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Abstract

The ability of young children to manage their emotions and behaviours is an important prerequisite for social adjustment and school readiness. With an increase in early-onset behavioural difficulties in children, understanding changes in child behaviour during the preschool years and the factors that influence it is a priority for policy and practice. Despite much evidence on the association between language and behavioural difficulties in children, few studies have examined longitudinally language and problem / prosocial behaviour in early years. Using a UK community-based sample, this study examined the association between language, gender and behavioural, social and emotional difficulties and prosocial behaviour during the toddler years and at school entry. The findings showed a moderate decline in behavioural and social difficulties during preschool, and stability in emotional difficulties. Moderate associations were found between vocabulary and problem behaviour but not prosocial behaviour, with literacy-based language emerging as a substantive predictor of teacher-rated behaviour. These findings have important implications for early years provision.

Keywords: prosocial behaviour, language, behavioural difficulties, early years

Children's language and behavioural, social and emotional difficulties and prosocial behaviour

during the toddler years and at school entry

Introduction

Social competence and emotional wellbeing in young children have received much attention in recent years as they link to language development and early school adjustment and learning (Miller-Lewis et al, 2006; Phillips and Lonigan, 2010; Pike et al, 2006). The ability of young children to manage their emotions and behaviours and to make meaningful interpersonal relationships is an important prerequisite for school readiness and academic success. Increasingly, teachers express concerns that children, especially those living in poverty, enter primary school with limited social and emotional competencies, which are likely to compromise their successful transition into a formal learning environment (Rimm-Kaufman, Pianta and Cox, 2000). Prosocial behaviour, defined as helpful, kind, considerate and cooperative behaviour, and the capacity to regulate behaviour have been found to strongly relate to school readiness and success, i.e., higher early numeracy and literacy skills at school entry (McClelland, Morrison, & Holmes, 2000), whereas limited social competence is a strong predictor of academic failure (Webster-Stratton, Reid and Stoolmiller, 2008). Understanding the factors, such as language, that influence behaviour and social and emotional development in young children is therefore an important research challenge and has implications for early years provision.

Although many factors influence young children's behaviour, there are strong theoretical and empirical grounds for the association between language and behavioural, social and emotional difficulties (Beitchman et al, 2001; Benasich, Curtiss and Tallal, 1993) with the co-occurrence rate of language and behavioural difficulties in young children having been estimated to 50 −

70% (Redmond and Rice, 1998). The link between language and behavioural difficulties has been established by two large bodies of research. The first has examined the prevalence of emotional and behavioural difficulties among children selected as having speech and language difficulties (eg, Fujiki, Brinton and Clarke, 2002), whereas the other examined the prevalence of language difficulties among children with behavioural and social difficulties (eg, Cohen et al, 1998). The relationship between behavioural and language difficulties has been found to persist over time. An age pattern of behavioural difficulties in children with language difficulties remains marked through early years (Benasich et al, 1993), primary years (Lindsay, Dockrell and Strand, 2007), later childhood and adolescence (Conti-Ramsden and Botting, 2004) and into adulthood (Beitchman et al, 2001).

Behavioural difficulties have been found to differentiate between boys and girls, with boys being 3-4 times more likely than girls to display disruptive behaviour (Office of National Statistics, 1999). However, the nature of the relationship between gender and behaviour remains unclear especially for preschool children (Huaqing Qi and Kaiser, 2003). In a study examining the developmental trajectories of behavioural difficulties in preschool boys and girls, boys were found to exhibit higher levels of disruptive behaviour than did girls (Spieker et al, 1999), whereas girls from low-income backgrounds were reported by their parents to exhibit more problem behaviours than boys (Eiden, 1999). Furthermore, in other studies, preschool boys and girls have been reported to be similar in their display of problem behaviour (Lavigne et al, 1996).

Despite much research on the association between language and behavioural, social and emotional difficulties (eg, Beitchman et al, 2001; Benasich, Curtiss and Tallal, 1993), an

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inconsistent pattern emerges regarding language and social competence in young children (Hart et al, 2004; Fujiki, Brinton, Morgan and Hart, 1999). In a study by Fujiki and colleagues, although children with language difficulties were less socially competent compared to their typically developing peers, no consistent pattern of association was found between language and social behaviour. Moreover, in a community-based sample of children between 18 and 35 months, behavioural and language difficulties were generally not correlated (Rescorla and Achenbach, 2002). This variation may be explained by considering the complexity inherent in children's social competence and its underpinning behavioural, social and emotional dimensions, and the lack of specificity in assessing child behaviour by using behaviour scales that offer generalisations in the characteristics examined. Also, differences in sample characteristics (community-based vs. clinical samples) are likely to explain variation in that clinical samples often find stronger associations between language and behaviour in children, but these associations can be inflated by their overrepresentation of extremes and comorbidity (Plomin, Price, Eley, Dale and Stevenson, 2002). Finally, the link between language and behaviour may manifest differently across different developmental trajectories, but also it may be less direct mediated by other factors.

