The Role of Social Cognition and Prosocial Behaviour

in relation to the Socio-emotional Functioning

of Primary Aged Children with Specific Language Impairment

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Abstract

Background and Aims: Children with language impairments often experience difficulties with their socio-emotional functioning and poorly developed prosocial behaviour. However, the nature of the association between language impairment and difficulties with socio-emotional functioning remains unclear. The social cognition skills of a group of primary-aged children (6 -11 years old) with Specific Language Impairment (SLI) were examined in relation to their teachers’ ratings of socio-emotional functioning.

Sample: Forty-two children with SLI were individually matched with 42 children for chronological age and non-verbal cognitive ability, and 42 children for receptive language ability. The children all attended mainstream primary schools or one Language Unit.

Methods: Four aspects of social cognition were directly assessed: emotion identification, emotion labelling, inferring the causes of emotions, and knowledge of conflict resolution strategies. The children’s socio-emotional functioning was assessed using the Strengths and Difficulties questionnaire (SDQ), a standardised measure, completed by their teachers. Associations between children’s performance on tasks of social cognition and children’s socio-emotional functioning were explored.

Results: Significant group differences were found for all social cognition tasks. The SLI group was rated to experience significantly more problems with socio-emotional functioning by their teachers than both control groups, indicating problems with all aspects of socio-emotional functioning. Social cognition and prosocial behaviour, but not language ability, predicted teacher-rated behavioural, emotional and social difficulties for the SLI group.

Conclusion: The results challenge current understanding of socio-emotional functioning in children with SLI by pointing to the crucial role of social cognition and prosocial behaviour. Factors other than expressive and receptive language play a role in the socio-emotional functioning of children with SLI.
1. Background

1.1 Introduction

Social cognition is an umbrella term that can refer to a wide range of behaviours related to the understanding of others’ emotional or mental states (Botting & Conti-Ramsden, 2008; Marton, Abramoff, & Rosenzweig, 2005). This includes the ability to identify, label and infer emotions, and for social problem solving and conflict resolution (Sharp, Fonagy, & Goodyer, 2008).

Language competence plays a critical role in social cognition in pre-school and school-aged children and adolescents (Im-Bolter, Cohen, & Farnia, 2013; Milligan, Astington, & Dack, 2007), for typical and clinical populations (Farrar et al., 2009; Peterson & Siegal, 2000), by facilitating factors which impact on social relationships and behavioural adjustment and, in turn, affect successful socio-emotional functioning (Astington & Baird, 2005). By corollary, studies have demonstrated that children with language impairments commonly experience difficulties with their socio-emotional functioning (Botting & Conti-Ramsden, 2000; Clegg, Hollis, Mawhood, & Rutter, 2005; van Daal, Verhoeven, & van Balkom, 2007), show difficulties in social perspective taking (Gillott, Furniss, & Walters, 2004; Loukusa, Makinen, Kuusikko-Gauffin, Ebeling, & Moilanen, 2014), and have immature social problem solving and conflict resolution abilities (Marton et al., 2005). However, the association between language competence and socio-emotional functioning has not consistently been demonstrated (Fujiki, Brinton, & Clarke, 2002; Fujiki, Brinton, Morgan, & Hart, 1999; Hart, Fujiki, Brinton, & Hart, 2004; Yew & O’Kearney, 2013). It has been hypothesised that social cognition may have a mediating role between language competence and socio-emotional functioning (Botting & Conti-Ramsden, 2008). The current study explores this relationship in a cohort of primary-aged children (6-11 year olds) with Specific Language Impairment (SLI).
1.2 The links between Language Difficulties and Difficulties with Socio-emotional Functioning in Children with SLI

There has been much debate about the diagnostic criteria and terminology used to describe the difficulties experienced by children with SLI (Bishop, 2014; Ebbels, 2014). There is a general consensus that SLI is a language learning disorder where a child shows significant deficits in language ability in the absence of other explanatory causes (ICD-10; World Health Organisation (WHO) 1994). Recent research has shown that children with SLI also show difficulties in areas of functioning not restricted to their language abilities. These may include, among others, difficulties with executive functioning and processing capacity and a range of motor difficulties (Im-Bolter, Johnson, & Pascual-Leone, 2006; Finlay & McPhillips, 2013).

Children with SLI are also significantly more likely to show difficulties with various aspects of socio-emotional functioning, and are at greater risk of developing behavioural, emotional and social difficulties than typically developing peers (Yew & O’Kearney, 2013). As pointed out by Lindsay and Dockrell (2012a), difficulties with socio-emotional functioning include a variety of difficulties in related but different domains of development. The main areas of difficulty for children with SLI are the development of successful peer relationships (Fujiki, Brinton, Issacson, & Summers, 2001; Lindsay, Dockrell, & Strand, 2007), and the risk of developing emotional difficulties, especially in studies of older primary aged children and adolescents (Conti-Ramsden & Botting, 2008; Durkin & Conti-Ramsden, 2007; Lindsay & Dockrell, 2012b; Redmond & Rice, 2002). Studies have also pointed out to less developed prosocial behaviour with raised concerns reported by both teachers (Hart et al., 2004; Lindsay & Dockrell, 2012a; 2012b; Timler, 2008), and parents (Stanton-Chapman, Justice, Skibbe, & Grant, 2007). There are also reports of increased behavioural difficulties, in particular, conduct problems in early childhood (Tomblin, Zhang, Buckwalter, & Catts, 2000). Significant difficulties with hyperactivity/attention problems in younger and older primary
aged children have often been reported (Lundervold, Heimann, & Manger, 2008; Lindsay et al., 2007).

Several dimensions of the language system have been associated with difficulties with socio-emotional functioning. Difficulties in using language to express oneself (expressive language ability) have been associated with increased difficulties in socio-emotional functioning (Caulfield, Fischel, DeBaryshe, & Whitehurst, 1989), predicting behavioural difficulties at 10 and 12 years (Lindsay et al., 2007). Studies have also found significant associations between a difficulty understanding language (receptive language ability) and the development of behavioural, emotional and social difficulties (Beitchman et al., 2001; Clegg, Law, Rush, Peters, & Roulstone, 2015; Conti-Ramsden & Botting, 2004; Lindsay, Dockrell, & Mackie, 2008), predicting later problems with friendships (Durkin & Conti-Ramsden, 2007). However, children with receptive language impairments have been found to be at a greater risk for developing difficulties with socio-emotional functioning than children presenting only with expressive language impairments (Toppelberg & Shapiro, 2000). The relationship between language and behavioural, emotional and social difficulties has also been questioned. Poor performance of children with SLI on tasks measuring their ability to access and participate in groups was not related to their language ability (Brinton, Fujiki, Spencer, & Robinson, 1997), and children with SLI performed poorly in a task requiring them to work together with their peers in cooperative learning groups even when the task was non-verbal (Brinton, Fujiki, & Higbee, 1998a). Moreover, children with SLI demonstrated poor negotiation skills even when the social situation posed linguistic demands that were well within their expressive language abilities as assessed by standardised language tests or when the linguistic demand of the task used was low (Brinton, Fujiki, & Mckee, 1998b; Timler, 2008). Similarly, the social knowledge of children with SLI, as measured in a conflict resolution task by Marton et al. (2005), was not related to their language impairment.
The age of the child is also an important variable. Levels of behavioural, emotional and social difficulties are reportedly higher among older relative to younger children with SLI, particularly for peer problems and prosocial behaviour (Lindsay & Dockrell, 2012a). Questions about the continuity of levels of behavioural, emotional and social difficulties have also been considered. Continuity in levels of difficulties among children with SLI aged 4 to 8 years have been demonstrated (Benasich, Curtis, & Tallal, 1993), but other studies have reported that continuity of difficulties over time varies according to the type of behavioural, emotional and social difficulty under investigation. For example, difficulties with peer relationships have been shown to be stable whereas prevalence of hyperactivity reduced from 8 to 12 years (Lindsay et al., 2007). Thus studies which aim to examine the relationship between social cognition, language and socio-emotional functioning difficulties should consider age differences.

Together these studies question the direct relationship between language and socio-emotional functioning. Language ability alone does not consistently predict levels of socio-emotional functioning, and language ability is not the only essential prerequisite for the implementation of socio-emotional skills. There is a need to take into account children’s age as well as their strengths and weaknesses and to examine a wider range of cognitive, behavioural and emotional processes, in addition to language ability, which support children’s ability to be socially and emotionally successful (Clegg et al., 2015). The present study’s aim was to address these issues by considering the role of social cognition in the socio-emotional functioning of a large cohort of children with SLI at two different developmental phases of primary school education.

1.3 **Social Cognition Skills of Children with SLI**

Traditionally, social cognition in children with SLI was examined using tasks designed to assess theory of mind performance, such as false belief tasks, and then compared to children with ASD (Ziatas, Durkin, & Pratt, 1998). Initially, studies have suggested that children with SLI were successful on false belief tasks in comparison with participants with
ASD (Shields, Varley, Broks, & Simpson, 1996), whilst others have produced conflicting results (Norbury, 2005). Given the children’s language difficulties it was hypothesised that the linguistic demands of the task could reduce task performance. Miller (2001) demonstrated that children with SLI (4 - 7 years) performed similarly to chronological age matched peers when the linguistic complexity of the tasks was low, but their performance was similar to that of younger children when the linguistic complexity was high suggesting that some of the relationships observed might be due to task effects. Moreover, the failure to include language matched samples means that it is not possible to rule out other explanations of the children’s difficulties, such as their social experience. Children’s poor social experience and limited access to conversations have been reported as influencing task performance (Farmer, 2000; Farrant, Fletcher, & Maybery, 2006). Farmer’s study showed significant differences in social cognition scores and ratings of social competence between typically developing children and children with SLI attending a special school concluding that limited social experience and lack of rich conversational discourses may interact with the language problems of the children with SLI to affect their social cognition development.

