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Short Report

Relationships between language impairment, temperament, behavioural adjustment and maternal factors in a community sample of preschool children

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Abstract

Background: Relationships between child language development and temperament have been little studied in young children, although it is known that children with language impairment are at risk in a number of domains of psychosocial development involving temperamental influences.
Aims: To investigate the relationships between temperament and language development, along with child behavioural adjustment and maternal psychosocial factors.
Methods & Procedures: A sample of 4-year-old children with language impairment was compared with typically developing children, from a large community cohort in a longitudinal study, on three temperament dimensions, behavioural and emotional problems, and maternal factors. Participants were part of a large community cohort involved in a longitudinal study.
Outcomes & Results: While the groups did not differ significantly on temperamental shyness/sociability, children with language impairment showed more negative dispositions on the persistence/self-regulation factor, and on overall temperamental difficultness. Behavioural problems were elevated in the language impairment group and were associated with temperament in both groups. Maternal measures of education level, reading and vocabulary skills were significantly lower in the language impairment group.
Conclusions & Implications: Generally the language impairment group showed a constellation of developmental disadvantages which add to the existing developmental vulnerability conferred by the presence of language impairment. Poorer child temperament self-regulation and behavioural adjustment are strong risk factors for school learning, while lower mother education and literacy contribute further disadvantage. Clinicians managing language impairment in children need to be aware of the whole package of risk factors which are common in this population.

Keywords: language impairment, temperament, behaviour problems.

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What this paper adds

What is already known on the subject?

Developmental language impairment is a risk factor for poor outcomes in social and cognitive development and school learning. Child temperamental characteristics and maternal psychosocial factors are likely to be influential in a range of negative psychosocial outcomes.

What this study adds

Compared with typically developing children, temperament factors of self-regulation and overall difficultness, as well as behavioural adjustment, are more negative in children with language impairment at 4 years of age. Suboptimal maternal educational and literacy factors further contribute to the package of disadvantages seen in language-impaired children before they enter school; these need early identification and intervention to improve longer-term outcomes.

Introduction

There is relatively little literature concerned with relationships between child temperament and language development in young children. Yet, temperament would be expected to have an influence on the development of social–communicative competence just as it does with so many other developmental characteristics, including behavioural adjustment, adaptation to school and social competence. Temperament is conceptualized as the 'style of behaviour' and has been defined as individual differences in emotional and behavioural self-regulation, and emotional reactivity, which underpin the unique behavioural style of the individual, and which play a significant role in how children develop and adjust in the home, school and wider environment over the life span. In an earlier paper on temperament and language development, Prior *et al.* (2008) showed that shy temperament along with gender and maternal psychosocial factors were associated with vocabulary development at 24 months in a large community sample, although relatively little variance in language status was accounted for overall. Paul and James (1990) reported that 2 year olds with mild language delay were rated on the Child Personality Scale as more active, inattentive (less persistent), more difficult and less positive in temperament. Children with delayed expressive language development (late talkers) who were followed up at 6 years of age showed more social withdrawal as measured by the Martin Temperament Scale, although this had reduced to only a trend by age 6 follow-up (Paul and Kellogg 1997).

Prior et al. (1988) assessed temperament in another at risk group: preschool children with hearing impairment. They found that these children were rated by their mothers as having a more difficult temperament compared with normally hearing children. Mothers self-reported elevated levels of psychological distress involving anxiety, depression and overall problems, and this was related to behavioural problems in the children, and hence to the interaction between temperament, child behaviour and maternal factors. Caring for a hearing-impaired child was a salient source of elevated distress in the mothers. This is likely to be an issue for families where children have less than optimal development across a range of domains, including language.

Family influences in this domain have also been studied. Carson *et al.* (2007) assessed parenting behaviour and child temperament in toddlers (25–31 months) with and without speech–language delay. Parental reports indicated that children with speech–language delay were more detached (aloof, withdrawn and difficult to engage) and under-reactive than those without speech–language delay, and parents reported themselves as being less nurturing and more punitive towards their language-delayed children. The authors argued that parents may be less positive and less accepting of their speech–language delay children's communications than parents of typically developing (TD) children; this along with more punitive discipline may put children at risk for continuing speech–language delay and social withdrawal.

Investigators in this field have raised the question of whether children with delayed or problematic development are perceived more negatively by parents, or whether their intrinsic handicaps make them more vulnerable to more negative dispositions, a more difficult temperamental style, less positive family interactions, and increased risk for development of the behavioural and emotional problems which are notoriously common in children with language-related developmental problems (Beitchman *et al.* 1996). This question can be examined more effectively via prospective longitudinal studies such as that of Slomkowski *et al.* (1992) who reported both concurrent and longitudinal relationships between temperament and communication development in children at 2 and again at 3 years of age. Positive sociability at 2 years was related to both receptive and expressive language at 3 years, and at age

7 years continued to be related to receptive language skills.

