**.23***	**-.33****
8. Surgency								1.00	-.04	.03	-.02	.13	.21*
9. Negative affectvity									1.00	-.04	.16	.16	-.10
10. Effortful Control										1.00	.13	.14	-.18
11. Authoritative style											1.00	**.23***	**-.29****
12. Authoritarian style												1.00	.10
13. *Permissive* style													1.00

*p < .05. **p < .01. ***p < .001

Table 3

Descriptive statistics for social competence and empathic behaviours

	Total ASD	Verbal	Non-verbal	t	p
Social competence					
Mean (SD)	10.82 (4.65)	13.62 (3.13)	7.76 (4.11)	-6.79	**<.001***
Range	1 – 19	3 – 19	1 – 17		
Empathic behaviours					
Mean (SD)	22.90 (8.71)	25.59 (7.89)	16.97 (8.73)	-2.85	**.006**
Range	38 – 45	7 – 45	7 - 36		

*p < .05. **p < .01. ***p < .001

Hierarchical regression analysis showed that social competence predicted empathic behaviours within the non-verbal subgroup, over and above the influence of potentially influential demographic variables (age, race, home language, total household income, highest level of education of primary caregiver), $R = .61$, $F (1, 27) = 7.67$, $p = .010$; $R^2 = .37$ (Table 4). However, social competence did not predict empathic behaviours within the verbal subgroup over and above the effect of potentially influential demographic variables, $R = .40$, $F (1, 30) = .93$, $p = .343$; $R^2 = .16$ (Table 5). In fact, the zero-order correlation for social competence was both extremely small and nonsignificant.

Table 4

Hierarchical regression of social competence on empathic behaviours within the non-verbal subgroup

	B	SE	β	t	p
Constant	29.38	8.22		3.56	.001**
Age (months)	-.07	.03	-.34	-2.04	.052
Race	-.24	1.06	-.04	-.22	.824
Language	-2.34	2.77	-.13	-.85	.405
Total household income	-.58	.52	-.20	-1.13	.268
Highest level of education	-.22	.44	-.09	-.50	.622
Social competence	1.00	.36	.47	2.77	**.010***

*p < .05. **p < .01. ***p < .001

Table 5

Hierarchical regression of social competence on empathic behaviours within the verbal subgroup

	B	SE	β	t	p
Constant	-5.10	16.00		-.32	.752
Age (months)	.08	.04	.35	1.90	.068
Race	-.39	1.00	-.08	-.40	.691
Language	-1.31	2.74	-.10	-.59	.561
Total household income	-.17	.44	-.08	-.40	.692
Highest level of education	1.35	.90	.29	1.51	.142
Social competence	.42	.44	.17	.96	.363

*$p < .05$. **$p < .01$. ***$p < .001$

Relations between Child Temperament and Empathic Behaviours

Inspection of the descriptive statistics for child temperament indicated that although the verbal and non-verbal subgroups exhibited comparable scores for surgency and effortful control, they differed statistically in terms of negative affectivity, $t = -2.03$, $p = .045$.

Table 6

Descriptive statistics for child temperament

	Total ASD	Verbal	Non-verbal	t	p
Surgency					
Mean (SD)	3.21 (.64)	3.07 (.60)	3.35 (.65)	1.90	.061
Range	1.85 – 4.70	1.85 – 4.66	1.90 – 4.70		
Negative affectivity					
Mean (SD)	3.05 (.76)	3.22 (.72)	2.86 (.78)	-2.03	**.045***
Range	1.43 – 4.90	1.97 – 4.53	1.43 – 4.90		
Effortful control					
Mean (SD)	3.22 (.74)	3.20 (.84)	3.25 (.62)	.26	.793
Range	1.63 – 4.70	1.63 – 4.70	1.90 – 4.17		

*$p < .05$. **$p < .01$. ***$p < .001$

Hierarchical regression analysis showed that when the three temperament subscales were inserted into one block, the overall model was not statistically significant within the non-verbal subgroup, $R = .31$, $F (3, 25) = 2.35$, $p = .097$; $R^2 = .37$. However, an inspection of the coefficients table indicated that effortful control *did* significantly predict empathic behaviours, $t = 2.63$, $p = .015$ (Table 7). In addition, hierarchical regression analysis indicated that none of the three child temperament subscales predicted empathic behaviours within the verbal subgroup, $R = .55$, $F (3, 28) = 2.27$, $p = .103$; $R^2 = .103$ (see Table 8). Interestingly, however, inspection of the zero-order correlations indicated a moderate, negative, correlation between negative affectivity and empathic behaviours within this subgroup, $r = -.42$, $p = .005$, suggesting that sample size was an issue. However, the zero-order correlations for both effortful control and surgency were extremely small, and therefore not worth noting.

Table 7

Hierarchical regression of child temperament subscales on empathic behaviours within the non-verbal subgroup

	B	SE	β	t	p
Constant	3.32	15.77		.21	.835
Age (months)	-.07	.04	-.35	-1.85	.076
Race	.92	1.05	.16	.88	.389
Language	-.02	3.04	<-.01	-.01	.995
Total household income	.34	.54	.12	.62	.541
Highest level of education	-.22	.46	-.08	-.47	.642
Surgency	.17	2.25	.01	.08	.940
Negative affect	-1.00	1.88	-.09	-.53	.601
Effortful control	6.99	2.66	.50	2.63	**.015***

*$p < .05$. **$p < .01$. ***$p < .001$

Table 8

Hierarchical regression of child temperament subscales on empathic behaviours within the verbal subgroup

	B	SE	β	t	p
Constant	11.77	18.75		.63	.535
Age (months)	.08	.05	.35	1.77	.088
Race	-.03	.96	-.01	-.03	.978
Language	-1.26	2.65	-.08	-.48	.639
Total household income	-.05	.43	-.02	-.12	.904
Highest level of education	1.30	.86	.28	1.52	.140
Surgency	1.88	1.71	.20	1.10	.581
Negative affect	-2.44	2.28	-.19	-1.07	.293
Effortful control	-3.48	1.89	-.32	-1.84	.076

*$p < .05$. **$p < .01$. ***$p < .001$

Relations between Parenting Style and Empathic Behaviours

Inspection of the descriptive statistics for parenting style indicated that although the verbal and non-verbal groups displayed similar scores for the authoritarian and permissive parenting subscales, they differed statistically in terms of the authoritative subscale, $t = -2.02$, $p = .004$ (Table 9).

Table 9

Descriptive statistics for parenting styles

	Total ASD	Verbal	Non-verbal	t	p
Authoritative style					
Mean (SD)	3.62 (.49)	3.73 (.45)	3.50 (.51)	-2.02	**.004****
Range	3 – 4	3 – 4	3 – 4		
Authoritarian style					
Mean (SD)	1.94 (.44)	1.97 (.44)	1.91 (.45)	-.58	.517
Range	1 – 3	1 – 3	1 – 3		
Permissive style					
Mean (SD)	2.30 (.70)	2.11 (.66)	2.50 (.71)	2.42	.148
Range	1 – 4	1 – 3	1 – 4		

*p < .05. **p < .01. ***p < .001

Hierarchical regression analysis showed that when the three parenting subscales were inserted into one block, parenting style had an effect on empathic behaviours over and above that of potentially influential demographic variables within the non-verbal subgroup, R = .67, F (3, 25) = 4.00, p = .019; R^2 = .45. Inspection of the coefficients table (Table 10) indicated that of these parenting typologies, only the authoritative style predicted empathic behaviours, t = 3.17, p = .004. Within the verbal subgroup, none of the parenting styles had an influence on empathic behaviours, over and above that exerted by potentially influential demographic variables, R = .51, F (3, 28) = 1.58, p = .215; R^2 = .26 (Table 11). Further, the zero-order correlations for each of these parenting subscales were extremely small, and therefore not worth noting.