Most research on factors, including language, that affect children's behavioural, social and emotional development has focused on 'at risk' groups and fewer on non-clinical, community-based samples (Pike at el, 2006). Also, few studies have used longitudinal designs to examine repeated measures on predictor variables (eg, vocabulary at ages 3 and 5) to capture the temporal quality of the effects of children's cognitive and linguistic skills on behaviour in preschool children (Miller –Lewis et al, 2006), and even fewer have included ratings of prosocial behaviour

as a counterpoint to negative behaviours (Phillips and Lonigan, 2010). Increasingly, studies have included teacher and parent ratings to examine the contextual parameters that influence child behaviour. The use of multiple sources of information (eg, parents, teachers) influences behaviour ratings, especially when informants are not in agreement (eg, Achenbach, McConaughy and Howell, 1987; Lindsay et al, 2007). Parents and teachers differ in their perceptions of children's behaviour. A review of cross-informant correlations of child behaviour by Achenbach and colleagues reported a mean correlation of .27 between parent and teacher ratings (1987). The low levels of parent-teacher agreement may be explained by considering the context specificity of children's behaviour which fluctuates depending on the academic, emotional and social demands placed on children at home and school.

Using a large community-based sample, the purpose of this study was to examine the relationship between gender, language (i.e., vocabulary, literacy-based language) and behavioural, emotional and social difficulties and prosocial behaviour in young children longitudinally. Also, the predictive power of cognitive, vocabulary and literacy-based language skills regarding parent and teacher ratings of behaviour was examined. Despite an increase in the numbers of young children with an early onset of behavioural difficulties (Hughes and Ensor, 2009), little is known about their association with gender and expressive vocabulary and literacy-based language during the toddler years and at school entry.

Method

Sample

The data for this study came from the second and third surveys of the Millennium Cohort Study (MCS), a national longitudinal birth cohort study, which offers a large-scale information about the 'New Century's Children' and their families. The surveys were carried out when the cohort children reached the ages of 3 and 5 respectively, achieving a response rate of 78% and 79% of the original target sample. The working sample derived from the surveys was 14,961 singleton cohort children (N=8671 for England only). Information about the sampling strategy and response rates for the survey are available in Plewis and Ketende (2006). Full details about the origins and objectives of the Millennium Cohort Study can be obtained from the UK Data Archive at Essex University. Ethical approval for the MCS was gained and parents gave informed consent before interviews took place and a written consent for the cognitive assessments.

Measures

There are three sets of measures, namely behaviour, cognitive and language obtained at ages 3 and 5.

Behaviour: Strengths and Difficulties Questionnaire (SDQ) (Goodman, Meltzer and Bailey, 1998), which consists of five scales with five items each. The scales are: Emotional Symptoms, Conduct Problems, Hyperactivity, Peer Problems and Pro-social. In each subscale scores for each of the five items were summed, giving a range of 0–10, and the total difficulties score, which is the sum of all problem SDQ domains, had a range of 0–40. The SDQ has a good test-retest reliability of .85 (Goodman et al, 1998).

Teacher –rated measures of children's behaviour were obtained from the Personal, Social and Emotional (PSE) development scale of the Foundation Stage Profile (FSP). The PSE contains

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Dispositions and Attitudes; Social Development; and Emotional Development. Each of these assessment scales has 9 points, with scores ranging between 3 and 27 (M=20.79, SD=4.42, N=8671). The FSP assessment framework provides teacher ratings of child social and academic progress based on continued observation during the first year of compulsory education (between ages 4 and 5) in England. Compared to standardised tests, FSP is thought to provide a more developmentally appropriate picture of school functioning for children of all abilities and children whose English is an additional language (Qualifications and Curriculum Authority, 2000).