We acknowledge that the term ‘social cognition’ covers a wide range of behaviours (Botting & Conti-Ramsden, 2008). Since the exact nature of the different aspects of social cognition is not fully agreed upon, we have adopted the term to apply to an understanding of others’ emotional or mental state, but acknowledge the fact that the implications of the studies reviewed may vary according to different aspects examined. The reliance in previous studies on false belief and false appearance tasks (Shields et al., 1996; Ziatas et al., 1998) does not, arguably, capture other aspects of social cognition, such as children’s understanding of emotions and ability to resolve conflicts. These aspects were the focus of the present study.
1.3.1 Emotion Identification and Emotion Labelling in Children with SLI

Being able to identify and interpret one’s own emotions, as well as the emotional reactions of others, has important implications for successful social functioning and relationship formation (Denham, 1998). Some previous studies pointed that there were no problems in the emotional identification of children with SLI. For example, children with SLI (9 -14 years) performed similarly to matched peers when asked to identify basic emotions but children were asked to identify only three emotions (happy, sad and angry) presented on photographed still faces in a forced choice situation, and, as a result, a ceiling effect was reached (Trauner, Ballantyne, Chase, & Tallal, 1993). Studies of preschool children using facial drawings and cartoon faces also found no significant differences between children with SLI and chronological age matched peers in their ability to identify four emotions (happiness, anger, fear, sadness) (Ford & Milosky, 2003; McCabe & Meller, 2004). Similar findings have been produced with children with SLI in the early stages of primary education (5 -8 years) when tasks examining the ability to match emotions (happy, sad, angry, afraid, disgusted, neutral) in photographs of children’s faces have been used (Loukusa et al., 2014).

In contrast, other studies have failed to corroborate these results. When presented with facial expressions from still faces depicting seven emotions (anger, fear, sadness, surprise, happiness, disgust, neutral) in a free labelling task, children (9 -12 years) with different types of learning disorders associated with verbal deficits were slower and less accurate than chronological age matched peers in identifying the emotions (Dimitrovsky, Spector, & Levy-Shiff, 2000). In the same vein, Spackman, Fujiki, Brinton, Nelson, and Allen (2006b) compared 5 to 8 and 9 to 12 year old children with SLI with typically developing peers using a forced-choice task to assess their ability to identify six emotions (happiness, anger, disgust, fear, sadness, surprise) depicted in still faces, and concluded that children with SLI identified the facial expressions of happiness, anger, sadness and fear with the same accuracy as typically developing children, but they were significantly less accurate than their peers at identifying surprise and disgust. Confusions in emotion identification and
labelling were further investigated by Delaunay-El Allam, Guidetti, Chaix, and Reilly (2011) who used a free labelling task of five emotions depicted by still face photographs in a study of 12 children with SLI aged 6 to 10 years. The researchers concluded that children with SLI were less accurate in emotion labelling than typically developing children (although results did not reach statistical significance) and that the semantic knowledge of anger and sadness emotion concepts is deficient in this group of children.

In addition to identifying and labelling emotions, a child must also attend to, and use contextual information to predict another’s emotional response. Even if children with SLI are able to identify facial expressions, they may not be able to use contextual information to make appropriate emotional inferences. Using short scenarios, Spackman, Fujiki, and Brinton (2006a) and Ford and Milosky (2003) examined children’s ability to indicate the emotions that the character experienced. Children with SLI were less accurate in integrating emotion knowledge with event context to infer a character’s emotion than typically developing peers. In both studies, inferencing was easier for the emotion of happiness whereas more inferencing errors occurred for the emotion of anger.

1.3.2 Conflict Resolution Abilities of Children with SLI

Knowledge of effective strategies for resolution of conflicts with peers is an important aspect of social knowledge for children (Cillessen & Bellmore, 2002). The difficulties that children with SLI have with language, as well as emotional understanding, are likely to impact on their ability to resolve conflict situations. There is limited research examining conflict resolution strategies of children with SLI. Children with learning disabilities and language impairments have been found to be more passive than their peers in avoiding disagreements, less persuasive and less effective in cooperative group tasks (Bryan, Donahue, & Pearl, 1981). Preschool children with SLI were found to reconcile fewer conflicts than children with typically developing language by seeking adult contact, preferring to solve the conflict themselves (Brinton & Fujiki, 1999; Fujiki, Brinton, & Todd, 1996; Horowitz,
Jansson, Ljunberg, & Hedenbro, 2005; Rice, Sell, & Hadley, 1991; Redmond & Rice, 1998). School-age children with SLI were involved in more bullying episodes and exhibited more submissive and aggressive behaviours (Baker, Cantwell, & Mattison, 1980). When the ability of children with SLI to negotiate with two other chronological age matched peers in triad interactions was examined, children with SLI were found to use significantly fewer negotiation strategies, and those they used were at developmentally lower levels, than either of the partners (Brinton et al., 1998b). Children with SLI asserted their own choices and failed to request others’ opinions or to reach an agreement within the group.

In studies using hypothetical scenarios and role-play enactments of conflicts, children with SLI suggested fewer strategies to resolve conflicts than their peers with typically developing language. They showed particular difficulties in using strategies involving persuasion, asking questions to clarify situations or acquire more information, and taking into account the perspective of others (Stevens & Bliss, 1995). In contrast, children with SLI showed evidence of physically aggressive behaviour, or passive and withdrawn reactions, such as departing the scene without resolving the conflict or expecting a third person to solve the conflict to avoid the negotiation process (Marton et al., 2005).

1.4 Aims and Predictions

The aim of this study was to examine the social cognition skills of a group of primary-aged children with SLI in relation to their socio-emotional functioning as rated by their teachers. Given the lack of consistency in the literature of the importance of developmental phase, the study also examines whether children with SLI of different ages present differently in their social cognition and socio-emotional functioning.

To this end, a range of experimental tasks were devised to examine different aspects of children’s social cognition skills: emotion identification, emotion labelling, inferring the causes of emotions, and knowledge of conflict resolutions strategies. Comparisons were made between younger SLI participants (6 – 8 years) and older SLI participants (8 – 11 years).
years) on their performance on the social cognition tasks to examine developmental differences in the social cognition skills of children with SLI. The study also employed two matched groups of typically developing children to identify any developmental delays and to elucidate the role of language level on task performance. Children were matched on the basis of their receptive language ability because of evidence suggesting that the ability to understand and process verbal information is linked with the areas researched in this study (Clegg et al., 2005; Craig & Washington, 1993; Farmer, 2000; Ford & Milosky, 2003), and that children with receptive language impairment are at a greater risk for developing difficulties with their socio-emotional functioning than children presenting only with expressive language impairment (Toppelberg & Shapiro, 2000). The second reason was methodological since the ability to process verbal information is required for all social cognition tasks employed in the study and it was important to be able to relate this variable to performance on the tasks.

In addition, information about children’s socio-emotional functioning (including their prosocial behaviour) was obtained through a standardised behavioural questionnaire, completed by the children’s teachers. Comparisons were made between younger SLI participants (6 – 8 years) and older SLI participants (8 – 11 years) to investigate developmental differences in the socio-emotional functioning of children with SLI as reported by their teachers. In addition, comparisons were made with the two control groups to determine the extent of any difficulties with socio-emotional functioning children with SLI experience in comparison to typically developing peers. Finally, to investigate whether social cognition, language and non-cognitive profiles were related to ratings of socio-emotional functioning, the study explored associations between children's performance on social cognition tasks, information about children’s receptive and expressive language and non-verbal cognitive ability and children’s socio-emotional functioning, as rated by their teachers. We predicted that:

1. In terms of children’s social cognition skills:
a. Children with SLI would follow typical developmental patterns in their performance on social cognition tasks in that the performance of younger SLI participants was expected to be poorer than the performance of older SLI participants in all three social cognition tasks.

b. Children with SLI would perform significantly worse than typically developing children matched for chronological age but similarly to typically developing children matched for language ability on tasks of social cognition requiring only receptive language abilities.

2. In terms of teacher rated socio-emotional functioning:

a. Younger SLI participants (6 – 8 years) would be rated as experiencing less difficulties than older SLI participants (8 – 11 years).

b. Children with SLI would be rated as experiencing more difficulties than their typically developing peers matched for chronological age.

c. Children with SLI would be rated as experiencing less developed prosocial behaviour than their typically developing peers matched for chronological age.

3. Poor language ability of the children with SLI would be significantly related to ratings of socio-emotional functioning (including children’s prosocial behaviour), and specifically receptive language measures would correlate more strongly to measures of socio-emotional functioning than expressive language measures.

4. Performance on social cognition tasks would relate to teachers’ ratings of socio-emotional functioning for all three participant groups.