Table 10

Hierarchical regression of parenting subscales on empathic behaviours within the non-verbal subgroup

	B	SE	*B*	*t*	p
Constant	-.27	12.35		-.02	.983
Age (months)	-.05	.03	-.27	-1.58	.127
Race	<-.01	.99	<-.01	<.01	.997
Language	-1.86	3.06	-.11	-.61	.550
Total household income	-.18	.48	-.06	-.37	.718
Highest level of education	-.63	.44	-.24	-1.45	.161
Authoritative style	9.26	2.92	.54	3.17	**.004****
Authoritarian style	.63	3.29	.03	.19	.849
Permissive style	1.25	2.20	.10	.57	.573

*p < .05. **p < .01. ***p < .001

Table 11

Hierarchical regression of parenting subscales on empathic behaviours within the verbal subgroup

	B	SE	*B*	*t*	*p*
Constant	-8.73	21.33		-.41	.685
Age (months)	.08	.04	.37	2.03	.053
Race	-.53	.96	-.10	-.55	.584
Language	-1.28	2.68	-.08	-.48	.638
Total household income	-.27	.52	-.12	-.52	.605
Highest level of education	1.58	.91	.34	1.74	.092
Authoritative style	4.00	3.19	.23	1.25	.221
Authoritarian style	-2.00	3.65	-.11	-.55	.589
Permissive style	-2.31	2.14	-.19	-1.08	.291

*p < .05. **p < .01. ***p < .001

Mediation Analyses: Child Temperament and Parenting Style

Having established that social competence predicted empathic behaviours within the non-verbal subgroup, we could investigate whether child temperament and parenting style mediated the relationship between social competence and empathic behaviours. However, since social competence did not predict empathic behaviours within the verbal subgroup, mediation analysis could not be conducted. The third research question was thus only investigated within the non-verbal subgroup.

In accordance with Baron and Kenny's (1986) subsequent criteria for establishing a mediation effect, we needed to establish whether social competence predicted child temperament, and whether social competence predicted parenting style. Since child temperament is innate, it would not normally be investigated as a product of social competence; instead, the direction of this relationship would be reversed. Due to technicality, however – specifically, that mediation analysis requires an examination of the path between the two constructs – social competence was inserted as the predictor variable, and child temperament the outcome variable. Outside of the context of mediation, this would not be a viable relationship.

Hierarchical regression analysis indicated that over and above the effects of potentially influential demographic variables, social competence did not predict surgency, $R = .29$, $F (1, 27) = .43$, $p = .518$; $R^2 = .09$ (see Table 12, Appendix I), or negative affectivity, $R = .39$, $F (1, 27) = 3.03$, $p = .093$; $R^2 = .15$ (see Table 13, Appendix J), within the non-verbal subgroup. However, social competence *did* predict effortful control within this subgroup, $R = .64$, $F (1, 27) = 5.81$, $p = .023$; $R^2 = .41$ (see Table 14). The inclusion of effortful control on the overall regression model resulted in the β-value of social competence reducing from .47 to .34, suggesting a possible mediation effect (see Table 15).

In order to confirm whether mediation was taking place, a Sobel test was conducted. The result of the Sobel test was nonsignificant, $Z = 1.32$, $p = .186$. Thus, the authoritative style did not mediate the relationship between social competence and empathic behaviours

Table 14

Hierarchical regression of social competence on effortful control within the non-verbal subgroup

	B	SE	β	t	p
Constant	4.09	.56		7.26	<.001***
Age (months)	<.00	.00	.14	.85	.404
Race	-.06	.07	-.16	-.88	.388
Language	-.35	.19	-.28	-1.84	.077
Total household income	-.10	.04	-.47	-2.72	**.011***
Highest level of education	-.01	.03	-.05	-.31	.757
Social competence	.06	.03	.39	2.41	**.023***

*$p < .05$. **$p < .01$. ***$p < .001$

Table 15

Hierarchical regression regarding the effects of effortful control on the relationship between social competence and empathic behaviours within the non-verbal subgroup

Model		B	SE	β	t	p
	(Constant)	29.28	8.22		3.56	.001**
	Age (months)	-.070	.03	-.34	-2.04	.052
	Race	-.24	1.06	-.04	-.22	.824
2	Language	-2.34	2.77	-.13	-.85	.405
	Total household income	-.58	.52	-.20	-1.13	.268
	Highest level of education	-.22	.44	-.09	-.50	.622
	Social competence	1.00	.36	**.47**	2.77	**.010***
	(Constant)	9.78	13.61		.72	.479
	Age (months)	-.08	.03	-.39	-2.37	**.026***
	Race	.07	1.04	.01	.06	.949
3	Language	-.68	2.83	-.04	-.24	.813
	Total household income	-.13	.56	-.04	-.22	.825
	Highest level of education	-.18	.43	-.07	-.41	.684
	Social competence	.71	.38	**.34**	1.87	.073
	Effortful control	4.77	2.71	.34	1.76	.090

*$p < .05$. **$p < .01$. ***$p < .001$

Subsequent analyses aimed to ascertain whether parenting style mediated the relationship between social competence and empathic behaviours within the non-verbal subgroup. Hierarchical regression analysis indicated that social competence did not have an effect on the authoritative style over and above that of potentially influential demographic variables, $R = .46$, $F (1, 27) = 1.71$, $p = .202$; $R^2 = .21$ (see Table 16, Appendix K). Similarly, social competence did not predict the authoritarian parenting style, $R = .43$, $F (1, 27) = 2.09$, $p = .160$; $R^2 = .19$ (see Table 17, Appendix L), or the permissive parenting style, $R = .52$, $F (1, 27) = .03$, $p = .860$; $R^2 = .27$ (see Table 17, Appendix M). Thus, none of the three parenting styles mediated the relationship between social competence and empathic behaviours within the non-verbal group.

Discussion

Of the central deficits endured, children with ASD encounter particular difficulty with social and affective stimuli. In particular, a long-standing line of inquiry has documented the direct relationship between ASD symptom severity and empathic behaviours, such that those who exhibit diminished social competence generally display fewer empathic behaviours. In recent decades, research has attempted to hone in on potential protective factors which aid in children's social development, and therefore, displays of empathic behaviours. Two of the most promising – yet vastly under-researched – of these are child temperament and parenting style, which the current study sought to investigate in more detail. This endeavour therefore explored the individual influences of child temperament and parenting style on empathic behaviours, and then assessed whether these constructs mediated the relationship between social competence and empathic behaviours amongst children diagnosed with ASD.

Preliminary Analyses

Social competence and empathic behaviours in verbal versus non-verbal children. It was observed that the subgroups differed statistically in terms of their observed levels of both social competence and empathic behaviours. In particular, verbal children scored significantly higher than non-verbal children on both constructs. This result is congruent with studies which have shown that non-verbal children are lower-functioning than their non-verbal counterparts (see, for example, Hoogenhout & Malcolm-Smith, 2014). Although I initially set out to treat the sample as a single unit, this observation was regarded as sufficient cause for examining the key research questions within each subgroup.

It is worth noting that the finding regarding empathic behaviours might, however, have been influenced – at least to some degree – by the measurement tool used. Despite that the EQ is more a measure of empathic *behaviours* than empathy, per se – which seems to negate the language disparity between the subgroups – a closer inspection of the EQ reveals that some items might necessitate the use of spoken language. For example, one item reads "my son may be blunt giving his opinions, even when these may upset someone," and another, "at school, when my son understands something he can easily explain it clearly to others." In this sense, the EQ – although despite its good psychometric properties (Lawrence et al., 2004) – might underestimate the number of empathic behaviours exhibited by non-verbal children. This is not to say that verbal and non-verbal children are equivalent in terms of their functioning. Instead, it merely highlights the need for novel measures of empathy which depict more accurate empathy profiles of children and therefore, allow for comparison between individuals, regardless of language ability.