Cognitive skills: Picture Similarities (verbal reasoning) and Pattern Construction (spatial skills) subscales of the British Ability Scale –II (BAS-II) were administered at age 5; and the Bracken School Readiness Assessment (BSRA) at age 3. The BSRA was made up of six subtests that assess the child's ability to identify colours, letters, numbers, shapes and to describe and compare objects e.g. by size.

Language: The Naming Vocabulary subscale of the British Ability Scale-II (BAS-II), which assesses expressive language and knowledge of names in English, was administered at 3 years (M=49.64, SD=11.39; N=12975) and 5 years (M=53.81, SD=11.25; N=14961). For comparison purposes, two vocabulary groups were formed, namely above average vocabulary, which was defined as containing scores of at least 1 SD above the mean (T=50) and the below average group, defined as at least 1SD below the mean. Language skills in the context of literacy were obtained via the Communication, Language and Literacy (CLL) from the FSP. CLL contains Language for Communication and Thinking; Linking Sounds and Letters; Reading; Writing. Each of these assessment scales has 9 points, with scores ranging between 4 and 36 (M=24.71, SD=7.16, N=8671).

Data analytic plan

A repeated- measures ANOVA was conducted to examine the relationship between vocabulary groups, gender and SDQ domains longitudinally. Analyses of within- and between- subject factors were deemed appropriate for group comparisons and for the examination of longitudinal patterns and possible interaction effects between the variables. The within-the-subject design examined longitudinal differences in the ratings of SDQ domains (i.e., emotional symptoms, conduct problems, hyperactivity, total difficulties and prosocial) at ages 3 and 5, and the between-group design examined two independent variables, namely vocabulary (i.e., above / below average vocabulary groups) and gender (i.e., male, female). The interactions examined were: SDQ domains x vocabulary; SDQ domains x gender; vocabulary x gender; and SDQ domains x vocabulary x gender (see Table 2). The effect sizes were calculated by applying the formulae $r= \sqrt{F(1, df_R) / F(1, df_R) + df_R}$, which uses the F-ratio and the residual degrees of freedom (df_R). Effect size values of 0-.2 are deemed small, .2-.5 medium and .5+ large (Field, 2009). Also, a univariate analysis of variance was conducted to examine the relationship between PSE, vocabulary groups and gender (partial eta squared was used for the effect size). Finally, a series of hierarchical regressions were conducted to assess the prediction of parents' and teachers' ratings of behaviour from i) children's cognitive skills, i.e., BSRA, Picture Similarity and Pattern Construction, and expressive vocabulary, i.e., Naming Vocabulary, at ages 3 and 5, and ii) from literacy-based language, i.e., CLL, at age 5.

Results

The repeated measures ANOVA yielded significant results for both within and between subject designs for most SDQ domains. Table 1 presents the descriptive statistics for gender, vocabulary, and SDQ domains for ages 3 and 5.

[put Table 1 here]

SDQ, PSE and vocabulary

Significant longitudinal differences of a medium effect for SDQ problem domains (with the exception of emotional symptoms) and of a small effect for prosocial were found, indicating that, between the ages of 3 and 5, significant downward changes in SDQ ratings, problem domains in particular, occurred (Table 2). Nonsignificant differences were found in parents' ratings for emotional symptoms, indicating less variability in emotional difficulties over the 2-year-period. Significant vocabulary main effects were found for SDQ problem domains but not for prosocial. Specifically, medium-size differences between vocabulary groups were found for emotional symptoms, conduct problems, hyperactivity, peer problems and total difficulties. These results indicated that, compared to children with above average vocabulary, children with below average vocabulary were rated significantly higher in problem behaviour but received roughly equal ratings for prosocial behaviour. Finally, significant gender effects that were small in size were found for SDQ domains, with the exception of emotional symptoms, indicating that parent-rated problem and prosocial behaviours did not differ substantially between males and females.

[insert Table 2 here]

The repeated ANOVA yielded nonsignificant interactions (Table 2). Specifically, the SDQ domains x vocabulary interaction was non significant, indicating that differences in SDQ ratings

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over the 2-year-period were independent of vocabulary group (above/ below average). The SDQ

domains x gender and the vocabulary x gender interactions were nonsignificant, indicating that

SDQ ratings and vocabulary did not differ in males and females. Finally, the SDQ domains x

gender x vocabulary interaction was nonsignificant, indicating that the decline in behavioural

and social difficulties over the 2-years-period was not moderated by vocabulary and gender, in

that a roughly equal drop in problem behaviour occurred for boys and girls across vocabulary

groups.

