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Research Report

Children with language delay referred to Dutch speech and hearing centres: caseload characteristics

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Abstract

Background: Early detection and remediation of language disorders are important in helping children to establish appropriate communicative and social behaviour and acquire additional information about the world through the use of language. In the Netherlands, children with (a suspicion of) language disorders are referred to speech and hearing centres for multidisciplinary assessment. Reliable data are needed on the nature of language disorders, as well as the age and source of referral, and the effects of cultural and socioeconomic profiles of the population served in order to plan speech and language therapy service provision.
Aims: To provide a detailed description of caseload characteristics of children referred with a possible language disorder by generating more understanding of factors that might influence early identification.
Methods & Procedures: A database of 11,450 children was analysed consisting of data on children, aged 2–7 years (70% boys, 30% girls), visiting Dutch speech and hearing centres. The factors analysed were age of referral, ratio of boys to girls, mono- and bilingualism, nature of the language delay, and language profile of the children.
Outcomes & Results: Results revealed an age bias in the referral of children with language disorders. On average, boys were referred 5 months earlier than girls, and monolingual children were referred 3 months earlier than bilingual children. In addition, bilingual children seemed to have more complex problems at referral than monolingual children. They more often had both a disorder in both receptive and expressive language, and a language disorder with additional (developmental) problems.
Conclusions & Implications: This study revealed a bias in age of referral of young children with language disorders. The results implicate the need for objective language screening instruments and the need to increase the awareness of staff in primary child healthcare of red flags in language development of girls and multilingual children aiming at earlier identification of language disorders in these children.

Keywords: developmental language disorders, caseload characteristics, assessment.

What this paper adds

What is already known on the subject

- Identifying language disorders before children enter school can foster the initiation of early interventions before these problems interfere with formal education and behavioural adjustment. Information on caseload characteristics is important to plan speech and language therapy service provision. There are only a few studies on the caseload characteristics of children at first referral for language assessment.

What this paper adds to existing knowledge

- This study provides a detailed description of the caseload characteristics of children referred to Dutch speech and hearing centres. The results reveal an age bias in referral: boys were referred earlier than girls,

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and monolingual children were revealed earlier than bilingual children. On top of that, bilingual children seemed to have more complex problems at referral.

What are the potential or actual clinical implications of this work?

- This study indicates that it is important to be aware of bias in the age of referral of subgroups of children with language disorders. Solutions might be to implement a language screening instrument designed for use by non-speech–language therapists, and training in early recognition of girls and multilingual children with (less complex) language disorders for health professionals in key positions in child healthcare. In addition, it might be worthwhile to assign speech and language therapists with diverse ethnic and language backgrounds and/or with experience with bilingual/cultural children in a regional mentoring function to support referral agents and parents.

Introduction

Delayed language acquisition is one of the most common developmental problems among preschool children. The language problems can be caused by an intellectual disability, hearing loss, autism or a combination of these factors. Language problems can also exist without a clear biomedical condition, often referred to as developmental language disorder (DLD) (Bishop *et al.* 2017). There are no estimates of the proportion of all children with language disorders. Studies report prevalence rates of language difficulties between 5% and 12% for children aged 0–7 years (Law *et al.* 2000; Tomblin *et al.* 1997; Shriberg *et al.* 1999).

Early detection and remediation of language disorders are important, because children need good communicative and language skills in order to participate adequately in daily life. Several studies have shown that problems in language acquisition may be a precursor for later learning disabilities and affect children's social emotional development, daily functioning and quality of life (Wallace *et al.* 2015). Estimates of the increased risk for poor reading outcomes in children at age 6–8 years are four to five times greater for children with DLD than for children with appropriate language development (Catts *et al.* 2001, 2002; Glogowska *et al.* 2006; Tomblin *et al.* 2000).

Identifying language problems before children enter school can foster initiation of early interventions before these problems interfere with formal education and behavioural adjustment (Wallace *et al.* 2015). Treatment in the form of language intervention can be quite successful although, depending on the severity and age of diagnosis, progress may not be rapid and age-appropriate language abilities may not always be achieved (Leonard 2014). In the systematic review of Wallace *et al.* (2015) it is concluded that for children of ages 5 or < 12 years treatment studies improved various outcomes in language; little evidence emerged for interventions improving other outcomes, such as behavioural problems or well-being, or for adverse effects of treatment. Speech and language therapy is also shown to be effective in older children (ages 5–15 years), although specific information on age effects is lacking and there might be subgroups such as children with receptive language problems with a less positive prognosis (Boyle *et al.* 2010; Law *et al.* 2003).