2. Method
2.1 Participants and Group Matching Procedures

Forty-two children with SLI were individually matched with 42 typically-developing children for chronological age and non-verbal cognitive ability (CA group) and 42 younger children for receptive language ability (LA group). All the children were screened through the use of standardised tests and tested on the Clinical Evaluation of Language Fundamentals – Revised (CELF-R; Semel, Wiig, & Secord, 1980), and the Raven’s Coloured Progressive Matrices (Raven’s CPM; Raven, Court, & Raven, 1986). For the identification of the SLI participants, school staff were asked to suggest children for the sample who had a language and communication difficulty, no known impairment in their physical, emotional or neurological development.

The criteria for the identification of the SLI group were: a) an age equivalent score on the CELF-R (Semel et al., 1980) at least 12 months below chronological age and/or Total Language Standard Score at least 1.5 standard deviations below the mean for chronological age and ;b) a score on Raven’s CPM no lower than the 25th percentile. A total of 42 children met the criteria for inclusion in the study and were aged 6 to 11;2 years. Thirty-seven were male and five were female representing the gender difference in children with SLI (Law, Boyle, Harris, Harkness, & Nye, 2000; Tomblin, 1996). Twenty-seven children had school identified special educational needs, and 15 had received a Statement of Special Educational Needs stating language and communication as their primary need (Department for Education and Skills, 2001). This statement is a legal document issued by the local educational authority detailing the needs of the child and how these should be addressed. Of the 42 children within the SLI group, 29 children attended four mainstream primary schools and 13 children attended a language unit attached to a primary school for part of their week, and were included in some of the lessons in the mainstream school’s classes. No receptive differences on the CELF-R or the Raven’s CPM ($t(40) = - .92, ns$) were found between children attending mainstream schools and a language unit within a mainstream school.
Thus, this variable is not considered further in the analyses. The SLI participants were also sub-divided into two age groups: participants from 6 to 8 years (25 children) and participants from 8:01 to 11:02 years (17 children).

The children with SLI were individually matched with a typically-developing group on gender, non-verbal ability and chronological age (CA). For the CA group, school staff of the same four primary schools were asked to suggest children from the same classes of the SLI participants who had no history of speech and language impairment, no known impairment in their physical, emotional or neurological development and no other academic difficulties. Children were screened by administering the standardised verbal and non-verbal tests administered for the identification of the SLI participants. From these results, a CA peer was selected for each child in the SLI group. Children within a matched pair had chronological ages that differed by no more than 3 months and ranged in age from 6 to 11:4 years. Their Raven’s CPM scores were in the same centile range as for the SLI participants and their mean non-verbal ability score was within the average range for their age. The CA group children had age appropriate language skills, defined as a CELF-R score above the 25th centile.

SLI participants were also matched with a second younger typically-developing group on their receptive language ability (LA). For each child with SLI, a match was identified who had the same raw score in the three receptive language sub-tests (Linguistic Concepts, Sentence Structure, and Oral Directions) on the CELF-R (Semel et al., 1980), but for whom this translated into a centile score above the 25th centile. The LA group children were also required to have age-appropriate non-verbal cognitive ability defined as a Raven’s CPM score above the 25th centile. The LA group consisted of 42 typically developing children ranging in age from 5 to 7:8 years. They were drawn from the same four mainstream primary schools and all had language skills and non-verbal ability scores within the average range for their age. The mean age of this group was 26 months lower than that of the SLI group and the CA group.
Children in all three groups had attended their current school for at least one academic year and English was their first language. Detailed characteristics of SLI participants and matched controls are shown in Table 1.

< Table 1 >

2.2 **Materials**

2.2.1 **General Procedure**

Each child was tested individually on two occasions. On the first visit, they were tested on the language and non-verbal measures, and on the second on the social cognition tasks. Teachers were given the SDQ questionnaires during the summer term of the academic year when the study took place and were asked to complete and return them to the researchers. In the case of the 13 children in the SLI group who attended a language unit attached to a primary school for part of their week, the language unit teacher was asked to complete the SDQ questionnaire as it was felt that they have a better knowledge of the child. Forty-two SDQ questionnaires were returned for the SLI and the CA groups and 39 for the LA group. All teachers had known the rated child for at least 7 months. The study was approved by the ethics committee of the Institute of Education, University of London and followed British Psychological Society guidelines. Consent for participation was obtained from parents and from schools and children were given the option not to take part in tasks.

2.2.2 **Selection and Control Measures**

**Language Assessment**

CELF-R consists of three sub-tests measuring receptive language and three sub-tests measuring expressive language (Semel et al., 1980). The receptive language subtests include: Linguistic Concepts, Sentence Structure and Oral Directions. Older children (8 to 11;2 years) were assessed by two more receptive language subtests: Word Classes and Semantic Relationships. The expressive language subtests are: Word Structure, Formulated
Sentences and Recalling Sentences. Older children were assessed by one more expressive language subtest: Sentence Assembly. CELF-R’s reliability is .77 and the validity with the Test of Language Development – Intermediate (TOLD-I) (Newcomer & Hammill, 1977) is .68, with the Peabody Picture Vocabulary – Revised (PPVT-R) (Dunn & Dunn, 1981) .52, and with the Wechsler Intelligence Scale for Children – Revised (WISC-R) (Wechsler, 1974) .42.

Non-Verbal Cognitive Ability

The Raven’s CPM presents children with a pattern with a section missing and children are required to select the item that would complete the pattern from a choice of four (Raven et al., 1986). The percentile score is reported: a cut-off at 25% indicates significantly low scores. Raven’s CPM demonstrates good reliability (reliability .80) and validity with the WISC-R (.91) (Wechsler, 1974), and with the Standford-Binet Intelligence Scales (.69) (Roid, 2003). The Matrices subtest of the British Ability Scales II (BAS II) was used for children in the LA group who were not old enough for the Raven’s CPM norms to be used. Children are required to identify the correct item to complete a grid of designs with a piece missing (reliability .85; validity with the WISC-III performance scale .47).

2.2.3 Socio-Emotional Functioning and Prosocial Behaviour

Children’s socio-emotional functioning and prosocial behaviour were assessed using the Strengths and Difficulties Questionnaire (SDQ: Goodman, 1997). SDQ is a 25-item-questionnaire providing a dimensional checklist-based assessment of psychological functioning for children 4-16 years-old. It asks about 25 attributes each in the form of a behavioural descriptor (e.g. ‘Considerate of other people’s feelings’). The rater is asked to comment whether this is ‘not true’, ‘somewhat true’ or ‘certainly true’. The 25 items are divided between four scales of five items each, generating scores for Conduct Problems, Hyperactivity, Emotional Symptoms, Peer Relationship Problems. These four scales are summed up to provide a Total Difficulties score. In addition, there is a five item Prosocial
scale that measures positive, actively helpful and friendly behaviours and resources in children, rather than difficulties. Thus, the Prosocial scale is not included in the Total Difficulties score because a lack of prosocial behaviour is conceptually different from the presence of difficulties with socio-emotional functioning assessed by the other four SDQ scales (Goodman, 1997). In all four SDQ scales, higher scores relate to poorer outcomes. The Prosocial scale is scored positively so that high scores are preferable, indicating the presence of more positive and adaptive behaviours and resources. The SDQ scale scores are used to categorise participants according to the extent of their difficulties as being in the Normal, Borderline or Abnormal range for each of the five subscales and the Total Difficulties score, using the published cut scores (available from http://www.sdqinfo.org/norms/UKNorm1.pdf). The concurrent and predictive validity of the SDQ as well as standardization data for the cut-off points for each scale and the Total Difficulties score have been set so that in a community sample approximately 80% of the participants are in the normal range, 10% of the participants are in the borderline range, and a further 10% are in the abnormal range on any given score (Meltzer, Gatward, Goodman, & Ford, 2000). The SDQ has also been shown to have satisfactory reliability, factor structure and prediction of DSM IV (APA, 1994) diagnoses (Goodman, 2001).

2.2.4 Social Cognition

Participants were presented with three experimental tasks measuring labelling and identifying emotions, inferring the causes of emotions and their knowledge of conflict resolution strategies.

Task 1: ‘Labelling and identifying emotions’ task.

The first social cognition task aimed to establish whether children can identify and appropriately label the four basic emotions: happiness, sadness, anger, and fear. Children were shown the first set of photographs and were asked to identify the expressions, first expressively, by naming, and prompted by the question “Please can you tell me what is this
boy / girl feeling?”. After having labelled the emotions, the researchers showed the second set of four photographs and asked the children to identify the expressions receptively, by pointing to the expression the researchers named by asking “Which of these children feel happy / sad / angry / frightened?” . The materials used were eight photographs portraying the four expressions – a set of four photographs for the first question and a set of four photographs for the second question - taken from a social skills programme, widely used in schools (Spence, 1995). The child photographs were used, and the male and female version was matched for the child’s gender. The photographs were presented in a random order.

Children were given a point for a correct answer. A Total Emotion Identification Score and a Total Emotion Labelling Score were measured out of 4.

Task 2: ‘Inferring the causes of emotion-eliciting context’ task.

The second task aimed to examine the ability to infer the emotions elicited by social situations. The materials used were four felt material faces portraying happy, sad, angry and frightened expressions, based on stories from a publicly available guide to emotional literacy (National Deaf Children’s Society & Reed, 2001).