Finally, the relationship between PSE, gender and vocabulary groups was examined. Vocabulary

had a significant main effect on PSE, $F(1, 4175)=868.09, p<.000, \eta p^2=.17$, whereas gender had

a significant yet weak effect, $F(1, 4175)=81.29, p<.000, \eta p^2=.02$. There was no significant

interaction between vocabulary and gender, indicating that teacher ratings of behaviour were

roughly the same across groupings, i.e., boys and girls in above / below average vocabulary

groups.

Prediction of parent and teacher ratings of behaviour

To assess their relative contribution to parent and teacher ratings of behaviour (i.e., SDQ total

difficulties, SDQ prosocial and PSE), vocabulary and cognitive skills at age 3 were entered first

(model 1) followed by cognitive skills and vocabulary at 5 (model 2 for prosocial and total

difficulties) as well as literacy-based language skills at 5 (model 2 for PSE only) (see Table 3).

For predicting parent-rated prosocial at age 5, cognitive and vocabulary skills at 3 accounted for

a statistically significant but very small portion of variance, *Adj. R²=.005*. The addition of

cognitive and vocabulary skills at 5 slightly improved the model fit $\Delta R^2 = .002$, indicating that these skills were not good predictors of prosocial behaviour. In predicting parent-rated total difficulties at 5, cognitive skills and vocabulary at 3 accounted for a portion of variance, *Adj. R^2=.101*. The addition of cognitive and vocabulary skills at 5 slightly improved the model fit $\Delta R^2 = .014$, with cognitive ($\beta = -.152, p < .000$) and vocabulary skills at 3 ($\beta = -.109, p < .000$) emerging as relatively good predictors. In predicting teacher-rated PSE, cognitive and vocabulary skills in step 1 made a significant contribution, especially BSRA ($\beta = .265, p < .000$), *Adj. R^2=.119*. In step 2, the addition of cognitive and vocabulary skills at 5 and especially literacy-based language (CLL) improved the model fit substantially $\Delta R^2 = .439$, with CLL emerging as a very strong predictor ($\beta = .760, p < .000$) for teacher-rated behaviour even when child cognitive / vocabulary skills were accounted for. Overall, cognitive and vocabulary skills at 3 made a significant but relatively small contribution to parent-rated problem behaviour and PSE, whereas CLL made a substantive contribution to teacher-rated behaviour.

[insert Table 3 here]

Discussion

The purpose of this study was to examine associations between language, gender and parent- and teacher -rated behaviour in young children during the toddler years and at school entry. Moderate associations between vocabulary and parent-rated behavioural, social and emotional difficulties were found, whereas no significant links emerged between vocabulary and prosocial behaviour. Also, a moderate association was found between PSE and vocabulary. Longitudinal analyses showed a decline in parent-rated behavioural and social difficulties between the ages of 3 and 5, which was independent of vocabulary groups. In contrast, emotional difficulties were less

varied. Finally, although vocabulary did not emerge as a strong predictor of parent-rated behaviour, language in the context of literacy (eg, communication and thinking in classroom and phonological awareness) was found to be a substantive predictor of teacher-rated child behaviour. Cognitive skills at 3 were good predictors of both parent and teacher-rated behaviour, suggesting that behaviour regulation also has a cognitive dimension.

Changes in child behaviour during preschool

Young children's behavioural and social difficulties showed, on average, a moderate drop whereas emotional symptoms did not vary. These findings are comparable to those from previous studies in which, approximately half of preschool children with significant externalizing difficulties were found to no longer manifest these behaviours after their transition to school (Campbell et al., 2000; Keenan and Wakschlag, 2000; Lavigne et al, 1996). A peak of socially problematic behaviours, aggression in particular, has been shown in three-years-olds (Egger and Angold, 2006), followed by a decline in oppositional /defiant difficulties between the ages of 3 and 5 years (Lavigne et al, 1996). In contrast, emotional difficulties, such as anxiety, have been shown to remain stable during the preschool years. Emotional difficulties in three- year- olds were reported to be highly stable across 12 months, .75 and .74 based on maternal and paternal reports respectively (Edwards et al, 2009), and stable only between ages 4 and 5 (Rose et al, 1989).