In the Netherlands, children with a language disorder are often identified in preventive child healthcare, where children's development and health is monitored at regular intervals between ages 1 month and 19 years. Speech and language development is monitored at ages 2;0, 3;0 and 3;9. Children judged to be at risk are referred to speech and hearing centres for multidisciplinary assessment. There are no data of the proportion of children seen in speech and hearing centres or other centres or by other professionals.

In Dutch speech and hearing centres, the assessment of children with (a suspicion of) language disorder consists of an evaluation of speech and language skills, cognition, behaviour, hearing (and other physical aspects) and family characteristics. A speech and language therapist, developmental psychologist and audiologist are involved in this assessment. For each child clinical and assessment scores are registered in a digital database (Buekers and Degens 2007). In the present study we analysed the data of 11,450 children aged 2–7 years from this database. We were interested in general caseload characteristics such as age of referral, ratio of boys and girls, mono- and bilingualism, nature of language disorder, and type of language profile.

There are only a few studies on caseload characteristics of children at first referral for language assessment (e.g., Broomfield and Dodd 2004; Harel *et al.* 1996; Keegstra *et al.* 2007). Information on caseload characteristics is important to plan speech and language therapy service provision. Reliable data are needed concerning the nature and severity of language disorders, as well as the age and source of referral and the effects of cultural and socioeconomic profiles of the population served (Broomfield and Dodd 2004). Harel *et al.*

(1996) analysed the medical, psychosocial, demographic and linguistic characteristics of children referred to a child development centre for the evaluation of speech, language and communication disorders. In their study, the mean age of referral of 323 children with DLD was 39 months (range 20–52 months). Children with combined comprehension and expressive problems (53%) were referred earlier, 36 months, than children with expressive disorders (47%), whose average age of referral was 41 months. However, the criteria used to diagnose and categorize the children are not described. The authors state that information regarding language characteristics, such as receptive and expressive ability, was derived from several sources, including the initial speech and language assessments, description of linguistic variables from a follow-up period of at least two years, clinical observations made during therapy sessions, and multidisciplinary staff reports. The procedure itself was performed by a senior speech and hearing pathologist who integrated the details of each case file and arrived at the specific conclusions. Keegstra *et al.* (2007) studied background variables and language profile of 240 children aged 2–5 years with a (suspicion of) language disorders referred to four speech and hearing centres in the Netherlands. Unfortunately, they only report on outcomes of two standardized language tests: information on non-verbal intelligence, hearing and behaviour is missing. A total of 123 out of 240 children (51%) had a language comprehension and/or sentence production quotient score of 1.3 SD below the mean (quotient scores $\leq$ 80). Problems with sentence production occurred more often than problems with language comprehension (39% versus 24%). In 27 children (11%), both sentence production and language comprehension were inadequate. In 51 children (21%), sentence production was the only problem. In 23 children (10%), language comprehension was the only problem. Broomfield and Dodd (2004) describe 1100 children referred to a paediatric speech and language therapy service for children who have a DLD. The presence of a difficulty was determined by performance < 1 SD on standardized speech and language tests and/or a profile of communication disability as observed through clinical symptoms. Of the 1100 referrals, the most common diagnostic category was speech difficulties (29.1%) followed by receptive language difficulties (20.4%) and expressive language difficulties (16.9%). Broomfield and Dodd found a gender ratio within language disability of at least 3:1 (boys:girls), whereas the gender ratio within speech disability was < 2:1. The proportion of girls with speech disorder is greater than might be expected. This implies that boys might have more severe language difficulties than girls, and therefore have a higher rate of referral. Gender was also a factor in a recent Dutch study, using a subsample of our database of a region in the north-west Netherlands, which revealed that boys with language disorder were referred to a speech and hearing centre 10 months younger than girls (Uilenburg *et al.* 2018). This motivated us to analyse if possible differences in age of referral also existed nationwide. In addition to gender, we were interested in the effect of bilingualism, for example, the characteristics of children that had a different home language than the majority language spoken in their country (Dutch in the Netherlands). Little is known about these children because in many studies on language-disordered bilingual (BL) children or children from ethnically diverse populations are excluded (Law *et al.* 2000).

This study provides a detailed description of caseload characteristics of children referred to Dutch speech and hearing centres. We analysed the general characteristics of the children and were also interested in the relationship between these characteristics, that is, how bilingualism influences age of referral. Language data consisted of outcomes on standardized tests and clinical judgements of the child's language comprehension, expressive vocabulary and sentence production. In addition, data were collected on non-verbal intelligence, hearing, behavioural problems and languages spoken at home.