The second task was presented to children through a software programme developed for the present study and presented using the researcher’s laptop. Initially, children were trained to use the software programme, and were instructed in the use of the different buttons on the keyboard. The participants then heard four stories. In each case, the scenario was supported by pictures of the story described where the character’s face was blank. After listening to each story, the children were asked to choose from a selection of four pictures the face that shows what the character was feeling by pressing a button on the keyboard. Four emotions were presented: happy, sad, angry and frightened. Children were also given the choice to press a button indicating that they had not understood the task or that they do not know how the character would feel.
Children were given a point for a correct answer. A *Total Emotion Identification Score* was then measured out of 4.

**Task 3:** ‘Conflict resolution abilities’ task.

The third social cognition task aimed to assess children's knowledge of a range of conflict resolution strategies. Four hypothetical conflict scenarios, taken from and adopted by the 'Child Role Play Measure' (Dodge, McClaskey, & Feldman, 1985), were presented to children. These are stories which describe situations in which the child's task is to preserve self-integrity while maintaining peer status. The scoring system developed by Dodge et al. (1985) with a high level of inter-rater agreement (Cohen’s kappa .92) was adopted for this study. For each scenario, the scale has six possible categories ranging from low-level conflict resolution strategies (indicating that the child did not respond or did not offer any conflict resolution strategies) to high-level conflict resolution strategies (indicating a response of an age-appropriate and sophisticated conflict resolution strategy). Since four hypothetical scenarios were presented, children could receive a minimum score of 0 and a maximum score of 24. The researchers followed the procedures set by the designing researchers (Dodge et al., 1985).

### 2.2.4.1 General scores derived from the three social cognition tasks.

The scores from the three experimental tasks described above were combined to create a *Social Cognition Composite Score*. The *Social Cognition Composite Score* was derived from two different general scores: a *Total Emotion Prediction Score* (calculated from Tasks 1 and 2) and a *Total Conflict Resolution Strategies Score* (from Task 3).

A *Total Emotion Prediction Score* was calculated from the first two experimental tasks. That was based on:

1. The Total Emotion Labelling Score (0 to 4) and Total Emotion Identification Score (0 to 4) from Task 1,
2. The Total Emotion Identification Score from Task 2 (0 to 4)

Thus, for the general Total Emotion Prediction Score children could receive a minimum score of 0 and a maximum score of 12.

The Total Emotion Prediction Score (0 to 12) and the Total Conflict Resolution Strategies Score (0 to 24) were combined to yield a Social Cognition Composite Score. Children could receive a minimum of 0 and a maximum of 36. The Social Cognition Composite Score is unequally-weighted due to the different score ranges of the component subscales.

3. Results

3.1 Results related to Hypothesis 1: Performance on Social Cognition Tasks

Task 1: ‘Labelling and identifying emotions’ task.

Within group comparisons between younger SLI participants (below 8 years) and older SLI participants (above 8 years) revealed that, in most cases, the younger SLI participants were less successful in their labelling (Happiness: 96.0% vs 100%, Sadness: 92.0% vs 88.2%; Anger: 68.0% vs 88.2%; Fear: 32.0% vs 17.6%) and identification of emotions (Happiness: 96.0% vs 100%; 64.0% vs 76.5%; Anger: 76.0% vs 76.5%; Fear: 68.0% vs 76.5) than the older SLI participants. Pearson’s chi-square tests revealed that there was no significant association between the two age groups and the ability of the children from the two age groups to label (happiness: $\chi^2 (1) = 1.01$, n.s; sadness: $\chi^2 (1) = 2.56$, n.s; anger: $\chi^2 (1) = 2.04$, n.s; fear: $\chi^2 (1) = 2.94$, n.s) or identify (happiness: $\chi^2 (1) = 1.01$, n.s; sadness: $\chi^2 (1) = 2.05$, n.s; anger: $\chi^2 (1) = 0.07$, n.s; fear: $\chi^2 (1) = 2.13$, n.s) any of the four basic emotions. Within group comparisons for the Total Scores between the younger and the older SLI participants showed that younger SLI participants scored less on the Total Emotion Labelling Score ($M = 2.84$, $SD = .89$) than the older SLI participants ($M = 2.94$, $SD = .65$). This difference was not significant $t(40) = .39$, ns. Younger SLI participants
also scored less on the Total Emotion Identification Score ($M = 2.96$, $SD = 1.17$) than the older SLI participants ($M = 3.29$, $SD = 1.04$), a difference which was however not significant $t(40) = .94$, $ns$.

Table 2 presents percentages of correct responses for the emotion labelling and emotion identification task across the three participant groups as well as mean scores (SDs) for the Total Emotion Labelling and Total Emotion Identification Scores.

As shown in Table 2, performance was near ceiling for labelling the emotions of happiness and sadness across the three groups. Children from all three groups made more errors when labelling the emotions of anger and fear. Pearson’s chi-square tests revealed that there was no significant association between the three groups and whether children were able to label the emotion of happiness ($\chi^2 (2) = 2.01$, $n.s$) and the emotion of sadness ($\chi^2 (2) = 1.20$, $n.s$). However, there were significant associations found between the three groups and whether or not children were able to label the emotion of anger ($\chi^2 (2) = 8.73$, $p = .013$) and the emotion of fear ($\chi^2 (2) = 8.82$, $p = .012$). The analyses for the Total Emotion Labelling Scores showed a significant effect of group ($F(2,123) = 5.59$, $p < .05$, $\eta^2 = .49$) where children with SLI did not differ in the Total Emotion Labelling Score from the LA group ($p$, $d =$ .01), but differed significantly from the CA group ($p < .05$, $d =$ .70). The latter two groups did not differ significantly from each other ($ns$, $d =$ .41).

In terms of emotion identification, nearly all the children with SLI identified the emotion of happiness correctly (97.6%) and the CA and LA groups reached a ceiling effect for the emotion of happiness. Similarly, children from all three groups made more errors when identifying the emotions of sadness, anger and fear. There was no statistical significant association between the three groups for the identification of happiness ($\chi^2 (2) = 2.01$, $n.s$) and fear ($\chi^2 (2) = .58$, $n.s$) but significant associations were found between the three groups and whether or not children were able to identify the emotion of sadness ($\chi^2 (2) = 16.45$, $p < .001$) and the emotion of anger ($\chi^2 (2) = 6.07$, $p < .05$). The analyses for the Total Emotion Identification Score showed a significant effect of group ($F(2,123) = 4.92$, $p < .05$, $\eta^2 = .49$).
\( \eta^2 = .49 \) where children with SLI differed significantly from the CA group \((p < .05, d = .62)\) but did not differ from the LA group \((ns, d = .01)\). The latter two groups did not differ significantly from each other \((ns, d = .16)\).

**Task 2:** *‘Inferring the causes of emotion-eliciting contexts’ task*

Table 3 reports the frequencies and percentages of correct responses for the two age groups within the SLI group, and shows that the older children with SLI were more successful in inferring the causes of emotions for all emotions but fear. Pearson’s chi-square tests showed that there were no significant associations between the two age groups and whether or not children with SLI of the two age groups were able to infer the causes of emotion-eliciting contexts in the case of happiness \((\chi^2 (1) = 4.18, ns)\), sadness \((\chi^2 (1) = 0.21, ns)\), anger \((\chi^2 (1) = 1.74, ns)\) and fear \((\chi^2 (1) = 3.89, ns)\).

<Table 3>

Table 4 reports the frequencies and percentages of correct responses for the three groups, and show that the SLI group was less successful in linking emotions with social situations than both the CA and LA groups. There were significant associations between the groups and children’s ability to infer the causes of emotion-eliciting contexts for the emotion of sadness \((\chi^2 (2) = 6.64, p = .03)\), anger \((\chi^2 (2) = 11.94, p = .003)\) and fear \((\chi^2 (2) = 25.56, p < .001)\) but no statistical significance in the association between groups and children’s ability to infer the emotion of happiness \((\chi^2 (2) = 2.98, ns)\) was found.

<Table 4>

**Task 3:** *‘Conflict resolution abilities’ task.*

A between group comparison is presented in Table 5 which shows that the most frequent conflict resolution strategy used by children with SLI was to involve an adult \((32.1\%)\). By contrast, the most frequent conflict resolution strategy used by both children in the CA and the LA groups was to ask their peer for clarifications to understand the motive.
behind their actions (38.6% and 25.5% respectively). For the Total Conflict Resolution Strategies Score, analyses showed that there was a significant group effect ($F(2,123) = 18.17, p < .001, \eta^2 = .22$). Post-hoc comparisons showed that the SLI group differed significantly from the CA group ($p < 0.01$) and from the LA group ($p < 0.01$). However, the two control groups did not differ from each other ($ns$).

< Table 5 >

**General Scores Derived from the Three Social Cognition Tasks**

Relationships between the three social cognition tasks were then considered. (Add table?) Strong positive correlations were identified between the scores of all three experimental tasks highlighting the fact that they measured related social cognition skills. Following that, Table 6 presents the general scores derived from the three social cognition tasks for the two age groups within the SLI group. There were no statistically significant differences found between the two age groups for the Total Emotion Prediction Score ($t(40) = -1.92, ns$) the Total Conflict Resolution Strategies Score ($t(40) = -1.74, ns$) or the Social Cognition Composite Score ($t(40) = -2.97, ns$).