In considering changes in young children's behaviour, it is important to note that the nature of behavioural, emotional and social difficulties exhibited by three -year-olds is qualitatively different from that of older children. For most three- year- olds, parent-reported elevated

behavioural difficulties tend to be a transient developmental phase within which they test boundaries and develop a sense of autonomy, whereas for some children, behavioural difficulties persist after their transition to school.

Problem and prosocial behaviour, vocabulary and gender

As with previous studies using community samples (Plomin et al., 2002), in this study, medium-size relationships were found between young children's vocabulary and parent ratings of problem behaviour at ages 3 and 5. Compared to children with high average vocabulary skills, those with below average vocabulary were more likely to be rated by their parents as having behavioural difficulties. A novel finding was that although a moderate association was found between expressive vocabulary and parent ratings of behavioural, emotional and social difficulties in young children, the decline in problem behaviour ratings during the preschool years did not differ across vocabulary groups. Children between the ages of 3 and 6 years are developing language and social and emotional skills at a rapid pace and the cognitive and affective processes involved are receptive to the socialisation practices that surround their life (Webster-Stratton et al, 2008). Social cognition supports the understanding of emotions and social situations and is likely to influence children's social experiences in their interactions with parents, ultimately influencing parents' ratings of problem and prosocial behaviour. Children's capacity to identify and predict others' emotions and their responses to emotional situations is crucial for regulating emotions and their behavioural expression and, ultimately, reducing problem behaviour (Egger and Angold, 2006). This is particularly important considering that,

among preschool children, inappropriate behaviour often reflects difficulties with emotion understanding rather than language or other cognitive skills (Hughes and Ensor, 2009).

In this study, vocabulary skills were found to differentiate between problem and prosocial behaviour with the latter showing stable parent ratings between vocabulary groups. This is comparable with previous research in which primary school children with language impairment did not differ from same-age typically developing peers on parent ratings of prosocial behaviour (Farmer, 2000). At first glance, these findings are counterintuitive in that for children to exhibit prosocial behaviours good expressive and receptive language skills are required (Hart et al, 2004). Although social competence involves both emotional and cognitive responses to social situations, it is important to differentiate between these responses (Dunn, 1995), considering that prosocial behaviour relies primarily on the capacity to engage emotionally with others, as well as on the existence of cognitive skills that are typically required to discriminate, encode or retrieve information that allows for linguistic and socio-cognitive representations to be developed (Bishop, 1997).

To discuss the relationship between language and problem and prosocial behaviour, three explanations have been offered: First, the link between behaviour and language difficulties may not be direct due to the presence of other factors such as emotional regulation, which may mediate the relationship. For example, in a study by Fujiki and colleagues, children with language difficulties were rated lower in emotional regulation (2002). Secondly, patterns of association between language and prosocial behaviour may be influenced by the severity of language difficulty, as in a study by Hart and colleagues where severe expressive language

difficulties had a significant impact on prosocial behaviour (2004). Thirdly, the conceptual dimensions that underpin social competence, which is typically defined as prosocial behaviour and likeability, may relate to language differently. For example, prosocial behaviour has been found to link to severe language difficulties, whereas likeability is linked to poor receptive language skills (Hart et al, 2004).

Finally, and consistently with previous studies, the gender effects on problem and prosocial behaviours were small in size and thus not substantive (Lindsay et al, 2007; Hughes and Ensor, 2009). The relationship between gender and behavioural difficulties in young children is ambiguous in that although gender effects have been found to differentiate between externalising and internalising difficulties with the former being more prevalent in boys (Office of National Statistics, 1999), this differentiation was not evidenced in the present study.

Predicting child behaviour from language

As with previous research (Benasich et al, 1993; Dockrell, Lindsay, Palikara and Cullen, 2007; Lindsay et al, 2007; Pike et al, 2006), children's expressive vocabulary during preschool and at school entry did not substantially predict parent ratings of behavioural, emotional and social difficulties and prosocial behaviour at 5. In a study by Benasich and colleagues (1993), language difficulties at age 4 did not predict either concurrent or behavioural difficulties at 8 years. However, language in the context of literacy (eg, communication and thinking in classroom and phonological awareness) was found to be a strong predictor of teacher-rated child behaviour, suggesting that teachers' views about children's language in the classroom is likely to influence

their perception of children's behaviour. Conversely, teachers tend to score higher on behavioural problems that interfere with aspects of children's learning with their reports of behaviour being influenced by their perception of children's academic performance (Miller-Lewis et al, 2006; Lindsay et al, 2007). Considering evidence that receptive language difficulties are better predictors of children's behaviour (Beitchman et al, 2001), it can be argued that an effective use of children's language in the classroom relies heavily on their receptive language skills. Finally, the differences in the extent to which children's language influences parent and teacher ratings of behaviour can be explained by considering that teachers have a normative view of what constitutes appropriate behaviour, whereas parents' views of behaviour are likely to be influenced by children's capacity for emotion understanding and overall communication (rather than vocabulary skills alone) whose meaning is constructed within the social and cultural milieu of a family.