Methods

Design

All data from children with suspected language problems who visited speech and hearing centres were registered by the Association of Dutch Audiology Centers (FENAC 2005). Data were available on five domains: speech–language, behaviour, cognition, physical and family characteristics. In this retrospective study, these data were used for analysis.

Participants

A database of 11,450 children was analysed, consisting of data of all children, aged 2–7 years, visiting one of 19 Dutch speech and hearing centres between 1 January 2010 and 31 December 2013. Children with sensorineural hearing loss ($\geq$ 25 dB) were excluded from the study. Children with episodes of conductive hearing loss because of otitis media with effusion, a common condition in young children, were included.

Outcome measures

Database

The database of the Association of Dutch Audiology Centers was established in order to give a brief and systematic description of the speech and language

disorders in children and the environmental, developmental and medical factors that might be related to these disorders. The database contains five domains: language, behaviour, cognition, physical and family characteristics. All aspects in these five domains were scored dichotomously: children performed within the normal range or children performed below normal range (FENAC 2013). Studies on the interrater reliability of classifying children into these categories were conducted by Perdok (2003, 2005). They show that for all items the percentage of agreement was satisfactory (> 80%), except for speech sound production, that is, phonological system (69%), likely because no standardized test for assessment of phonology was available in Dutch at that time.

Language

The domain Language covers expressive language and receptive language. If available, standardized tests were used such as CELF Preschool-2-NL (De Jong 2012) (Dutch edition, range 3;0–6;11 years), Schlichting test for language comprehension (receptive vocabulary and sentence comprehension) (Schlichting and Lutje Spelberg 2010a) (range 2;0–7;0 years) or Schlichting test for language production (word and sentence production) (Schlichting and Lutje Spelberg 2010b) (range 2;0–7;0 years). Results were coded as normal or lower than 1 SD. If standardized tests were not available (e.g., for speech-sound production/phonology or for assessment of languages other than Dutch) or if the child was not (yet) capable of participating in testing, the speech–language therapist used spontaneous language analysis, observation, clinical expertise and information from parents and/or an translator to judge the presence of a language problem. If this resulted in strong indications of language problems, this was categorized as 'general language problem'. In data analysis for this study, the categories 'lower than one standard deviation' and 'general problem' were merged.

Behaviour

Behavioural problems (autism spectrum disorder, attention and concentration problems, oppositional disorder, emotional problems) were registered only when diagnosed by a psychiatrist. If there were strong indications for behavioural or emotional problems, but there was no psychiatric diagnosis, this was registered by a psychologist as a 'general' behavioural problem and included in the data analysis. This was very often the case since most children were very young and for the first time assessed by specialized professionals. These children were referred to a psychiatrist for further psychiatric assessment.

Cognition

Non-verbal intelligence was assessed with the SON-R 2½-7 (Snijders *et al.* 1995) or the Bayley Scales of Infant and Toddler Development—Third Edition—Dutch version (Van der Meulen *et al.* 2004). Results were coded in two categories: normal or < 1 SD. If the child was not (yet) capable of participating in behavioural testing, the psychologist used observation, clinical expertise and information from parents to judge the intellectual abilities of the child. If there was a suspicion of low non-verbal IQ, this was categorized as a general cognitive problem. For the analysis, the categories 'lower than one standard deviation' and 'general' were combined.

Physical characteristics

Three types of physical problems were assessed: conductive hearing loss (persistent otitis media), motor skills (gross, fine and oral) and other medical problems including perinatal problems, neurological dysfunction, cleft palate and syndromes. Children with a medical diagnosis as well as children who were referred to a medical specialist after the multidisciplinary assessment were scored as 'physical problem' in the data analysis.

Family characteristics

In this domain, bi- or multilingualism were registered. In the database, the term 'monolingual' (ML) is used to refer to children whose home language is Dutch, the majority language. We registered 'bi- or multilingual' when children were exposed to another language than Dutch at home, for example, Italian or Turkish, or when Dutch was spoken in combination with one or more other languages. This included Frisian (a Dutch indigenous language) and the Dutch dialect Limburgian. The language of BL or multilingual children was assessed in their dominant language.

Analysis

We looked at the relationships between factors for two subgroups: children with developmental language disorder (DLD) and children with a language disorder and additional (developmental) problems.

- Children with DLD. These children had limitations in at least one of the language domains, normal cognitive development, no behavioural problems and no physical problems. We used the term 'DLD' for the whole age range of our 2–7-year-old group, although the youngest children,

the 2 year olds and just 3 year olds, might be better labelled as 'late talkers' since it is difficult to predict if they will have long-term language problems.
- Children with language disorder and additional problems. These children had weak language skills and additional behavioural and/or cognitive problems and/or physical complaints. We will refer to this group as 'language disorders (LD) with additional problems'.