< Table 6 >

Table 7 presents the general social cognition scores for the three participant groups.

<Table 7>

The between-group analyses for the Total Emotion Prediction Score showed a significant group effect, $F(2,123) = 15.68, p < .001, \eta^2 = .20$, where children with SLI differed from the CA group ($p < .001$), and from the LA group ($p = .01$). The latter two groups did not differ from each other ($ns$). Finally, the three groups differed significantly on the Social Cognition Composite Score $F(2,123) = 35.33, p < .001, \eta^2 = .36$, with the SLI group differing significantly from the CA group ($p < 0.01$), as well as the LA group ($p < 0.01$). Differences were not found between the two comparison groups ($ns$).
3.2 Results related to Hypothesis 2: Prevalence of difficulties with socio-emotional functioning based on teacher ratings.

Table 8 presents the SDQ means (SDs) between the two age groups within the SLI group as rated by their teachers. Group differences for the SDQ subscales were analysed using a MANOVA with age group (2 levels) as a between factor. The results indicated that there was no significant main age group effect, Wilk’s Lambda: $F(1,40) = .91$, $ns$, $\eta^2 = .08$.

The two age groups did not differ significantly in any of the SDQ subscales or the Total Difficulties Score ($F(1,40) = 1.05$, $ns$, $\eta^2 = .02$; Emotional Symptoms: $F(1,40) = .32$, $ns$, $\eta^2 = .008$; Conduct Problems: $F(1,40) = .03$, $ns$, $\eta^2 = .001$; Hyperactivity: $F(1,40) = 1.77$, $ns$, $\eta^2 = .04$; Peer Problems: $F(1,40) = 1.25$, $ns$, $\eta^2 = .03$; Prosocial: $F(1,40) = .30$, $ns$, $\eta^2 = .008$).

Table 9 shows the comparison of the SDQ results for the children with SLI and their matched peers indicating that there was a significant main effect for group Wilk’s Lambda: $F(2,120)=7.21$, $p<.001$. The three groups differed significantly in the Total Difficulties Score, and all the SDQ subscales (Total Difficulties: $F(2,120)=22.59$, $p<.001$, $\eta^2 = .27$; Emotional Symptoms: $F(2,120)=10.81$, $p<.001$, $\eta^2 = .15$; Conduct Problems: $F(2,120)=6.92$, $p = .001$, $\eta^2 = .10$; Hyperactivity: $F(2,120)=16.83$, $p<.001$, $\eta^2 = .21$; Peer Problems: $F(2,120)=19.36$, $p<.001$, $\eta^2 = .24$; Prosocial: $F(2,120)=34.69$, $p<.001$, $\eta^2 = .36$). On all the SDQ subscales, post-hoc analyses showed that the mean score for the children with SLI was significantly higher than the mean score of both the CA and LA group children ($p<.005$), and that the mean score of the CA group children did not differ significantly from the mean scores of the LA group ($n.s$).
3.3 Results related to Hypotheses 3 and 4: The role of verbal ability, non-verbal cognitive ability, prosocial behaviour, and social cognition on socio-emotional functioning.

To examine the relationships between measures of socio-emotional functioning, language ability, non-verbal cognitive ability, prosocial behaviour, and social cognition, a series of partial correlations were conducted controlling for the effect of age. The effects of age were partialled out as it was considered that some aspects of language ability may be affected by increase in age, as might some aspects of socio-emotional functioning and performance on social cognition tasks. The Social Cognition Composite Score was used as an overall measure of children’s social cognition competence. The SDQ Total Difficulties score was used as a measure of children’s overall social-emotional functioning and the Prosocial Behaviour subscale, which is not included in the Total Difficulties score, was used as an index of children’s positive social attributes and helpful behaviours. The analyses were conducted for the three groups separately.

As seen in Table 10 below, the only significant correlations for the SLI group were between the Total Difficulties Score and the Social Cognition Composite and the Prosocial Behaviour subscale of the SDQ. The negative correlations indicated that the weaker social cognition skills were for children with SLI, the stronger the likelihood was for teachers to report difficulties with socio-emotional functioning; and similarly, the poorer prosocial behaviour was for children with SLI, the greater behavioural, emotional and social difficulties teachers reported. There were no significant relationships found between measures of language and non-verbal cognitive ability and the Total Difficulties SDQ Score.

For the CA group (Table 11), the strongest significant relationships were found between the Total Difficulties Score of SDQ and the Social Cognition Composite and the Prosocial Behaviour subscale of the SDQ. These results highlight that for CA group children, their performance on tasks of social cognition and their prosocial skills were strongly interrelated with their general socio-emotional functioning at school. In particular, the
negative correlations pointed to the fact that weak social cognition skills and poor prosocial
behaviour correlated with more behavioural, emotional and social difficulties at school for the
CA group. As for the SLI group, no statistically significant relationships were found between
the language and non-verbal measures and the Total Difficulties SDQ Score. Finally for the
LA group, as seen in Table 11, the strongest relationships with the Total Difficulties Score of
the SDQ were found with the measure of non-verbal cognitive ability Raven's CPM, the
Social Cognition Composite score and the Prosocial Behaviour subscale of the SDQ. The
negative correlations emphasise that children's general socio-emotional functioning related
strongly with their non-verbal cognitive ability, as well as their ability to understand others'
mental and emotional states, in that lower non-verbal cognitive ability scores, poorer social
cognition and prosocial skills significantly correlated with poorer socio-emotional functioning
for the LA group.

*Table 11*

Multiple hierarchical regressions were carried out to investigate in sequence the role
of verbal ability, non-verbal cognitive ability, prosocial behaviour and social cognition in
predicting children's socio-emotional functioning. To examine the relative role of the
different factors, regression analyses were performed for each group separately. The
dependent variable indexing socio-emotional functioning was the SDQ Total Difficulties
Score (excluding the prosocial behaviour subscale). The independent variables were
entered stepwise in five steps: (i) chronological age; (ii) social cognition composite; (iii)
prosocial behaviour; (iv) non-verbal cognitive ability; (v) receptive language and (vi)
expressive language. The assumption of non-multicollinearity was checked using the
correlation matrixes and the VIF values, which found to be less than 10 in all three
regressions thus the assumption of non-multicollinearity was met.

The SLI group final model was significant explaining 44% of the variance \( F(1,38) =
13.79, p < .001, R^2_{adj} = .44 \). The significant predictors were the Social Cognition Composite
Score (26% of the variance) and the Prosocial Behaviour Scale (18% of the variance).
Chronological age, language and non-verbal cognitive ability did not contribute to the final
model. For the CA group, the final model was significant and explained 38% of the variance
\((F(1,39) = 15.15, p < .001, R_{adj}^2 = .38)\) with the Prosocial Behaviour subscale as the most
significant variable. Finally, for the LA group the final model comprised Social Cognition
Composite Score, explaining a significant 61% of the variance \((F(1,31) = 51.87, p < .001, R_{adj}^2 = .61)\).

< Table 12 >

4. Discussion

4.1 Summary of findings

Based on a relatively large population-based cohort, our results indicated that children
with SLI differed from their typically developing peers in their processing of social information
and, thus our results support previous studies which found that children with language
impairments also have subtle social cognition impairments (Botting & Conti-Ramsden, 2008;
Clegg et al., 2005; Farmer, 2000). Contrary to our first prediction, children with SLI
performed significantly lower than both CA and LA group peers on all three measures of
social cognition. Crucially, because the performance of children with SLI was lower than both
comparison groups, performance across the three areas of social cognition investigated
cannot be explained solely by children’s poor language ability.

Results from the ‘Labelling and identifying emotions’ task pointed to children with SLI
having difficulties in labelling and identifying emotions and, contrary to our first prediction,
their performance differed from both the CA and LA groups. Children with SLI thus
demonstrated difficulties with emotional understanding which suggests that the basic ability
to identify emotions from facial expressions may develop more slowly in this group of
children but also that their abilities are not directly linked to their receptive language levels
(Delaunay-El Allam et al., 2011; Spackman et al., 2006b). These results contrast with those
of McCabe and Meller (2004) with younger preschool children. The measure used in the
current study was not restricted by a ceiling effect as in the McCabe and Meller (2004) study
and, as such, allowed a clear indication of the children’s difficulties.
Based on previous research literature, we expected that some emotions might be easier
to identify and label than others and this was indeed the case. Almost all the children in the
current study were able to identify and produce lexical labels for the facial expressions of
happiness and sadness (see for example Ford & Milosky, 2003). Children in all three groups
also made significantly more errors for the facial expressions of ‘anger’ and ‘fear’. However,
differences between the groups were still observed, with the SLI group performing
significantly lower than both comparison groups for the emotions of sadness, anger and fear.
Children with SLI were also less proficient than both comparison groups at making
accurate social inferences of a character’s emotions as shown by the ‘Inferring the causes of
emotion-eliciting contexts’ task results. Contrary to our prediction, differences between the
three groups were found for the emotions of sadness, anger and fear, with the SLI group
being less successful than both comparison groups. All three groups found it harder to
interpret the more ambiguous, subtle and complex emotions of sadness and fear and
children in all groups made significantly more correct inferences in the happy condition,
supporting Denham’s argument (1998) about developmental differences in emotion
understanding. Although there is limited research in the area of emotion understanding and
how children with SLI infer emotions elicited by social situations, the findings support those
of Ford and Milosky (2003) and Spackman et al. (2006a) who found that children with SLI
had significantly more difficulty inferring the expected emotional reaction when compared
with children with typical language skills. The ability to predict the emotion that an event is
likely to produce is important in judging how to respond to others in social situations. The
difficulties experienced by the children with SLI in making causal inferences about the
emotional states of others are likely to have an adverse impact on their relationships.
Results from the final ‘Conflict resolution abilities’ task showed that the most frequent
conflict resolution strategies for children with SLI were getting help from an adult, doing
nothing and being submissive or physically aggressive when conflicts arose. When
compared to the two control groups, children with SLI reported that they would use
reconciliation significantly less in conflict scenarios, and that they would not use language-
based strategies such as asking for clarifications, to make sense of a conflict situation (see also Brinton et al., 1998b; Marton et al., 2005; Stevens & Bliss, 1995). Statistically significant differences were found between the three groups on the Total Conflict Resolution Strategies Score with the SLI group scoring significantly lower than both matched groups.