Strengths and limitations

There are strengths and limitations to this study. Using a large, community-based sample has enabled replication of other studies with fairly small samples to examine the longitudinal patterns of child behaviour as well as its association with expressive vocabulary and gender, a relatively under researched area in early years. This study involved multiple behaviour aspects (eg, problem and prosocial behaviour), various measures of language (i.e., vocabulary and literacy-based language) and multiple informants (eg, parents, teachers). Finally, it explored the predictive power of child's vocabulary at ages 3 and 5 and language as it was used in the context of literacy regarding parent and teacher-rated behaviour in a large, non-clinical sample of young children.

As this study shows, vocabulary was not associated with prosocial behaviour but was moderately associated with behavioural, social and emotional difficulties, suggesting a vocabulary specificity effect on parent ratings of child behaviour. Further research is needed to delineate the types and severity of language difficulties or language delay that are more likely to associate with problem and prosocial behaviour in preschool children, and explore the contribution of emotion understanding and social problem solving skills to child behaviour. Finally, to truly consider the dynamic processes of child behaviour development, an examination of reciprocal effects is required in terms of collecting data across three different points in time, for example, language measures at time one, affecting ratings of child behaviour (both problem and prosocial) at time two, which then affects language at time three.

Conclusions and implications

Young children who lack self-regulatory skills and social competence find it difficult to learn and relate socially to others in early years settings and after their transition to school. For most young children, behavioural difficulties is a transient phase, but for children who enter formal education without the required social / emotional competencies and language skills, school-based support needs to be three-fold in terms of targeting language, behaviour and learning. To ensure that early year settings and schools are geared to meeting children's language and social and emotional needs, the development of contextually relevant intervention strategies, situated within the curriculum, should be considered to intentionally foster the development of language and critical social-emotional skills (Fantuzzo et al, 2007). Early years intervention programmes should take an ecological approach in terms of focusing on children as well as their immediate environments (eg, home, school), and recognise the context specificity of young children's

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behaviour as well as the interlinked nature of children's, parents' and teachers' adaptive or maladaptive behaviour. Most crucially, family- and school- based interventions should approach children as active participants in the construction of their behaviour, who, as they grow, they develop skills to regulate behaviour and engage socially with others. As this study shows, how well children fared with regard to classroom-based language made a significant contribution to teachers' perceptions of their behaviour, whereas in the home, children's vocabulary did not exert a strong influence on parental views of behaviour. The relationship between language and behaviour, especially in early years, is not monotonic in that other attributes such as cognition and emotion regulation are important in influencing views about child behaviour. Considering children's behaviour specificity and the multitude of social competencies that young children bring into their interactions with others at home and in the school, to provide early years intervention effectively is a balancing act between supporting toddler-age children's needs for autonomy and independence and tackling elevated problem behaviours that are likely to pose obstacles to learning with and from others.

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Table 1   *Descriptive statistics*

	Age	Below Average Vocabulary		Above Average Vocabulary	
		Male M(SD)	Female M(SD)	Male M(SD)	Female M(SD)
Emotional Symptoms	3	2.57(3.05)	2.80(3.34)	1.42(1.85)	1.36(1.66)
	5	2.40(2.76)	2.63(2.87)	1.28(1.65)	1.35(1.64)
Conduct Problems	3	3.98(2.92)	3.94(2.99)	2.91(2.30)	2.54(2.10)
	5	2.46(2.52)	2.16(2.31)	1.49(1.61)	1.19(1.41)
Hyperactivity	3	6.01(3.45)	5.49(3.38)	4.16(2.72)	3.53(2.55)
	5	5.06(3.33)	4.77(3.44)	3.35(2.47)	2.64(2.23)
Peer Problems	3	3.46(3.33)	3.17(3.35)	2.30(2.72)	1.97(2.43)
	5	2.58(2.93)	2.60(2.88)	1.54(2.11)	1.36(1.94)
Total Difficulties	3	16.02(10.01)	15.43(10.41)	10.82(6.90)	9.42(6.11)
	5	12.52(9.11)	12.19(8.80)	7.67(5.50)	6.56(4.97)
Prosocial	3	8.04(2.54)	8.08(2.39)	7.59(2.01)	7.97(1.81)
	5	8.26(1.92)	8.52(1.79)	8.34(1.65)	8.82(1.40)
PSE	5	17.52 (4.84)	19.04 (4.70)	21.82 (3.77)	22.75 (3.43)