All children could be either mono- or bilingual.

In addition, we created two subgroups based on the language scores/clinical judgment to look at differences between children with and without receptive language disorders:

- Expressive language disorder. These children had weak expressive language, but their receptive language was within the normal range.
- Receptive language disorder. These children have weak receptive and expressive language skills.

Descriptive statistics were used for gender, age of referral and type of language disorder. A multivariate analysis of variance (MANOVA) was used to compare means in age of referral; Chi^2 tests were used to assess differences in categorical variables, such as gender, language profile and mono- versus bilingualism (Field 2017).

Results

The database consisted of 11,450 children aged 2–7 years. In this group of referred children, 8058 (70%) were boys and 3392 (30%) were girls. Most children, 7124 (62%), were referred very young, at the ages of 2 or 3. The remaining 4326 children were referred at the ages of 4–7 years. A total of 13% of all children (1518) had no language disorder. These children had scores within the normal range on all language tests. However, most of these children did have additional behavioural and/or cognitive problems and/or physical complaints and/or problems in the family or social context. This group is excluded from further analyses, which means that the results described below address 9932 children with language disorders.

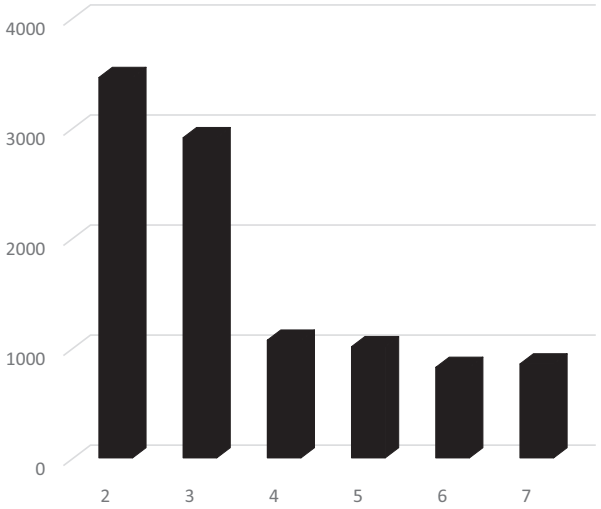

Figure 1. Number of children with (a suspicion of) language disorder at age of referral (years).

Gender and age of referral of children with language disorder

Children with language disorders were often referred at the ages of 2 or 3 years: 6367 (64%) (figure 1). At these ages, 4774 (76%) were boys and 1593 (24%) were girls (table 1). A total of 3565 children were referred at the ages of 4–7 years: 64% boys and 36% girls.

Mean age of referral was 5 months younger for boys than for girls (46 versus 51 months; ($F(1, 9928) = 138{,}06$, $p < 0.001$). Mean age of referral was slightly younger for ML than for BL children (46 versus 49 months; ($F(1, 9928) = 38{,}45$, $p < 0.001$). We found no interaction effects, meaning that no differences were found between ML and BL girls or for ML and BL boys.

Type of language disorder

Of all children with language disorders, 3893 (39%) had DLD and 6039 (61%) had language disorders and

Table 1. Age, gender and type of language disorder

	2 years	3 years	4–7 years	All children
Age	3457 (35%)	2910 (29%)	3565 (36%)	9932
Gender				
Boys	2621 (76%)	2153 (74%)	2284 (64%)	7058 (71%)
Girls	836 (24%)	757 (26%)	1281 (36%)	2874 (29%)
Type of language disorder				
Developmental language disorder (DLD)	1258 (36%)	1101 (38%)	1534 (43%)	3893 (39%)
Language disorder with additional problems	2199 (64%)	1809(62%)	2031 (57%)	6039 (61%)

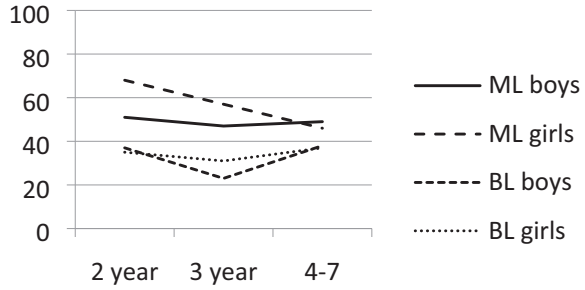

Figure 2. Children with DLD: expressive language problems (%).