In relation to teachers’ ratings of children’s socio-emotional functioning, participants with SLI were reported to have raised levels of difficulties in all aspects of their socio-emotional functioning, as identified by the SDQ in comparison to national norms (see also Lindsay et al., 2007). As predicted in our second hypothesis, when the children’s scores were compared with both control groups, who attended the same schools, all scales of SDQ varied significantly between groups, with the SLI group being rated as exhibiting significantly more problems than both control groups according to previous studies (Beitchman, Wilson, Brownlie, Walters, Inglis, & Lancee, 1996; Clegg et al., 2005; Lindsay & Dockrell, 2012a).

Teachers’ ratings indicated that 28.6% of children with SLI rated as ‘abnormal’ in the Total Difficulties scale, compared to 2.4% from the CA group and none from the LA group.

Our results also confirm the importance of examining different types of behavioural, emotional and social difficulties, as opposed to only considering a composite of socio-emotional functioning or a general diagnosis of psychiatric disorder supporting warnings from earlier studies about the generic nature of the term (Lindsay & Dockrell, 2012a; 2012b), and thus extend our understanding by providing a detailed description of these children’s behavioural, emotional and social needs. Examination of specific types of behavioural, emotional and social difficulties revealed that teachers reported fewer emotional symptoms and conduct problems, in accordance to previous research (Lindsay et al., 2007; Lindsay & Dockrell, 2012a; Maughan, Rowe, Messer, Goodman, & Meltzer, 2004; Redmond & Rice, 2002). By contrast, reports of hyperactivity were very high in the school setting (35.7%) (see also Lindsay et al., 2007; Lundervold et al., 2008; Marton, 2008). Teachers also raised significant concerns about the children’s prosocial behaviour (47.6%). Poor prosocial behaviour is expected to affect children’s social relationships and interactions with peers. Children with higher levels of prosocial skills show greater empathy, are more likely to be
popular, and are less likely to be rejected (Findlay, Girardi, & Coplan, 2006; Ladd, 2005; Warden & Mackinnon, 2003). In the present study, lower levels of prosocial behaviour were associated with greater problems with peers (28.6%), reflecting the significant difficulties children with SLI are reported to have with social integration and peer acceptance (Brinton & Fujiki, 1999; Lindsay et al., 2007; McCabe & Marshall, 2006).

The present study also addressed the lack of consistency in the literature of the importance of developmental phase by examining a population based sample with a large age range and thus allowing for within group comparisons between the younger (below 8 years) and older (8 years and above) SLI participants. In response to the developmental pattern noted in the literature, we hypothesised that a) younger SLI participants would perform more poorly than the older SLI participants in tasks of social cognition and that b) teachers would rate older SLI participants as experiencing more difficulties with socio-emotional functioning in comparison to younger SLI participants. Although there was a trend for the older SLI participants to score higher on all social cognition tasks in comparison to the younger group, the differences between the age groups were not statistically significant contrary to our research prediction. Also, teachers rated the group of younger children with SLI as presenting with more difficulties in all the areas of socio-emotional functioning, but again the differences between groups did not reach statistical significance, and thus our age-group prediction was not confirmed. These findings are also in contrast with recent research showing an increase in behavioural, emotional and social difficulties for older primary aged children (Lindsay & Dockrell, 2012a; 2012b).

A unique feature of the present study was also the potential to investigate the relationships between socio-emotional functioning, verbal ability, non-verbal cognitive ability, prosocial behaviour and social cognition and therefore to examine the predictors of socio-emotional functioning for the three participant groups. For all three groups, reported difficulties with socio-emotional functioning by teachers were significantly correlated with children's performance on social cognition tasks and their prosocial behaviour. The greater the level of difficulties with socio-emotional functioning reported by the teachers, the more
likely it was for children of all three groups to experience difficulties with their understanding of others’ mental states and their prosocial behaviours. Verbal and non-verbal cognitive measures were not found to have any relationship with reported behavioural, emotional and social difficulties, with the exception of the LA group where non-verbal cognitive ability was significantly positively correlated with measures of socio-emotional functioning.

Regression analyses demonstrated that for children with SLI, performance on social cognition tasks and prosocial behaviour emerged as significant predictors jointly explaining about half of the variance (44% of the variance). Social cognition was also the most significant predictor of the socio-emotional functioning of LA group children. In contrast, for the CA group, prosocial behaviour, and not social cognition, predicted socio-emotional functioning. These results suggest that the way children encode, interpret and reason about social information plays an important role in their ability to interact with others (Crick & Dodge, 1994), and set as a reminder of the importance of considering not only language skills but also social cognition skills in relation to children’s socio-emotional functioning. The absence of a relationship between social cognition and socio-emotional functioning for the CA group could be explained by a hypothesis whereby, once certain features are in place (such as competent language ability), other features may enhance and play a role in general socio-emotional functioning. In the present study, the relationships between language and non-verbal cognitive ability with social cognition were not as predicted. An absence of a relationship between language and measures of socio-emotional functioning may reflect the low language scores for the SLI group and the relatively high scores for the CA group. In both groups, differentiation of scores would be difficult which would make relationships between language and socio-emotional functioning hard to identify.

4.2 Limitations

A number of methodological issues need to be considered. In the present study, social cognition was conceptualised as a multi-faceted construct that refers to the mental operations underlying social interactions. These mental operations include perceiving,
interpreting and generating responses to the emotional states, intentions, and behaviours of others (Fiske & Taylor, 1991; Kunda, 1999). As mentioned earlier, social cognition is a somewhat ambiguous ‘umbrella’ term of a construct not fully understood in research (Botting & Conti-Ramsden, 2008). The implications of our study, and the tasks we used to assess this skill, need to be considered with regard to the fact that social cognition is a composite ability which includes a number of independent but related skills. Although we use the general ‘social cognition’ term, it should be noted that our tasks tap into specific aspects of this composite ability. Future studies, using different measures, could tap into different aspects of the social cognition construct and therefore maybe reveal different patterns in social cognition development of children with SLI and its relationship to children’s socio-emotional functioning.

Furthermore, there is some concern in research that social cognition tasks tap into language impairments and therefore children with SLI are disadvantaged by the linguistic load evident in those tasks (Miller, 2001; Timler, 2008). We have controlled for this by using tasks designed for children of younger age but also by including a LA group so as to elucidate the role of language level on task performance.

The present study explored associations between children’s receptive and expressive language, their non-verbal cognitive ability and ratings of socio-emotional functioning; we did not find any association between language measures and ratings of socio-emotional functioning. However, no measure of pragmatic language skills was collected. Evidence from previous studies suggests that difficulties with socio-emotional functioning may be due to problems relating to the pragmatics of language (Conti-Ramsden & Botting, 2004; Olswang, Coggins, & Timler, 2001; St Clair, Pickles, Durkin, & Conti-Ramsden, 2011). Future studies should include a broader range of language measures to include both structural and pragmatic language so that the association between language measures and ratings of socio-emotional functioning can be investigated comprehensively.
Equally, there may be other factors beyond the scope of the present study, in addition to specific language dimensions, that may impact on the socio-emotional functioning and/or social cognition skills of children in SLI. For example, literacy problems (Carroll, Maughan, Goodman, & Metzler, 2004), children’s self-esteem (Wadman, Durkin, & Conti-Ramsden, 2008), social and economic status (Mistry, Biesanz, Chien, Howes, & Benner, 2008) or a lack of rich conversational opportunities (Farmer, 2000) could be further investigated in future studies as potential factors.

While considering the relationship between language impairment and difficulties with socio-emotional functioning, this study considered children’s profiles at school. It would be important to also investigate their parents’ perceptions, developing previous research that shows inconsistencies across different environments (Lindsay et al., 2007). Future studies could explore both within-child factors (verbal ability, non-verbal cognitive ability and social cognition) and the influence of the environment (home and school) in engendering, maintaining and altering behavioural, emotional and social difficulties.

4.3 Conclusions and Implications

The present study has advanced our understanding of the relationship between language impairment and socio-emotional functioning by investigating the role of children’s social cognition skills as a possible mediating factor in the relationship (Clegg et al., 2005; Farmer, 2000), and by considering some methodological issues not deeply addressed before. Firstly, it was crucial to understand the relationship between social cognition and socio-emotional functioning in a mainstream population-based sample, like that employed in the present study. The study involved a relatively large sample of language-impaired and typically-developing children, who were all selected from mainstream primary schools and individually matched on objective and consistent criteria for age, language and non-verbal cognitive ability. Additionally, the age range of children with SLI (6 to 11 years) has not been extensively studied in the literature in relation to this subject and it was interesting to
investigate whether there are any within group differences between younger and older primary aged children with SLI.