N_{age3}=3721 (N=1859 below average vocabulary; N=1862 above average vocabulary)

N_{age5}=6551 (N=1510 below average; N=5041above average)

N_{pse}=4176 (N=1218 below average; N=2985 above average)

Table 2   *Repeated ANOVA for SDQ domains, vocabulary and gender*

Source	Df	F	p	r
Between subjects				
Vocabulary (V)	1	527.02	.001	.28
Gender (G)	1	4.6	.03	
VxG	1	3.97	.04	
Between-group error	5802	(5.40)		
Within subjects				
Emotional Symptoms(ES)	1	9.74	.02	
ESxV	1	1.30	.25	
ESxG	1	.844	.35	
ESxVxG	1	.714	.39	
Within-group error	5802	(2.86)		
Between subjects				
Vocabulary (V)	1	371.44	.001	.24
Gender (G)	1	19.23	.00	.05
VxG	1	2.16	.41	
Between-group error	5802	(5.96)		
Within subjects				
Conduct Problems (CP)	1	1553.02	.001	.46
CPxV	1	11.21	.01	
CPxG	1	1.25	.26	
CPxVxG	1	4.74	.03	

Within-group error	5802	(2.71)		
Between subjects				
Vocabulary (V)	1	622.96	.001	.31
Gender (G)	1	49.38	.01	.09
VxG	1	3.05	.08	
Between-group error	5798	(10.72)		
Within subjects				
Hyperactivity (H)	1	331.77	.001	.23
HxV	1	.03	.84	
HxG	1	.57	.44	
HxVxG	1	2.50	.11	
Within-group error	5798	(3.94)		
Between subjects				
Vocabulary (V)	1	298.34	.001	.22
Gender (G)	1	8.59	.003	
VxG	1	.88	.34	
Between-group error	5800	(8.22)		
Within subjects				
Peer Problems (PP)	1	208.95	.001	.18
PPxV	1	.15	.69	
PPxG	1	5.16	.02	
PPxVxG	1	.613	.43	
Within-group error	5800	(4.36)		

Between subjects				
Vocabulary (V)	1	789.99	.001	.34
Gender (G)	1	19.67	.01	.05
VxG	1	4.31	.038	
Between-group error	5796	(68.02)		
Within subjects				
Total Difficulties (TD)	1	748.05	.001	.34
TDxV	1	2.38	.12	
TDxG	1	1.33	.24	
TDxVxG	1	.007	.93	
Within-group error	5796	(24.82)		
Between subjects				
Vocabulary (V)	1	.79	.37	
Gender (G)	1	36.07	.01	.07
VxG	1	8.71	.03	
Between-group error	5800	(4.25)		
Within subjects				
Prosocial (P)	1	233.85	.001	.19
PxV	1	40.03	.01	.08
PxG	1	4.64	.03	
PxVxG	1	.52	.46	
Within-group error	5800	(2.49)		

Note: Values enclosed in parentheses represent mean square errors

Table 3   *Standardised regression coefficients for SDQ total difficulties, SDQ Prosocial and PSE at 5*

	Prosocial		Total difficulties		PSE	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
BSRA (3)	.057***	.046ns	-.203***	-.152***	.263***	-.052**
NV (3)	.024ns	.024ns	-.152***	-.109**	.113***	.010ns
PC (5)		.035ns		-.079***		.004ns
NV (5)		-.014ns		-.077***		.012ns
PS (5)		.028ns		-.042***		.009ns
CLL (5)						.760***
Adj. R^2	.005	.007	.101	.115	.119	.558
F	18.67***	10.44**	375.78***	174.93***	459.82*****	1433.56***

N=6675-6795

***p<.001; **p<.01

Note: BSRA: Bracken School Readiness Assessment; NV: Naming Vocabulary; PS: Picture

Similarity; PC: Pattern Construction; CLL: Communication Language Literacy