Exploring the association between social competence and empathic behaviours. Although this study did not explicitly aim to examine the association between social competence and empathic behaviours, the assumed relationship between these two constructs served as the basis for subsequent analysis, which therefore warranted this investigation. Hierarchical regression analysis found that whilst social competence predicted empathic behaviours within the non-verbal subgroup, there was no predictive relationship between these variables within the verbal subgroup.

The finding that social competence predicts empathic behaviours – at least within the non-verbal subgroup – is congruent with a well-established body of literature, which has frequently cited the inverse relationship between ASD symptom severity and empathic behaviours (Wakabayashi et al., 2007; Wheelwright et al., 2006). In other words, children who exhibit diminished social competence, specifically, have been found to display fewer empathic behaviours, and vice-versa (Smith, 2006). The finding that social competence did not predict empathic behaviours within the verbal subgroup is thus unexpected. Since the subgroups exhibited comparable variability in terms of their social competence scores, it is unlikely that a restricted range of scores influenced this finding. It is possible, however, that a third factor such as language ability – which was the most salient distinguishing factor between the subgroups – may have influenced the relationship between social competence and empathic behaviours within the verbal subgroup. Additional research is required.

Does Child Temperament Predict Empathic Behaviours?

Temperament in verbal versus non-verbal children. Before examining the

relationship between child temperament and empathic behaviours, the temperament profile of the sample was considered. Although the verbal and non-verbal subgroups exhibited similar scores for effortful control and surgency, they differed statistically in terms of negative affectivity. Moreover, within the verbal subgroup, children exhibited comparable scores for effortful control, surgency, and negative affectivity. Within the non-verbal subgroup, children scored similarly on the surgency and effortful control subscales, but somewhat lower on the negative affectivity subscale. To date, no known study has compared the temperament profiles of verbal and non-verbal children. It would be interesting to see whether future research yields similar results.

Exploring the association between child temperament and empathic behaviours. Within the non-verbal subgroup, only effortful control predicted empathic behaviours. This result is congruent with existing research which indicates that children high in effortful control generally exhibit more empathic behaviours than those with lower levels of this construct (Vohs & Baumeister, 2011); a relationship which has been observed not only within the ASD population, but within various other clinical and typically-developing groups. That effortful control predicts empathic behaviours is likely due to the fact that the capacity for empathy often entails inhibiting one's own immediate feelings and needs to consider those of someone else.

Within the verbal subgroup, however, effortful control did not predict empathic behaviours; a finding which is inconsistent with previous research. Since the variability in scores for effortful control was similar across subgroups, it is unlikely that this affected the outcome. Once more, the role of third variables such as language ability ought to be explored.

Interestingly, though negative affectivity did not significantly predict empathic behaviours, there was a moderate, negative correlation between these two constructs within the verbal group. This is congruent with some studies on typically-developing children, which suggest that high levels of negative affectivity are tied to diminished numbers of empathic behaviours (Rothbart et al., 1994; van der Mark et al., 2002; Young, et al., 1999). That this pattern was observed amongst verbal participants, but not within the non-verbal subgroup, suggests that a third variable such as language might have exerted an effect on the association between child temperament and empathic behaviours.

Does Parenting Style Predict Empathic Behaviours?

Parenting verbal versus non-verbal children. Before exploring the relationship between parenting and empathic behaviours, the parenting profile of the sample was considered. Since no known study has compared the parenting profiles of verbal and non-

verbal cohorts of the ASD population – instead treating samples as a single unit (e.g., Crnic, et al., 2005; Halpern et al., 2001) – it was hoped that this would contribute to the literature.

Though the subgroups scored similarly on the authoritarian and permissive subscales, their scores differed significantly on the authoritative subscale. Specifically, the verbal subgroup scored significantly higher on the authoritative subscale than the non-verbal subgroup. Interestingly, subgroups were similar in that each scored highest overall on the authoritative subscale, followed by the permissive subscale. Within each subgroup, the lowest scores were observed for the authoritarian subscale. These results are in contrast to existing studies pertaining to parenting within the ASD population, which suggest that parents of affected children tend to exhibit an authoritarian parenting style more often than they do an authoritative approach (Deater-Deckard, 2006; Douglas, 2010; Rutgers et al., 2007). It is also surprising, given that little – if any – research indicates that parents of affected children tend to adopt a permissive style of parenting. It is, however, crucial to note that social desirability bias might have significantly influenced this finding, since parents are often very reluctant to admit using authoritarian tactics (Reitman, Rhode, Hupp, & Altobello, 2002).

Exploring the association between parenting style and empathic behaviours. Over and above the influence of potentially influential demographic variables, it was observed that authoritative parenting predicted the presence of empathic behaviours within the non-verbal sample. This is congruent with a much of the literature, which has documented a well-established link between the two constructs (Brown & Rogers, 2003; Dyches et al., 2012). This association likely occurs because the authoritative parenting style – characterised by firm control and high amounts of warmth/ responsiveness – has been found to engender a familial context that is able to effectively transmit values within the family unit (Brown & Rogers, 2003). Further, neither the authoritarian nor the permissive parenting styles predicted empathic behaviours within the non-verbal subgroup. This is in contrast to studies which suggest that the domineering nature of authoritarian discipline (Brown & Rogers, 2003), and the narrowed focus on the interests of the child observed amongst permissive parents (Antonopoulou et al., 2012; Aunola et al., 2000), are linked to fewer numbers of empathic behaviours. That these last two parenting styles were not found to be predictive of empathic behaviours within the non-verbal subgroup is not surprising, however, since only a few studies – generally, those which have focussed on typically-developing children – have observed these relationships.

Regarding the verbal subgroup, it was observed that none of the three parenting

subscales predicted empathic behaviours. Though – for the same reasons outlined above – it is unsurprising that the authoritarian and permissive subscales were not significant, the finding that the authoritative parenting style did not predict the outcome variable is inconsistent with the existing literature. As conjectured in earlier analyses, it is likely that a third variable – perhaps language ability – influenced this outcome.

Do Child Temperament and Parenting Style Mediate the Relationship between Social Competence and Empathic Behaviours?

Since there was no relationship between social competence and empathic behaviours within the verbal subgroup, mediation analyses could not be conducted within this cohort. In contrast, hierarchical regression seemed to support the idea that effortful control would mediate the relationship between social competence and empathic behaviours within the non-verbal subgroup. The result of the Sobel test, however, indicated that this was not the case.

To date, no known research has explored the potential mediating influence of child temperament and parenting style on the relationship between social competence and empathic behaviours. It is thus difficult to contextualise these findings. Since mediation analyses typically require much larger samples than the one in this study – at least in the region of a few hundred participants (Fritz & MacKinnon, 2007) – the small size of the non-verbal subgroup was likely responsible for this result. Alternatively, this finding could point to the strength of a well-established, direct link between social competence and empathic behaviours. These findings should not detract from the significant influence of both child temperament and parenting style on empathic behaviours. On the contrary, the findings obtained in this investigation suggest that both the authoritative parenting style, as well as effortful control, serve as protective factors which aid in children's social development – at least within the non-verbal subgroup – by contributing to the number of empathic behaviours that these children exhibit. This, in turn, could be used to guide interventions that are tailored to meet the needs of children diagnosed with ASD.

Limitations and Suggestions for Future Research

Limitations imposed by sample size. Owing to the exclusion criteria, as well as time and financial constraints, which prevented us from recruiting participants from other South African regions, the small sizes of the verbal and non-verbal subgroups meant that much of the endeavour is to be regarded as explorative. Given that the analyses required much larger sample sizes – particularly in the case of the Sobel test – statistical outputs need to be interpreted with caution. Where possible, future investigations must ensure that samples are large enough to detect small effects.