In the context of a large community-based longitudinal study of language development from 8 months to 4 years of age, the 'Early Language in Victoria Study' (ELVS), we had the opportunity to assess the relationships between temperament and language development, as well as a range of influential associations including child behavioural adjustment and maternal psychosocial factors. The hypothesis was that shy temperament in particular would be associated with delay in language competence because communication problems could inhibit interaction between child and parent. We also expected that children with language impairment (LI) would be rated as having a more difficult temperament and lower self-regulation skills as seen in poorer levels of attention and persistence (Sanson et al. 2004).

We assessed a range of temperamental characteristics with a particular focus on those children who by 4 years were showing clear evidence of delayed language development, and were identified as LI based on clinical assessment. We used an Australian measure of temperament developed by Prior *et al.* (2000) from the early temperament work of Thomas and Chess (1977). Behavioural adjustment was also measured, including dimensions of internalizing and externalizing problems and an overall adjustment score. Given the critical relationships between child development factors and maternal factors, we also measured a range of maternal variables known to affect child development in cognitive, language and psychological domains, including mother psychological distress, and sociodemographic variables especially mothers' language and literacy skills.

The questions for this study were as follows. Do children with identified LI at age 4 show particular temperament characteristics by comparison with TD children? What moderating factors are related to group differences in temperament?

Method

Participants

Children in the ELVS sample were recruited from six of Melbourne's metropolitan local government areas using the SEIFA Relative Index of Socioeconomic Disadvantages from the Australian Bureau of Statistics (2001) (incorporating income, educational attainment and unemployment), covering the spectrum of disadvantage–advantage. The mean (standard deviation (SD)) Index for Disadvantage score (SEIFA) for the ELVS sample was 1038.7 (58.2), which was slightly higher than that for all metropolitan Melbourne, 1020.6 (66.4).

Participants were recruited in 2003–2004 through the maternal and child health programme provided by the state government, which services approximately 98% of newborn infants, with about 82% of families reporting in for check-ups at around 8 months of age. Child health nurses consecutively approached parents of all infants attending for their 8-month visit. More participants were recruited at standard 8-month hearing screening sessions, and following some publicity in local newspapers interested parents were able to contact the research team directly.

All children aged between 7.5 and 10 months living in the six local government areas during the recruitment phase were targeted, unless they had identified hearing impairment, cerebral palsy or other serious disability, or if their parents did not speak and understand English well enough to participate. Questionnaires used in the study were written at no more than a School Year Six reading level; and completion by telephone interview was available. Children were followed up at yearly intervals with parent questionnaires, plus individual assessments at 12 months, and at 48 and 60 months.

The sample of 1559 for this study was drawn from children from the original sample of 1910, whose parents completed follow-up questionnaires at 48 months, and whose children completed an individual assessment. For the sample there were 797 (51.1%) boys, 762 girls, of mean age = 4.14 years (SD = 0.09). The SEIFA Index of disadvantage for the group had an overall mean of 1038.7 (SD = 58.16) (LI: 1017.8, SD = 69.52; TD: 1043.9, SD = 53.77) and was significantly lower ($t = 7.20$, $p < 0.001$) in the LI group. A total of 310 of the children were identified as LI with more boys than girls being in the LI group (62% versus 38%), i.e. close to the 2:1 ratio commonly found. The mean SEIFA score of ELVS children no longer participating in this study was 1024.2 (SD = 70.0); this is significantly lower than the mean of the retained participants ($p = 0.0001$), but similar to the original recruited sample from Melbourne. We acknowledge the fact that some of the lower SES families were lost from the original sample over time. Some children had missing data on some items hence the numbers shown in Table 1 vary slightly from 265 to 306.

The study was approved by the Ethics Committees of the Royal Children's Hospital and La Trobe University.

Measures

Language impairment (LI)

LI was defined via scores on the Australian adaptation of the Clinical Evaluation of Language Fundamentals—Preschool, 2nd Edition (CELF-P2) receptive or

Table 1. *T*-tests of group differences (language impaired versus typically developing) at 4 years