The present study showed that the difficulties in socio-emotional functioning experienced by children with SLI could not be totally explained by a single factor in their profile of abilities. However, the study indicated that performance on social cognition tasks and prosocial skills were significant predictors of teachers' ratings of socio-emotional functioning. Children’s impaired expressive and receptive language abilities were not found to be associated with poor socio-emotional functioning, suggesting that factors other than expressive and receptive language ability are at play in this group of children. Provision for children with SLI should therefore take into account their likelihood of needing support to develop prosocial skills and social cognition skills, as well as targeting their language weaknesses.

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Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.
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Table 1

Raw score means (M) and Standard Deviations (SDs) for children’s chronological age in months, along with the Raven’s CPM and CELF-R measures used for matching.

<table>
<thead>
<tr>
<th>Group</th>
<th>SLI n = 42</th>
<th>CA n = 42</th>
<th>LA n = 42</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M (SD)</td>
<td>M (SD)</td>
<td>M (SD)</td>
<td></td>
</tr>
<tr>
<td>Age (in months)</td>
<td>94.81 (20.15)</td>
<td>95.21 (21.02)</td>
<td>68.88 (6.40)</td>
<td>SLI = CA &gt; LA</td>
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<tr>
<td>Raven’s CPM</td>
<td>61.43 (23.74)</td>
<td>63.14 (24.37)</td>
<td>70.41 (28.26)</td>
<td>SLI = CA = LA</td>
</tr>
<tr>
<td>(centile)</td>
<td>25-95</td>
<td>25-95</td>
<td>25-95</td>
<td>F(2,118)=1.62, n.s</td>
</tr>
<tr>
<td>Linguistic Concepts</td>
<td>12.26 (2.72)</td>
<td>17.62 (2.14)</td>
<td>12.26 (2.72)</td>
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<tr>
<td>Sentence Structure</td>
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<td>22.88 (1.92)</td>
<td>19.29 (2.28)</td>
<td>SLI = CA &lt; CA</td>
</tr>
<tr>
<td>Oral Directions</td>
<td>7.38 (3.90)</td>
<td>15.98 (3.97)</td>
<td>7.38 (3.90)</td>
<td>SLI = LA &lt; CA</td>
</tr>
<tr>
<td>Receptive Language Standard Score</td>
<td>17.33 (3.55)</td>
<td>17.33 (3.55)</td>
<td>27.86 (3.33)</td>
<td>SLI = LA &lt; CA</td>
</tr>
<tr>
<td></td>
<td>F(2,123)=32.25, p&lt;.001</td>
<td>F(2,123)=62.0, p&lt;.001</td>
<td>F(2,123)=67.14, p&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>Expressive Language Standard Score</td>
<td>16.74 (2.93)</td>
<td>32.36 (5.73)</td>
<td>31.14 (5.18)</td>
<td>SLI &lt; CA = LA</td>
</tr>
<tr>
<td></td>
<td>F(2,123)=120.72, p&lt;.001</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sum of Standard Scores</td>
<td>34.07 (5.96)</td>
<td>63.71 (9.60)</td>
<td>59.00 (7.38)</td>
<td>SLI &lt; CA = LA</td>
</tr>
</tbody>
</table>

Note. The Raven’s CPM score is percentile score.
Table 2

Task 1 Percentage of Correct Emotion Labelling and Correct Emotion Identification across Group and Means (SD) of Total Emotion Labelling and Total Emotion Identification Scores

<table>
<thead>
<tr>
<th>Emotion Labelling</th>
<th>Emotion Identification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SLI (n = 42)</td>
</tr>
<tr>
<td>Happiness</td>
<td>97.6</td>
</tr>
<tr>
<td>(n = 41)</td>
<td>(n = 42)</td>
</tr>
<tr>
<td>Sadness</td>
<td>90.5</td>
</tr>
<tr>
<td>(n = 38)</td>
<td>(n = 39)</td>
</tr>
<tr>
<td>Anger</td>
<td>76.2</td>
</tr>
<tr>
<td>(n = 32)</td>
<td>(n = 41)</td>
</tr>
<tr>
<td>Fear</td>
<td>26.2</td>
</tr>
<tr>
<td>(n = 11)</td>
<td>(n = 24)</td>
</tr>
<tr>
<td>Total Mean Scores</td>
<td>2.88</td>
</tr>
<tr>
<td>(SD)</td>
<td>(.80)</td>
</tr>
</tbody>
</table>
Table 3

Task 2 Frequencies and Percentage of Correct Responses for Inferring the Causes of Emotion-Eliciting Contexts by Age Group within the SLI Group

<table>
<thead>
<tr>
<th></th>
<th>&lt; 8 years (n = 25)</th>
<th>&gt;8 years (n = 17)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Happiness</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td>19</td>
<td>76.0</td>
</tr>
<tr>
<td>Sadness</td>
<td>13</td>
<td>52.0</td>
</tr>
<tr>
<td>Anger</td>
<td>14</td>
<td>56.0</td>
</tr>
<tr>
<td>Fear</td>
<td>9</td>
<td>36.0</td>
</tr>
</tbody>
</table>
Table 4

*Task 2 Frequencies and Percentage of Correct Responses for Inferring the Causes of Emotion-Eliciting Contexts across Groups*

<table>
<thead>
<tr>
<th></th>
<th>SLI <em>(n = 42)</em></th>
<th></th>
<th>CA <em>(n = 42)</em></th>
<th></th>
<th>LA <em>(n = 42)</em></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>n</em></td>
<td>%</td>
<td><em>n</em></td>
<td>%</td>
<td><em>n</em></td>
<td>%</td>
</tr>
<tr>
<td>Happiness</td>
<td>35</td>
<td>83.3</td>
<td>40</td>
<td>95.2</td>
<td>40</td>
<td>95.2</td>
</tr>
<tr>
<td>Sadness</td>
<td>22</td>
<td>52.4</td>
<td>33</td>
<td>78.6</td>
<td>29</td>
<td>69.0</td>
</tr>
<tr>
<td>Anger</td>
<td>24</td>
<td>57.1</td>
<td>38</td>
<td>90.5</td>
<td>29</td>
<td>69.0</td>
</tr>
<tr>
<td>Fear</td>
<td>12</td>
<td>28.6</td>
<td>35</td>
<td>83.3</td>
<td>22</td>
<td>52.4</td>
</tr>
</tbody>
</table>
Table 5

Task 3 Frequencies and Percentages of Conflict Resolution Strategies across Groups for all Scenarios and Means (SD) for Total Conflict Resolution Strategies Score

<table>
<thead>
<tr>
<th>SLI (n = 42)</th>
<th>CA (n = 42)</th>
<th>LA (n = 42)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>No response</td>
<td>23</td>
<td>13.6</td>
</tr>
<tr>
<td>Physical Retaliation</td>
<td>25</td>
<td>14.8</td>
</tr>
<tr>
<td>Verbal Retaliation</td>
<td>19</td>
<td>11.3</td>
</tr>
<tr>
<td>Involving an Adult</td>
<td>54</td>
<td>32.1</td>
</tr>
<tr>
<td>Being Submissive</td>
<td>23</td>
<td>13.7</td>
</tr>
<tr>
<td>Situations Responses</td>
<td>9</td>
<td>5.3</td>
</tr>
<tr>
<td>Asking for clarifications</td>
<td>15</td>
<td>8.9</td>
</tr>
<tr>
<td>Total Mean Score (SD)</td>
<td>11.50</td>
<td>18.26</td>
</tr>
<tr>
<td></td>
<td>(5.61)</td>
<td>(4.29)</td>
</tr>
</tbody>
</table>
Table 6

Means (SDs) of Social Cognition Scales and Social Cognition Composite Scores by Age Group within the SLI Group

<table>
<thead>
<tr>
<th></th>
<th>&lt;8 years (n = 25)</th>
<th>&gt;8 years (n = 17)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Emotion Prediction Score</td>
<td>8.11 (2.44)</td>
<td>8.71 (2.56)</td>
</tr>
<tr>
<td>Total Conflict Resolution Strategies Score</td>
<td>10.28 (5.08)</td>
<td>13.29 (4.72)</td>
</tr>
<tr>
<td>Social Cognition Composite Score</td>
<td>18.39 (6.10)</td>
<td>22.0 (7.52)</td>
</tr>
</tbody>
</table>
Table 7

Means (SDs) of Social Cognition Scales and Social Cognition Composite Scores across Groups

<table>
<thead>
<tr>
<th></th>
<th>SLI (n = 42)</th>
<th>CA (n = 42)</th>
<th>LA (n = 42)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Emotion Prediction Score</td>
<td>8.31 (2.82)</td>
<td>11.43 (2.38)</td>
<td>10.98 (2.43)</td>
</tr>
<tr>
<td>Total Conflict Resolution Strategies Score</td>
<td>11.50 (5.61)</td>
<td>18.26 (4.29)</td>
<td>16.19 (5.76)</td>
</tr>
<tr>
<td>Social Cognition Composite Score</td>
<td>19.81 (6.90)</td>
<td>29.69 (7.16)</td>
<td>27.17 (9.44)</td>
</tr>
</tbody>
</table>
Table 8