Rethinking the *modus operandi* in ASD research. As Schwartz et al. (2009) assert, perceptions of the similarities which define a diagnosis often overpower a recognition of symptom variation within the diagnostic category. This is especially true where ASD is concerned. Owing, perhaps, to the uncertainty surrounding the aetiology of the condition, as well as the relative paucity of information about many aspects of ASD (Bendixen et al., 2011), the overwhelming majority of contemporary research continues to group affected individuals into an overarching group defined by an ASD diagnosis, rather than attempting to disaggregate the group into, for example, verbal and non-verbal subgroups (Colle, Baron-Cohen, & Hill, 2006). It is this oversight which has caused investigations to overlook potential between-group differences. The disparate results obtained for the subgroups in this study provide an impetus for future works to distinguish between verbal and non-verbal participants in their investigations.

The inclusion of a (neurotypical) control group. Owing to time constraints, we were unable to recruit a sizeable control group for inclusion in this study. As a result, the relationships between the variables under investigation cannot be compared to those that exist within the neurotypical population in South Africa, which might make for an interesting endeavour. Given the dearth of information pertaining to the associations between child temperament and empathic behaviours, as well as parenting style and empathic behaviours, including a control group in future investigations will provide additional insight into an under-researched area.

The need to be mindful of age. Although the study sought to utilise developmentally-sensitive measures of the constructs under investigation (where feasible), and to include age as a potentially influential demographic variable in all statistical analyses, there still exists the possibility that variables beyond our control influenced the results. These might include, for example, the physiological changes associated with puberty. To this end, it is advised that future studies narrow their focus to include a smaller age range in order to mitigate the influence of confounding variables, and to provide a more nuanced account of these relationships between various cohorts of the verbal and non-verbal subgroups.

The influence of parent stress on parenting style (and therefore, child temperament). As Pisula (2011) remarks, the behavioural and emotional difficulties that frequently occur among the ASD population mean that parenting a child on the spectrum can be particularly stressful. In light of the fact that parental stress is significantly associated with one's parenting style (Anthony et al., 2005; Guajardo, Snyder, & Petersen, 2009) which, in turn, has been shown to exert a modifying influence on child temperament (Kiff, Lengua, &

Zalewski, 2011), the inclusion of parental stress would permit a more refined examination of the factors which predict empathic behaviours in children with ASD.

Towards a mixed-methods approach, where appropriate. In light of the dearth of research pertaining to the various subgroups of ASD, future investigations might benefit from the inclusion of qualitative elements in the research design. In this sense, information obtained from participants and/or collaterals could supplement the existing research, perhaps proving to be particularly useful in directing the efforts of researchers in areas with little or no substantial findings. Discourse analysis, for example, might have provided additional insight into why the verbal and non-verbal groups differed markedly in many of the analyses.

Conclusion

Despite that a growing body of work has sought to hone in on the protective factors which aid in children's social development – thus elevating the presence of empathic behaviours within this cohort – surprisingly little ASD-related research has focussed on two of the most promising constructs: child temperament and parenting style. Since both of these variables have been shown to influence the trajectory of many pathologies, as well as responses to treatment programmes, there exists a strong impetus for further research within the ASD population – particularly in studies which aim to better understand social functioning in ASD. This, in turn, could be used to inform interventions tailored to meet the needs of this group.

Moreover, comparatively few inquiries have disaggregated the ASD population into its verbal and non-verbal components. The results of this study clearly indicate that doing so leads researchers to overlook variations that exist within the population. In order to gain a better understanding of the condition, and to maximise the efficacy of treatment interventions targeted at this group, future research ought to reconsider the *modus operandi* that currently governs much of the ASD research.

Overall, pro-social behaviours such as empathy form the foundation of good relationships between people which, in turn, are key to a sense of self and community (Chow & Chan, 2008). Despite a long-standing awareness that social deficits constitute the key domain of impairment in ASD, there has been surprisingly minimal advancement in the knowledge of what underlies these deficits, much less the ways in which they can be ameliorated. It is hoped that the results obtained in this study will provide an impetus for much-needed additional research regarding empathy-related protective factors within the various subgroups of the ASD population. It is also hoped that this research will help combat the stigma which sometimes accompanies an ASD diagnosis, such that affected individuals

will not feel marginalised within their families and communities.

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Appendix A

Departmental ethical clearance for the larger study

UNIVERSITY OF CAPE TOWN

Department of Psychology

University of Cape Town Rondebosch 7701 South Africa
Telephone (021) 650 3414
Fax No. (021) 650 4104

13 April 2015

Mr K. Hamilton
Department of Psychology
University of Cape Town
Rondebosch

Dear Ms Hamilton,

This is to confirm that ethical clearance has been given by an Ethics Review Committee of the Faculty of Humanities for your study, *The Biological Bases of Social Deficits.* The reference number is PSY2014-024.

I wish you all the best for your study.

Yours sincerely,

Johann Louw PhD
Professor
Chair: Ethics Review Committee

Appendix B

Western Cape Education Department ethical clearance for the larger study

Western Cape Government

Education

REFERENCE: 20150422-46598

ENQUIRIES: Dr A T Wyngaard

Ms Kate Hamilton

PO Box 1694

Milnerton

7435

Dear Ms Kate Hamilton

RESEARCH PROPOSAL: THE BIOLOGICAL BASES OF SOCIAL DEFICITS: THE POSSIBLE ROLES OF THE MU-OPIOID RECEPTOR (OPRM1) AND THE SEROTONIN TRANSPORTER PROMOTER LENGTH POLYMORPHISM (5-HTTLPR) IN SOCIAL MOTIVATION AND THEORY OF MIND IN AN AUTISM SPECTRUM DISORDER (ASD) SAMPLE

Your application to conduct the above-mentioned research in schools in the Western Cape has been approved subject to the following conditions:

1. Principals, educators and learners are under no obligation to assist you in your investigation.
2. Principals, educators, learners and schools should not be identifiable in any way from the results of the investigation.
3. You make all the arrangements concerning your investigation.
4. Educators' programmes are not to be interrupted.
5. The Study is to be conducted from **24 April 2015 till 30 September 2017**
6. No research can be conducted during the fourth term as schools are preparing and finalizing syllabi for examinations (October to December).

7. Should you wish to extend the period of your survey, please contact Dr A.T Wyngaard at the contact numbers above quoting the reference number?
8. A photocopy of this letter is submitted to the principal where the intended research is to be conducted.
9. Your research will be limited to the list of schools as forwarded to the Western Cape Education Department.
10. A brief summary of the content, findings and recommendations is provided to the Director: Research Services.
11. The Department receives a copy of the completed report/dissertation/thesis addressed to:

> **The Director: Research Services Western Cape Education Department**
> **Private Bag X9114**
> **CAPE TOWN**
> **8000**

We wish you success in your research.

Kind regards.

Signed: Dr Audrey T Wyngaard

Directorate: Research
DATE: 22 April 2015

Lower Parliament Street, Cape Town, 8001
tel: +27 21 467 fax: 0865902282
Safe Schools: 0800 45 46 47

Private Bag X9114, Cape Town, 8000
Employment and salary enquiries: 0861 92 33 22
ww.westerncape.gov.za

Appendix C

Information sheet

Brief Overview of Psychology Doctoral Study – **The Biological Bases of Social Deficits: The possible roles of two candidate genes in social motivation and social ability in Autism Spectrum Disorder**

Dear Parents

You and your child are invited to participate in my study! I am a PhD Psychology student with a history in in Neuropsychology (MA Clinical Neuropsychology, 2014), and am a member of the University of Cape Town Autism Research Group (uctautism.com). I am investigating the social difficulties in Autism Spectrum Disorders (ASD) and I am inviting children with ASD and <u>without ASD</u> to participate. I am interested in general social ability, and specifically in social motivation and Theory of Mind. Theory of Mind refers to the ability to understand other people's thoughts, beliefs, and emotions, and to understand that these are different from one's own. For example, the ability to understand jokes and the ability to understand that when you know something, everyone else doesn't automatically know it too, are forms of Theory of Mind. I am interested in two candidate genes as one may be involved in whether children look for social interaction (the mu-opioid receptor, OPRM1), and the other may be involved in how well children understand social interaction and other people's behaviours (the serotonin transporter promoter length polymorphism, 5-HTTLPR). In order to conduct my study, I have recruited children with ASD and I am now inviting children who do not have ASD to participate. This will enable me to make comparisons and improve our understanding of how children with ASD may differ from other children.