Variable	Language impaired		Typically developing		Mean difference (typically developing – language impaired)			
	n	Mean (SD)	*n*	Mean (SD)	Difference	95% Confidence intervals	*p*-value	Cohen's *d*
Temperament								
Persistence	268	24.49 (6.10)	1174	22.29 (5.45)	−2.19	−2.93 to –1.45	<0.001	−0.38
Shyness/sociability	269	20.93 (6.85)	1174	19.94 (6.54)	−0.99	−1.86 to –0.11	0.027	−0.15
Easy–difficult	268	72.44 (12.98)	1173	67.06 (12.28)	−5.38	−7.03 to –3.73	<0.001	−0.43
Behaviour scales								
Emotional symptoms scale	270	1.53 (1.67)	1179	1.37 (1.49)	−0.16	−0.36 to 0.04	0.113	−0.10
Conduct problems scale	270	2.04 (1.64)	1179	1.54 (1.45)	−0.51	−0.70 to –0.31	<0.001	−0.33
Total difficulties scale	270	9.58 (5.32)	1179	7.32 (4.24)	−2.26	−2.85 to –1.67	<0.001	−0.47
Maternal factors								
Reading (WRAT)	294	91.53 (9.50)	1205	96.65 (8.90)	5.11	3.96 to 6.26	<0.001	−0.56
Vocabulary (Mill Hill)[a]	287	25.44 (5.69)	1202	28.34 (4.44)	2.90	2.29 to 3.51	<0.001	0.57
Highest level of education[b]	265		1162				<0.001	
Mother distress	266	2.18 (0.61)	1159	2.14 (0.56)	−0.04	−0.11 to 0.04	0.312	−0.07

Notes: [a]Mill Hill measured at 12 months.
[b]Chi-squared test (χ^2 (2) = 26.67, $p < 0.001$).
Temperament scale: higher scores for persistence, sociability, and easy–difficult indicate shy, not persistent and difficult, respectively.
Behaviour scales: higher scores indicate more problems in that area.
Maternal distress: higher scores indicate more distress.

expressive composites that were more than 1.25 SD below the mean (i.e. ≤ 81) for the norming population. This was in accordance with cut-points adopted in previous epidemiological studies and was the same as those of Tomblin *et al.* (1997), Beitchman *et al.* (1996) and Justice *et al.* (2009) in their longitudinal studies which showed poor outcomes even with this relatively low threshold. This is a cut-point that would flag children in need of clinical input; however, the LI participants were not classified as specific–language impaired (SLI) since the exclusion criteria generally applied to identify SLI were not considered. In addition, we ran the analyses comparing children with SLI and TD children in the sample, and no differences in any of the variables were found. Children with hearing problems were excluded in the first stage of the ELVS study. Language assessments were conducted by research assistants (either speech pathologists or honours graduate students) who were trained by senior investigators experienced with the test battery. Protocols were in place to maintain consistency across assessments and over time.

Temperament

Temperament was measured with the Australian Pre-school Temperament Scale (Prior et al. 1989) derived from the *parent rated* Childhood Temperament Questionnaire (Thomas and Chess 1977), which contains dimensions of Inflexibility, Approach/Sociability, Persistence, Rhythmicity, and Activity/Mood, as well as a composite measure derived from the questionnaire factors of Approach/Sociability, Inflexibility, Cooperation/Manageability, and Persistence, and called the Easy Difficult Scale (EDS). For these analyses we focused on three salient temperament factors: *approach/sociability*—following the hypotheses that children with LI would be vulnerable to shyness or low sociability; problems with attention or *persistence* (the self-regulation domain which is a commonly found factor in children with developmental impairments with wide-ranging effects); and an *overall more difficult temperament* based on the EDS. (For a full account of the psychometrics of the Australian Temperament Scales including the EDS, see Prior *et al.* 1989.)

Child behavioural adjustment

Parents completed the Strengths and Difficulties Questionnaire (SDQ; Goodman 1997), a 25-item behavioural screen comprising five composites: Emotional Symptoms, Conduct Problems, Hyperactivity, Peer Problems, and Prosocial scales. A Total Difficulties score was generated from the first four of these scales, as well as two subscales of 'Emotional problems' and 'Conduct problems', equating to 'internalizing' (*problems within the self*) and 'externalizing' (*acting out*) behavioural problems.

Maternal factors

Mother distress was measured using a composite score made up of three indicators (range of scores from 1.0 to 4.5): score on the Non-specific Psychological Distress Scale (Kessler-6) (Kessler and Mroczek 1994); and measures of mothers' psychosocial health via two self-ratings on current life stresses, and perceived coping capacities, using two five-point Likert scales The latter scales showed good reliability in studies within the Australian Temperament Project (Prior *et al.* 2000). The Mother Distress Scale was created by generating a mean score on these three measures which factored together (Bretherton *et al.* 2011).

Maternal education and literacy

This domain included level of maternal education (from less than completion of secondary education to tertiary degree levels); maternal literacy as measured by the word recognition subtest of the Wide Range Achievement Test—4 (Wilkinson and Robertson 2006) administered to parents during child assessment visits; and a mother's self-rated vocabulary level as measured by the Mill Hill Vocabulary scale, self-completed when the child was aged 12 months.