SDQ Raw Score Means (SDs) by Age Group for the SLI Group

<table>
<thead>
<tr>
<th></th>
<th>&lt; 8 years</th>
<th></th>
<th>&gt;8 years</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M (SD)</td>
<td></td>
<td>M (SDs)</td>
<td>(SD)</td>
</tr>
<tr>
<td>Total Difficulties</td>
<td>13.60</td>
<td>(7.58)</td>
<td>11.06</td>
<td>(8.26)</td>
</tr>
<tr>
<td>Emotional Symptoms</td>
<td>2.96</td>
<td>(2.59)</td>
<td>2.47</td>
<td>(2.98)</td>
</tr>
<tr>
<td>Conduct Problems</td>
<td>1.96</td>
<td>(2.40)</td>
<td>1.82</td>
<td>(2.48)</td>
</tr>
<tr>
<td>Hyperactivity</td>
<td>5.44</td>
<td>(2.45)</td>
<td>4.35</td>
<td>(2.80)</td>
</tr>
<tr>
<td>Peer Relationship Problems</td>
<td>3.24</td>
<td>(2.35)</td>
<td>2.41</td>
<td>(2.34)</td>
</tr>
<tr>
<td>Prosocial Behaviour</td>
<td>4.48</td>
<td>(2.66)</td>
<td>4.94</td>
<td>(2.65)</td>
</tr>
</tbody>
</table>
Table 9

SDQ Raw Score Means (SDs) Across Groups including the National Average

<table>
<thead>
<tr>
<th></th>
<th>SLI (n = 42)</th>
<th>CA (n = 42)</th>
<th>LA (n = 39)</th>
<th>National</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M (SD)</td>
<td>M (SD)</td>
<td>M (SD)</td>
<td>M (SD)</td>
</tr>
<tr>
<td>Total Difficulties</td>
<td>12.57 (7.89)</td>
<td>4.45 (4.42)</td>
<td>5.82 (4.71)</td>
<td>6.6 (6.0)</td>
</tr>
<tr>
<td>Emotional Symptoms</td>
<td>2.76 (2.73)</td>
<td>.95 (1.36)</td>
<td>.97 (1.73)</td>
<td>1.4 (1.9)</td>
</tr>
<tr>
<td>Conduct Problems</td>
<td>1.90 (2.40)</td>
<td>.60 (.93)</td>
<td>.92 (1.28)</td>
<td>0.9 (1.6)</td>
</tr>
<tr>
<td>Hyperactivity</td>
<td>5.00 (2.62)</td>
<td>1.98 (2.19)</td>
<td>3.10 (2.40)</td>
<td>2.9 (2.8)</td>
</tr>
<tr>
<td>Peer Relationship Problems</td>
<td>2.90 (2.35)</td>
<td>.95 (1.24)</td>
<td>.82 (1.23)</td>
<td>1.4 (1.8)</td>
</tr>
<tr>
<td>Prosocial Behaviour</td>
<td>4.67 (2.63)</td>
<td>8.36 (1.46)</td>
<td>7.33 (2.00)</td>
<td>7.2 (2.4)</td>
</tr>
</tbody>
</table>

Note. \( p < .001 \) and CA = LA < SLI in all cases
Table 10

Partial Correlations controlling for age between Measures of Socio-Emotional Functioning, Prosocial Behaviour, Social Cognition, Non-Verbal and Language Ability for the SLI Group

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sum of Receptive SS</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Sum of Expressive SS</td>
<td>.53**</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Raven’s CPM</td>
<td>.39**</td>
<td>.03</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Social Cognition Composite</td>
<td>.11</td>
<td>.04</td>
<td>.16</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Prosocial Behaviour</td>
<td>-.02</td>
<td>-.05</td>
<td>-.07</td>
<td>.24</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>6. Total Difficulties Score</td>
<td>.09</td>
<td>-.03</td>
<td>.04</td>
<td>-.56**</td>
<td>-.54**</td>
<td>-</td>
</tr>
</tbody>
</table>
Table 11

Partial Correlations controlling for age between Measures of Socio-Emotional Functioning, Prosocial Behaviour, Social Cognition, Non-Verbal and Language Ability for the CA and LA Matched Groups

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sum of Receptive SS</td>
<td>-</td>
<td>.48**</td>
<td>.17</td>
<td>.21</td>
<td>.14</td>
<td>-.14</td>
</tr>
<tr>
<td>2. Sum of Expressive SS</td>
<td>.66**</td>
<td>-</td>
<td>.38**</td>
<td>.61**</td>
<td>.46**</td>
<td>-.36</td>
</tr>
<tr>
<td>3. Raven’s CPM</td>
<td>.09</td>
<td>.31*</td>
<td>-</td>
<td>.64**</td>
<td>.34*</td>
<td>-.49**</td>
</tr>
<tr>
<td>4. Social Cognition Composite</td>
<td>.21</td>
<td>.00</td>
<td>.01</td>
<td>-</td>
<td>.62**</td>
<td>-.79**</td>
</tr>
<tr>
<td>5. Prosocial Behaviour</td>
<td>.12</td>
<td>.24</td>
<td>.11</td>
<td>.15</td>
<td>-</td>
<td>-.65**</td>
</tr>
<tr>
<td>6. Total Difficulties Score</td>
<td>-.10</td>
<td>-.21</td>
<td>-.02</td>
<td>-.41**</td>
<td>-.43**</td>
<td>-</td>
</tr>
</tbody>
</table>

*Note.* Partial correlations between measures for the CA Matched Group are presented below the diagonal, and partial correlations for the LA Matched Group are presented above the diagonal.
Table 12

Regression analyses for concurrent variables predicting Total Difficulties Score SDQ

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>SE B</th>
<th>B</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SLI Group</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chronological Age</td>
<td>-.13</td>
<td>.03</td>
<td>.24</td>
<td>4.38</td>
<td>.195</td>
</tr>
<tr>
<td>Social Cognition Composite</td>
<td>-.49</td>
<td>.13</td>
<td>-.43**</td>
<td>-3.64</td>
<td>.001</td>
</tr>
<tr>
<td>Prosocial Behaviour Scale</td>
<td>-1.33</td>
<td>.36</td>
<td>-.44**</td>
<td>-3.71</td>
<td>.001</td>
</tr>
<tr>
<td>Raven’s CPM</td>
<td>-.00</td>
<td>.00</td>
<td>-.07</td>
<td>-1.94</td>
<td>.189</td>
</tr>
<tr>
<td>Sum of Receptive SS</td>
<td>-.00</td>
<td>.00</td>
<td>-.19</td>
<td>2.06</td>
<td>.073</td>
</tr>
<tr>
<td>Sum of Expressive SS</td>
<td>-.00</td>
<td>.00</td>
<td>-.21</td>
<td>-2.98</td>
<td>.188</td>
</tr>
<tr>
<td><strong>CA Matched Group</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chronological Age</td>
<td>-.21</td>
<td>.04</td>
<td>.25</td>
<td>4.50</td>
<td>.187</td>
</tr>
<tr>
<td>Social Cognition Composite</td>
<td>-.05</td>
<td>.02</td>
<td>-.22</td>
<td>-2.44</td>
<td>.079</td>
</tr>
<tr>
<td>Prosocial Behaviour Scale</td>
<td>-.77</td>
<td>.39</td>
<td>-.25*</td>
<td>-1.97</td>
<td>.05</td>
</tr>
<tr>
<td>Raven’s CPM</td>
<td>-.00</td>
<td>.00</td>
<td>-.08</td>
<td>-1.96</td>
<td>.186</td>
</tr>
<tr>
<td>Sum of Receptive SS</td>
<td>-.00</td>
<td>.00</td>
<td>-.24</td>
<td>2.32</td>
<td>.075</td>
</tr>
<tr>
<td>Sum of Expressive SS</td>
<td>-.00</td>
<td>.00</td>
<td>-.22</td>
<td>-2.89</td>
<td>.191</td>
</tr>
<tr>
<td><strong>LA Matched Group</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chronological Age</td>
<td>-.27</td>
<td>.08</td>
<td>.31</td>
<td>4.39</td>
<td>.179</td>
</tr>
<tr>
<td>Social Cognition Composite</td>
<td>-.37</td>
<td>.05</td>
<td>-.79**</td>
<td>-7.20</td>
<td>.001</td>
</tr>
<tr>
<td>Prosocial Behaviour Scale</td>
<td>-1.25</td>
<td>.63</td>
<td>-57</td>
<td>-2.69</td>
<td>.135</td>
</tr>
<tr>
<td>Raven’s CPM</td>
<td>-.00</td>
<td>.00</td>
<td>-.06</td>
<td>-1.86</td>
<td>.196</td>
</tr>
<tr>
<td>Sum of Receptive SS</td>
<td>-.00</td>
<td>.00</td>
<td>-.18</td>
<td>2.03</td>
<td>.070</td>
</tr>
<tr>
<td>Sum of Expressive SS</td>
<td>-.00</td>
<td>.00</td>
<td>-.27</td>
<td>-2.74</td>
<td>.156</td>
</tr>
</tbody>
</table>

*p < .05, **p < .005