Who can participate?
In order to participate, your son must be between 4-18 years old and must understand English. Children can participate as long as they do not have a diagnosed Autism Spectrum Disorder and their home language or the language their teachers use with them is English. You as the parent must also be fluent in either English or Afrikaans as I will need to interview you about your son.

Must my child and I participate?
No, not at all – this study is completely optional. There are no negative consequences if you choose not to participate. Also, if you decide to participate and then change your mind, you can just let me know that you are withdrawing and you don't even need to provide a reason. If this happens, you and your son will not be penalised in any way.

What will happen if we take part?
If you decide to participate in the study, I will ask you to sign a consent form and complete a demographics form. The demographic forms asks about your son's medical history and your family income and education. I understand that this is personal information, so as soon as I

receive it I will remove your name and record the information under a confidential participation number. This information will not be shared with anyone else. We need this personal information for two reasons: first, we need the medical information to establish whether anything else could explain the relationships we are exploring, in which case we may not be able to include your son in the study, and second, we need the financial information to make sure that this research recruits children from all backgrounds and is therefore representative of the South African population.

Myself or someone in my team will then call you to arrange a time to interview you. The interview will consist of two parts, each 30-60 minutes, and can be done telephonically or we can meet and conduct the interview in person.

I will then meet with your son at his school. At the start of every session I will ask your son if he is willing to play the games with me that day, and if he isn't then we won't have a session. I will meet each child for 2 sessions of approximately 40 minutes, where we will complete several tasks all designed to measure different aspects of social and cognitive ability. All the tasks are designed to appear as games for the children, so they are all toy or story based.

Later in my PhD I will contact you again to arrange to use a non-invasive cheek swab to collect a DNA sample from your child. This is done to see which expression of the candidate genes I'm researching your son has. I will do this by gently rubbing a cotton swab on the inside of his cheek. This swab is similar to an earbud and will not hurt your son or pose any risk to him. To make sure your son is comfortable, I will first let him play with a cotton bud and get used to putting it in his mouth. He can then imitate me showing him how to rub the inside of the cheek. I will only collect the sample once your son is comfortable.

What will happen to the information I give you and the information from seeing my son?
All information is recorded under a confidential participant number, and your privacy will be maintained at all times. I will not share this information with others, and if any data is shared it will be the kind of information that does not reveal who you are (for example, when I send the lab samples I may give them the age and sex of you son, but not his name, school, or anything else). Therefore, your name, income information, son's medical information, and all other information will not be shared with anyone. All information will be securely stored so that no one else can access it, and the data is coded so that your name and your son's name are removed. Any DNA that is unused will be destroyed.

What will happen with the results of this study?
At the end of this study I will provide you with a personalised report explaining what I learnt about your son. You can keep this report, and you can choose to share it with schools or any clinical professional involved in your son's care (for example, psychologists, GPs, speech therapists, etc). I am also always available to discuss anything about the research and to answer any questions.

If I publish my findings from this study, you and your son will never be identified personally. I will be delighted to share the results with you as soon as they are available.

Who has approved this study?
This study has received ethical approval from the Western Cape Education Department, the UCT Psychology Department Ethics Board, and the UCT Faculty of Science Ethics Board.

Who is responsible for this study?
I am the Doctoral Candidate who is conducting the study, and can be contacted at any time with any questions. My supervisor, Dr Susan Malcolm-Smith, is a senior lecturer and Neuropsychologist at UCT can also be contacted if you have any queries or complaints that you would rather address to her. Or, alternatively you can address these issues to Rosalind Adams, the administrative assistant for the Psychology Department Ethics board. All contact details are included at the end of this letter.

How to participate?
Thank you for considering participating in my study! In order to join the study, please sign the attached consent form, complete the demographic form and return these forms to your school. Please feel free to call me with any questions or for help submitting these forms.

I look forward to hearing from you!

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PhD Psychology	Senior Lecturer	Admin. Assistant: Ethics
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Appendix D

Consent form: Parent participant

Consent Form

The study has been explained to me, and my questions have been answered. I understand that participation in this study is voluntary, and that I may withdraw my child at any point. I understand that my child will not be identified except by an initial, and that this anonymity will be maintained throughout the study and when the research is published.

I consent to participate and to allow my child to **participate** in this study.

Child's name:

Signature of parent /guardian: _____

Date: _____

I hereby give consent for **DNA** samples to be collected from my child using cheek swabs. I understand that this DNA will only be used for research purposes. I give consent for this DNA to be stored at the Department of Molecular and Cell Biology or the Department of Psychology, UCT, and to be used in later research.

Signature of parent /guardian: _____

Date: _____

Please indicate below if you would like to be notified of future research conducted by our research group:

Yes, I _____ (initial) would like to be added to your research participation pool and be notified of research projects in which I or my child might participate in the future.

Phone number: _____

Cell phone number: _____

E-mail address: _____

{Parent/guardian} _____ has been informed of the purpose, procedures, and any possible risks or this study. He / she has been given time to ask any questions, and these questions have been answered to the best of my ability. He / she understands that participation is voluntary.

Researcher: _____

Signature & Date: _____

Appendix E

Assent form: Child participant

Assent for DNA Collection and Psychological Assessment

Hello! I want to tell you about a research study I am doing. A research study is a way to learn more about something, and we want to learn more about autism!

If you join this study, I will ask you to put a cotton bud inside your mouth and rub your cheek with it. This will not hurt you at all. You can bring your parent or guardian with if you want to.

I will also ask you to complete tasks and play a few games with me. Some of the games will have toys, and some will involve listening to stories and looking at some pictures with me. I may ask to see you again after today so that we can play more games. Every time we meet I will have new games. If you get tired, then we can take a break.

You do not have to join this study. It is up to you. No one will get upset if you don't want to be in the study. You won't get into trouble if you don't join this study. It is also fine if you join the study, but then change your mind and want to stop. You can decide at any time to stop being in this study.

Do you have any questions?

{Participant's name} _____ has been informed of the purpose, procedures, and any possible risks or this study. He has been given time to ask any questions, and these questions have been answered to the best of my ability. He understands that participation is voluntary.

Researcher _____

Signature _____

Date _____

Appendix F

Demographics questionnaire

Your name: _____

Date: _____

Child's Name: _____

School: _____

Age: _____

Date of Birth: _____

Number(s) to contact you on for parent interview: _____

1. Child's Sex: *Male*   *Female*

2. Ethnicity: *White*   *Black*   *Indian*   *Coloured*

    Asian   *Other*   *If other please specify: _____*

3. Home Language: _____

4. Handedness (circle one):   *Left*   *Right*   *Ambidextrous*

5. Number of siblings: _____

6. Number of **older** siblings: _____

7. Who is the child's primary caregiver?

    _____

8. What is your relationship to the child (e.g. mother, father, etc)?

    _____

9. Has your child ever been diagnosed with Autism Spectrum Disorder (ASD)?   YES

    NO

    Please indicate any other diagnoses or information related to your child's ASD: _____

    _____

    _____

10. Has your child ever been diagnosed with a disruptive, impulse-control, or conduct disorder,

    such as conduct disorder or oppositional defiant disorder (ODD)?