Results

The results are summarized in Table 1. Numbers in the sample varied slightly due to a small amount of incomplete data in some cases. We repeated the analyses for boys and girls separately, but the figures remained substantially the same, hence gender differences were not apparent in the variable assessed in this study, apart from the fact that the ELVS sample girls were overall ahead of boys on the language measures (Reilly *et al.* 2010). We also repeated the analyses comparing those children who had LI in the context of IQ scores on the K-BIT2 Matrices scores within the average range, and who were thus classifiable as SLI with TD children. Since the results did not differ between the LI and SLI group analyses, we report on only the LI group here, i.e. all children whose language scores were low. Scores of LI and TD groups were compared using *t*-tests on the temperament dimensions, behavioural difficulties and maternal factors. Bonferroni correction for multiple tests resulted in an alpha level of 0.005. We also report effect sizes to assess clinical significance of differences.

Scores on the CELF P2 for LI and typical children were as follows: receptive language, TD ($n = 1249$), mean = 102.05, SD = 11.02, LI ($n = 310$), mean = 75.99, SD = 8.74; and expressive language, TD ($n = 1249$), mean = 104.80, SD = 11.21; LI ($n = 310$), mean = 78.80, SD=10.17.

Contrary to expectation, the groups did not differ significantly on the approach/sociability temperament dimension at 4 years. This finding was inconsistent with the findings on this sample at 2 years when shyness was associated with lower vocabulary scores (Prior *et al.* 2008). However, in that study the influence was relatively weak as might be expected at such a young age. LI children in the current study did show more negative outcomes on temperament persistence/self-regulation, and on overall difficultness (EDS) (Table 1).

Behavioural adjustment was significantly more compromised in the LI children on the Conduct Problems scale (low effect size (ES) = 0.33) and on the Total Difficulties scale (medium ES = 0.47). The lack of a significant difference on emotional factors seems to be consistent with the non-significant finding for group differences in shy temperament. Strong group differences came from comparisons of maternal language and literacy factors, where mothers of LI differed from those of TD children on the reading, vocabulary and education level factors with ESs of 0.6 and 0.7 respectively, for reading and vocabulary. Consistent with these findings, mother's education level was significantly lower in the LI group. The Mother Distress variable did not discriminate between groups.

Correlation analyses were carried out across all independent variables using the total sample (estimates did not differ when LI and TD groups were considered separately). Correlations at 0.3 or higher ($p < 0.001$) were accepted as meaningful and are reported here. Temperament associations with behavioural adjustment variables included: lower persistence/total SDQ, 0.42; low sociability/emotional problems, 0.39; EDS/total SDQ, 0.57; Emotional problems/EDS 0.41; and Conduct problems/EDS 0.44. Temperament persistence was also related to mother vocabulary (0.48), and mother distress to total SDQ (0.30).

Discussion

Overall, the findings identify a constellation of disadvantaged developmental features that appear to be common in children with LI as defined in this study. Mothers of children with LI had lower educational achievements as measured by two tests of literacy skills and on level of education. The latter variable is an indicator of family disadvantage and relevant to the lower socio-economic status of the LI group via the SEIFA measure. The frequently reported relationships between temperament factors and behaviour problems emerged here for both LI and TD children (Prior *et al.* 2000). In addition, mother vocabulary was associated with temperamental persistence/self-regulation, and mother distress was associated with overall child behaviour problems. The estimates of LI in this study were somewhat higher than

are commonly reported. However, this is a 'population' sample tracked since birth and not recruited from clinics; hence, it is possible that we may be describing a group where relatively mild (–1.25 SD) LI is more prevalent but not yet detected or diagnosed in clinics where referred children with behavioural and learning problems are often found to have unidentified language problems. Alternatively we may find in further follow-ups that this rate diminishes as false-positives emerge.

The fact that group differences on the shyness/sociability factor were not statistically significant, contrary to findings in the previous literature, may be due to differing measures and/or differing ages of the children in the various research studies, many of whom were toddlers. Like the participants in Paul and Kellogg's (1997) research, our children with LI may have increased sociability by 4 years, especially with exposure to social interaction in preschools or playgroups.

This study of 4 year olds with LI shows that they are vulnerable to a package of associated difficulties in temperament and behavioural domains which add to the existing risk coming from poorer language development. While the *pattern* of temperament and behaviour relationships is similar to that found in TD children, the children with LI are significantly worse off at 4 years, just prior to school entry. This pattern potentiates risk for less than optimal outcomes in the school years where poorer self-regulation capacities and behavioural adjustment added to LI compromise learning progress. In addition, the maternal literacy variables suggest that their mothers may be less able to compensate in the early years for the developmental difficulties of their children. Since temperament is modifiable to some extent, the negative temperament traits emerging here can be explicated to parents along with guidance on how to adapt to, and manage, these behavioural styles within the family context. *Early identification and intervention* for children with LI are recommended to reduce disadvantage at school entry, and on through further learning. From a clinical perspective the findings indicate that professionals involved with preschoolers with LI need to consider and treat the whole constellation of disadvantages these children bring with them.

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