    YES   NO

    If yes, please specify: _____

    _____

11. Has your child ever had a communication disorder? (For example: Having problems with

    understanding or producing speech, slow vocabulary development, difficulties recalling

    words or problems with producing sentences appropriate for his/her age.)

    YES   NO

If yes, please specify: _____

_____

_____

12. Has your child ever experienced learning difficulties such as dyslexia or attention-deficit /
hyperactivity disorder (ADD/ ADHD)?   YES
        NO
If yes, please specify: _____

_____

13. Has your child ever experienced a head injury? (e.g., being hit on the head and losing
consciousness as a result)   YES   NO
If yes, please give details: _____

_____

_____

14. Has your child ever experienced any of the following medical conditions:
a. Neurological problems (e.g., epilepsy, meningitis, cerebral palsy, encephalitis, Tourette's
    syndrome, brain tumour, other)   YES   NO
    If yes, please specify: _____

_____

_____

b. Depression   YES   NO
   If yes, please specify: _____

_____

_____

c.   Memory problems   YES   NO
   If yes, please specify: _____

_____

_____

d.   Problems with their vision: YES   NO
   If yes, please specify: _____

_____

_____

e. Problems with their hearing (e.g. difficulty hearing, hearing aids, grommets): YES
    NO

    If yes, please specify (please include details on how this affected their language
    development): _____

    _____

    _____

f. Is he/she currently taking any prescription medication?   YES   NO
    If yes, what medication(s)? _____

    _____

    _____

Parent / Guardian Information

Please indicate here if child is adopted: _____

*Please note that information on the primary caregiver is required. If the primary caregiver is
not the biological or adoptive mother or father, please place their information under
"Guardian".*

What is the total monthly income of your household? (Tick the appropriate block):

[NOTE: This should be total household income, not personal income]

0 – R2999	R3000 – R6299	R6300 – R 10 499	R10 500 – R 14599
R14 600 – R18 799	R18 800 – R22 999	R23 000 – R26 999	R27 000 – R31 299
R31 300 – R35 499	R35 500 - R39 499	R39 500 – R43 750	more than R43 750
What is the estimated value of your total monthly household income: R			

Highest level of education completed for… (please circle number):	Mother	Father	Guardian
1) 0 years (Never went to school)	1	1	1
2) Grade 1	2	2	2
3) Grade 2	3	3	3
4) Grade 3 / Standard 1	4	4	4
5) Grade 4 / Standard 2	5	5	5
6) Grade 5 / Standard 3	6	6	6
7) Grade 6 / Standard 4	7	7	7
8) Grade 7 / Standard 5 [Completed primary school]	8	8	8
9) Grade 8 / Standard 6	9	9	9
10) Grade 9 / Standard 7	10	10	10
11) Grade 10 / Standard 8	11	11	11
12) Grade 11 / Standard 9	12	12	12
13) Grade 12 / Standard 10 [Matric]	13	13	13
14) Tertiary education: Higher education certificate	14	14	14
15) Tertiary education: Diploma received	15	15	15
16) Tertiary education: Bachelor's degree received	16	16	16
17) Tertiary education: Post graduate degree received	17	17	17
18) Don't know	18	18	18

Parental employment (Please circle appropriate number):	Mother	Father	Guardian
1. Higher executives, owners of large businesses, major professionals (e.g. doctors, lawyers)	1	1	1
2. Business managers of medium sized businesses, professions like nurses, opticians, pharmacists, social workers, teachers, accountants	2	2	2
3. Administrative personnel, managers, owners/ sole proprietors of small businesses (decorator, actor, reporter, travel agent)	3	3	3
4. Clerical and sales, technicians (e.g. bank teller, bookkeeper, clerk, draftsperson, timekeeper, secretary)	4	4	4
5. Skilled manual – usually having had training (e.g., baker, barber, chef, electrician, fireman, machinist, mechanic, welder, police, plumber, electrician)	5	5	5
6. Semi-skilled (e.g. hospital aide, painter, bartender, bus driver, cook, garage guard, checker, waiter, machine operator)	6	6	6
7. Unskilled (e.g. attendant, janitor, construction helper, unspecified labour, porter)	7	7	7
8. Homemaker	8	8	8
9. Student, disabled, no occupation	9	9	9

Which of the following items, in working order, does your household have?	Yes	No
1. A refrigerator or freezer	Yes	No
2. A vacuum cleaner or polisher	Yes	No
3. A television	Yes	No
4. A hi-fi or music centre (radio excluded)	Yes	No
5. A microwave oven	Yes	No
6. A washing machine	Yes	No
7. A video cassette recorder or DVD player	Yes	No

Which of the following do you have in your home?	Yes	No
1. Running water	Yes	No
2. A domestic servant	Yes	No
3. At least one car	Yes	No
4. A flush toilet	Yes	No
5. A built-in kitchen sink	Yes	No
6. An electric stove or hotplate	Yes	No
7. A working telephone / cellular phone	Yes	No

Do you personally do any of the following?		
1. Shop at supermarkets	Yes	No
2. Use financial services such as a bank account, ATM card or credit card	Yes	No
3. Have an account or credit card at a retail store	Yes	No

Thank you for your participation!

Appendix G

Parent interview 2: Child temperament

Date: _____   Child's Name: _____

Parent's Name: _____   Relationship to Child: _____

Thank you for agreeing to participate in our research. Today I am going to continue the interview about your son's behaviour toward you, your family members, and toward other people. First, to ensure our records are accurate, please could you tell me your son's date of birth:

DoB: _____ (eg. 15 Feb 2001 – *use this format*).

CBQ: Temperament

I am going to ask about how your son reacts to a number of situation. I want you to tell me what your son's reaction is likely to be if this happens. There are no "correct" answers, Children naturally differ in their reactions, and it is these differences that we are trying to learn about. Please say if the statement is "true" or "untrue" based on his behaviour in the last 6 months.

First ask if true or untrue. Then get whether it's extremely, quite, or slightly.

		Untrue			Neither	True		
		Extremely	*Quite*	*Slightly*		*Slightly*	*Quite*	*Extremely*
1.	He always seems to be in a big hurry to get from one place to another.	1	2	3	4	5	6	7
2.	He gets quite frustrated when prevented from doing something he wants to do.	1	2	3	4	5	6	7
3.	When drawing or colouring in a book, he shows strong concentration.	1	2	3	4	5	6	7

4.	He likes going down high slides or other adventurous activities.	1	2	3	4	5	6	7
5.	He is quite upset by a little cut or bruise.	1	2	3	4	5	6	7
6.	He prepares for trips and outings by planning things he'll need.	1	2	3	4	5	6	7
7.	He often rushes into new situations.	1	2	3	4	5	6	7
8.	He tends to become sad if the family's plans don't work out.	1	2	3	4	5	6	7
9.	He likes being sung to.	1	2	3	4	5	6	7
10.	He seems to be at ease with almost any person.	1	2	3	4	5	6	7
11.	He is afraid of burglars or the "boogie man".	1	2	3	4	5	6	7
12.	He notices it when parents are wearing new clothing.	1	2	3	4	5	6	7
13.	He prefers quiet activities to active games.	7	6	5	4	3	2	1
14.	When he is angry about something, he tends to stay upset for ten minutes or longer.	1	2	3	4	5	6	7
15.	When building or putting something together, he becomes very involved in what he is doing and works for long periods.	1	2	3	4	5	6	7

16.	He likes to go high and fast when pushed on a swing.	1	2	3	4	5	6	7
17.	He seems to feel depressed when unable to accomplish some task.	1	2	3	4	5	6	7
18.	He is good at following instructions.	1	2	3	4	5	6	7
19.	He takes a long time in approaching new situations.	7	6	5	4	3	2	1
20.	He hardly ever complains when ill with a cold.	7	6	5	4	3	2	1
21.	He likes the sound of words, such as nursery rhymes.	1	2	3	4	5	6	7
22.	He is sometimes shy even around people he has known a long time.	7	6	5	4	3	2	1
23.	He is very difficult to sooth when he has become upset.	1	2	3	4	5	6	7
24.	He is quickly aware of new items in the house.	1	2	3	4	5	6	7
25.	He is full of energy, even in the evening.	1	2	3	4	5	6	7
26.	He is not afraid of the dark.	7	6	5	4	3	2	1
27.	He sometimes becomes absorbed in a picture book and looks at it for a long time.	1	2	3	4	5	6	7
28.	He likes rough and rowdy games.	1	2	3	4	5	6	7

29.	He does not get very upset when he gets a minor cut or bruise.	7	6	5	4	3	2	1
30.	When he has been told a place is dangerous, he approaches it slowly and cautiously.	1	2	3	4	5	6	7
31.	He is slow and unhurried in deciding what to do next.	7	6	5	4	3	2	1
32.	He gets angry when he can't find something he wants to play with.	1	2	3	4	5	6	7
33.	He enjoys gentle rhythmic activities such as rocking or swaying.	1	2	3	4	5	6	7
34.	He sometimes turns away shyly from a new person.	7	6	5	4	3	2	1
35.	He becomes upset when loved relatives or friends are getting ready to leave following a visit.	1	2	3	4	5	6	7
36.	He comments when a parent has changed their appearance.	1	2	3	4	5	6	7

OR

EATQ: Temperament

I am going to ask about how your son reacts to a number of situations. I want you to tell me what your son's reaction is likely to be if this happens. There are no "correct" answers, Children naturally differ in their reactions, and it is these differences that we are trying to learn about. Please say if the statement is "true" or "untrue" based on his behaviour in the last 6 months.

First ask if true or untrue. Then get whether it's almost always or usually. Note: Sometimes is middle option.

		Untrue		Sometimes true, sometimes untrue	True	
		Almost Always	*Usually*		*Slightly*	*Quite*
1.	He worries about getting into trouble.	1	2	3	4	5
2.	When he is angry with something, he says thing he knows will hurt that person's feelings.	1	2	3	4	5
3.	He has a hard time finishing things on time.	5	4	3	2	1
4.	He thinks travelling to places like India or going on an African safari would be exciting.	1	2	3	4	5
5.	If he is having a problem with someone, he usually tries to deal with it right away.	1	2	3	4	5
6.	He has a hard time waiting for his turn to speak when excited.	5	4	3	2	1
7.	He often does not seem to enjoy things as much as his friends.	1	2	3	4	5
8.	He opens presents before he is supposed to.	5	4	3	2	1
9.	He would be frightened by the thought of skiing fast down a steep slope.	5	4	3	2	1
10.	Some days he feels like crying over little things.	1	2	3	4	5
11.	If he is very angry, he might hit someone.	1	2	3	4	5
12.	He likes taking care of other people.	1	2	3	4	5

13.	He likes to be able to share his private thoughts with someone else.	1	2	3	4	5
14.	He usually does something fun a while before starting his homework, even though he is not supposed to.	5	4	3	2	1
15.	He finds it easy to really concentrate on a problem.	1	2	3	4	5
16.	He thinks it would be exciting to more to a new city.	1	2	3	4	5
17.	When asked to do something, he does it right away, even if he doesn't want to.	1	2	3	4	5
18.	He would like to be able to spend time with a good friend every day.	1	2	3	4	5
19.	He tends to be rude to people he doesn't like.	1	2	3	4	5
20.	He is annoyed by little things other kids do.	1	2	3	4	5
21.	He gets very irritated when someone criticises him.	1	2	3	4	5
22.	When interrupted or distracted, he forgets what he was about to say.	5	4	3	2	1
23.	He is more likely to do something he shouldn't do the more he tries to stop himself.	5	4	3	2	1
24.	He enjoys exchanging hugs with people he likes.	1	2	3	4	5
25.	He tends to try to blame mistakes on someone else.	1	2	3	4	5
26.	He is sad more often than other people realise.	1	2	3	4	5

27.	He can generally think of something to say, even with strangers.	5	4	3	2	1
28.	He wouldn't be afraid to try a risky sport like deep sea diving.	1	2	3	4	5
29.	He expresses a desire to travel to exotic places when he hears about them.	1	2	3	4	5
30.	He worries about our family when he is not with us.	1	2	3	4	5
31.	He gets irritated when I will not take him someplace he wants to go.	1	2	3	4	5
32.	He slams doors when angry.	1	2	3	4	5
33.	He is hardly ever sad, even when lots of things are going wrong.	5	4	3	2	1
34.	He would like driving a race car.	1	2	3	4	5
35.	He has a difficult time tuning out background noise and concentrating when trying to study.	5	4	3	2	1
36.	He usually finishes his homework before it is due.	1	2	3	4	5
37.	He likes it when something exciting and different happens at schools.	1	2	3	4	5
38.	He usually gets started right away on difficulty assignments.	1	2	3	4	5
39.	He is good at keeping track of several different things that are happening around him.	1	2	3	4	5

40.	He is energized by being in large crowds of people.	1	2	3	4	5
41.	He makes fun of how other people look.	1	2	3	4	5
42.	He doesn't criticise others.	5	4	3	2	1
43.	He wants to have close relationships with other people.	1	2	3	4	5
44.	He is shy.	1	2	3	4	5
45.	He gets irritated when he has to stop doing something he is enjoying.	1	2	3	4	5
46.	He usually puts off working on a project until it is due.	5	4	3	2	1
47.	He is able to stop himself from laughing at inappropriate times.	1	2	3	4	5
48.	He is afraid of the idea of my dying or leaving him.	1	2	3	4	5
49.	Often when he is in the middle of doing one thing he then goes off to do something else without finishing it.	5	4	3	2	1
50.	He is not shy.	5	4	3	2	1
51.	He is quite a warm and friendly person.	1	2	3	4	5
52.	He sometimes seems sad even when he should be enjoying himself, like at Christmas or on a trip.	1	2	3	4	5
53.	He doesn't enjoy playing cricket or other ball games because he is afraid of the ball.	1	2	3	4	5
54.	He likes meeting new people.	5	4	3	2	1

Appendix H

Parent interview 1: Empathic behaviours and parenting style

Date: Child's Name:

Parent's Name: Relationship to Child:

Use son's name to make it more personal. Phrase as questions, as conversationally and naturally as possible.

Thank you for agreeing to participate in our research. Today I would like to ask you several questions to help me better understand your son. As his mother/father, you can provide unique insight into how he behaves in different environments. I would like to ask you about how he behaves around friends or other children, how well he is able to relate to others, and finally about his behaviour at home. If a question is unclear or you aren't sure which answer best suits your son, we can discuss the question in more depth and go over some examples of your son's behaviour that you may have in mind.

EQ: How son relates to others

Now I am going to ask about how well your son relates to other children. For these questions, I would like you to answer whether you agree or disagree.

First ask if they agree or disagree, then get whether it's definitely or slightly.

		Definitely Agree	**Slightly Agree**	**Slightly Disagree**	**Definitely Disagree**
E1.	My son likes to look after other people.	2	1	0	0
E2.	My son often doesn't understand why some things upset other people so much.	0	0	1	2
E4.	My son would not cry or get upset if a character in a film died.	0	0	1	2
E6.	My son is quick to notice when people are joking.	2	1	0	0

E7.	My son cuts up worms, or pulls the legs off insects.	0	0	1	2
E9.	My son has stolen something he wanted from his sibling or friend.	0	0	1	2
E13.	My son has trouble forming friendships.	0	0	1	2
E14.	When playing with other children, my son spontaneously (that means without being told) takes turns and shares toys.	2	1	0	0
E17.	My son can be blunt giving his opinions, even when these may upset someone.	0	0	1	2
E18.	My son would enjoy looking after a pet.	2	1	0	0
E20.	My son is often rude or impolite without realising it.	0	0	1	2
E23.	My son has been in trouble for physical bullying.	0	0	1	2
E26.	At school, when my son understands something he can easily explain it clearly to others.	2	1	0	0
E28.	My son has one or two close friends, as well as several other friends.	2	1	0	0
E30.	My son listens to others' opinions, even when different from his own.	2	1	0	0
E31.	My son shows concern when others are upset.	2	1	0	0
E33.	My son can seem so preoccupied (caught up with) with his own thoughts that he doesn't notice others getting bored.	0	0	1	2
E36.	My son blames other children for things that he himself has done.	0	0	1	2
E37.	My son gets very upset if he sees an animal in pain.	2	1	0	0
E40.	My son sometimes pushes or pinches someone if they are annoying him.	0	0	1	2
E42.	My son can easily tell when another person wants to enter into conversation with him.	2	1	0	0

E43.	My son is good at negotiating for what he wants.	2	1	0	0
E45.	My son would worry about how another child would feel if they weren't invited to a party.	2	1	0	0
E48.	My son gets upset at seeing others crying or in pain.	2	1	0	0
E52.	My son likes to help new children fit in in class.	2	1	0	0
E53.	My son has been in trouble for name-calling or teasing.	0	0	1	2
E55.	My son tends to use physical aggression to get what he wants.	0	0	1	2

PSDQ: Your son and your family

Now I would like to ask questions about your son and your family, and specifically about how your son responds to you. Some of the questions focus on discipline and dealing with disruptive behaviours. These questions were designed for typically developing children, so they may not all be appropriate for you son, but please try answer as accurately as you can.

Read statement and then prompt parents with "never, sometimes, often, or always". If parent stuck, ask if their child ever does it: if "no", check whether "never or sometimes"; if "yes", check frequency.

		Never	Sometimes	About Half of the Time	Often	Always
1.	I am responsive to my child's feelings and needs.	1	2	3	4	5
2.	I use physical consequences as a way of disciplining my child.	1	2	3	4	5
3.	I take my child's desires into account before asking him to do something.	1	2	3	4	5

4.	When my child asks why he has to conform, I state: because I said so, or I am your parent and I want you to.	1	2	3	4	5
5.	I explain to my child how I feel about his good and bad behaviour.	1	2	3	4	5
6.	I spank when my child is disobedient.	1	2	3	4	5
7.	I encourage my child to talk about his troubles.	1	2	3	4	5
8.	I find it difficult to discipline my child.	1	2	3	4	5
9.	I encourage my child to freely express himself even when disagreeing with his parents.	1	2	3	4	5
10.	I discipline by taking privileges away from my child with little if any explanations.	1	2	3	4	5
11.	I emphasize the reasons for rules.	1	2	3	4	5
12.	I give comfort and understanding when my child is upset.	1	2	3	4	5
13.	I yell or shout when my child misbehaves.	1	2	3	4	5
14.	I give praise when my child is good.	1	2	3	4	5
15.	I give into my child when he causes a commotion about something.	1	2	3	4	5
16.	I explode in anger towards my child.	1	2	3	4	5

17.	I threaten my child with consequences more often than actually giving it.	1	2	3	4	5
18.	I take into account my child's preferences in making plans for the family.	1	2	3	4	5
19.	I grab my child when being disobedient.	1	2	3	4	5
20.	I state consequences to my child and do not actually do them.	1	2	3	4	5
21.	I show respect for my child's opinions by encouraging him to express them.	1	2	3	4	5
22.	I allow my child to give input into family rules.	1	2	3	4	5
23.	I scold and criticize to make my child improve.	1	2	3	4	5
24.	I spoil my child.	1	2	3	4	5
25.	I give my child reasons why rules should be obeyed.	1	2	3	4	5
26.	I use threats as a consequence with little or no justification.	1	2	3	4	5
27.	I have warm and intimate times together with my child.	1	2	3	4	5
28.	I help my child to understand the impact of behaviour by encouraging my child to talk about the consequences of his own actions.	1	2	3	4	5

29.	I scold or criticize when my child's behaviour doesn't meet my expectations.	1	2	3	4	5
30.	I explain the consequences of his behaviour.	1	2	3	4	5
31.	I slap my child when he misbehaves.	1	2	3	4	5

– END –

Appendix I

Association between social competence and surgency within the non-verbal subgroup

Table 12

Hierarchical regression of social competence on surgency within the non-verbal subgroup

	B	SE	β	t	p
Constant	3.42	.74		4.63	<.001***
Age (months)	-.00	.00	-.27	-1.35	.189
Race	-.04	.10	-.09	-.41	.684
Language	.05	.25	.04	.22	.830
Total household income	-.01	.05	-.06	-.28	.779
Highest level of education	.02	.04	.11	.55	.584
Social competence	.02	.03	.13	.66	.518

$*p < .05. **p < .01. ***p < .001$

Appendix J

Association between social competence and negative affectivity within the non-verbal subgroup

Table 13

Hierarchical regression of social competence on negative affectivity within the non-verbal subgroup

	B	SE	β	t	p
Constant	2.22	.85		2.62	.014*
Age (months)	<.01	<.01	.18	.92	.368
Race	.02	.11	.04	.19	.855
Language	.03	.29	.02	.09	.927
Total household income	-.04	.05	-.16	-.77	.451
Highest level of education	.01	.05	.04	.18	.861
Social competence	.06	.04	.34	1.74	.093

*$p < .05$. **$p < .01$. ***$p < .001$

Appendix K

Association between social competence and authoritative parenting within the non-verbal subgroup

Table 16

Hierarchical regression of social competence on authoritative parenting within the non-verbal subgroup

	B	SE	β	t	p
Constant	2.95	.54		5.53	<.001***
Age (months)	<-.01	<.01	-.07	-.38	.711
Race	.06	.07	.16	.80	.434
Language	-.16	.18	-.16	-.91	.372
Total household income	-.01	.03	-.04	-.21	.835
Highest level of education	.04	.03	.24	1.27	.214
Social competence	.03	.02	.25	1.31	.202

*p < .05. **p < .01. ***p < .001

Appendix L

Association between social competence and authoritarian parenting within the non-verbal subgroup

Table 17

Hierarchical regression of social competence on authoritarian parenting within the non-verbal subgroup

	B	SE	β	t	p
Constant	1.85	.48		3.84	<.001***
Age (months)	<-.01	.00	-.26	-1.34	.193
Race	.01	.06	.04	.21	.838
Language	.10	.16	.11	.59	.562
Total household income	-.04	.03	-.24	-1.18	.249
Highest level of education	.02	.03	.12	.60	.555
Social competence	.03	.02	.28	1.44	.160

*p < .05. **p < .01. ***p < .001

Appendix M

Association between social competence and permissive parenting within the non-verbal subgroup

Table 18

Hierarchical regression of social competence on permissive parenting within the non-verbal subgroup

	B	SE	β	t	p
Constant	1.67	.72		2.33	.027*
Age (months)	<.00	.00	.19	1.08	.291
Race	-.02	.09	-.04	-.19	.853
Language	.65	.24	.46	2.71	**.012***
Total household income	-.01	.05	-.05	-.25	.808
Highest level of education	-.01	.04	-.04	-.21	.834
Social competence	.01	.03	.03	.18	.860

*$p < .05$. **$p < .01$. ***$p < .001$