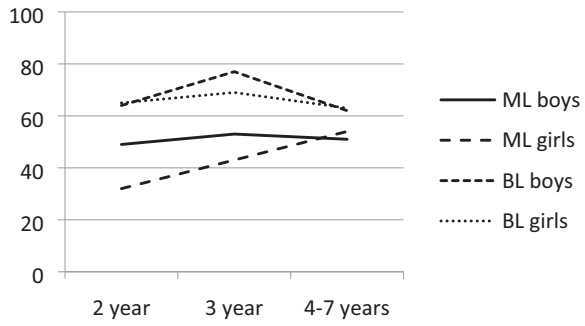

Figure 3. Children with DLD: receptive and expressive language problems (%).

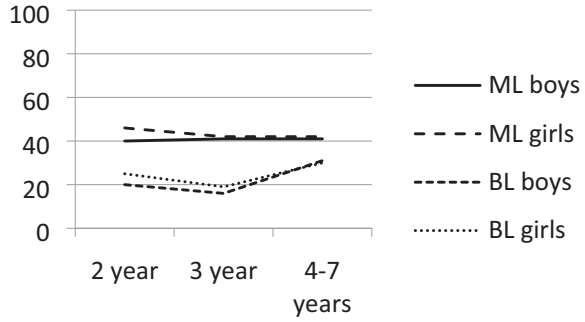

Figure 4. Children with language disorder (LD) and additional problems: expressive problems only (%).

additional problems (table 1). The majority of children (61%) had receptive and expressive language problems: 39% had only expressive language problems. In the subgroup of children with language disorders and additional problems, this was 65% and 35% and in the group children with DLD 56% versus 44%.

Average age of referral of children with DLD was 49 months; for children with additional problems, it was 46 months ($t(9930) = 7.25$; $p < 0.001$). Boys and girls did not differ in this respect. In the database, BL children more often had DLD than ML children ($Chi^2 = 96.58$; $p < 0.001$).

Figures 2–5 present the results of children in the database categorized as DLD or language disorder with additional problems. They show differences as a function of age and ML or bilingualism (ML girls and boys and BL girls and boys). Figures 2 and 3 show the percentages of children in the language only group with an expressive (figure 2) or receptive language (figure 3) profile. Figures 2 and 3 are complementary, meaning that their percentages add to 100 for each child category, that is, ML girls, ML boys, BL girls, and BL boys. The same applies to figures 4 and 5, but for children with language disorder and additional problems.

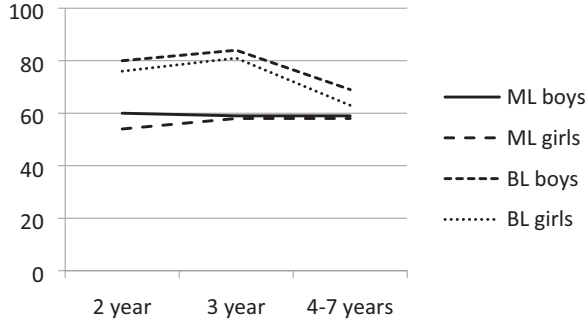

Figure 5. Children with language disorder (LD) and additional problems: receptive and expressive problems (%).

BL children more often had receptive language problems compared with ML children, both in children with DLD, respectively 66% versus 49% ($Chi^2 = 113.54$; $p < 0.001$), and in children with additional problems, respectively 63% versus 47% ($Chi^2 = 199.39$; $p < 0.001$). Also, more boys than girls had a receptive language disorder: in children with DLD 58% versus 54% ($Chi^2 = 5.33$; $p = 0.021$) and in children with language disorder (LD) and additional problems 53% versus 48% ($Chi^2 = 27.89$; $p < 0.001$).

Behaviour and cognition

For the group children with language disorder with additional problems, we analysed the type of additional problem, that is, behavioural problems and problems in cognition. First, children with receptive language problems more often had behavioural problems compared with children with expressive language problems (32% versus 19%; $Chi^2 = 120.71$; $p < 0.001$). Second, these children also had more problems in cognition (33% versus 8%; $Chi^2 = 458.13$; $p < 0.001$). Figures 6 and 7 show the presence of behavioural problems and problems in cognition as a function of gender and mono- or bilingualism, for children with receptive and/or expressive problems. Overall, behavioural problems are more prevalent in boys ($Chi^2 = 59.36$; $p < 0.001$) and in ML children ($Chi^2 = 33.00$; $p < 0.001$).

Cognitive problems were more prevalent in BL children ($Chi^2 = 76.25$; $p < 0.001$), we found no differences between boys and girls.

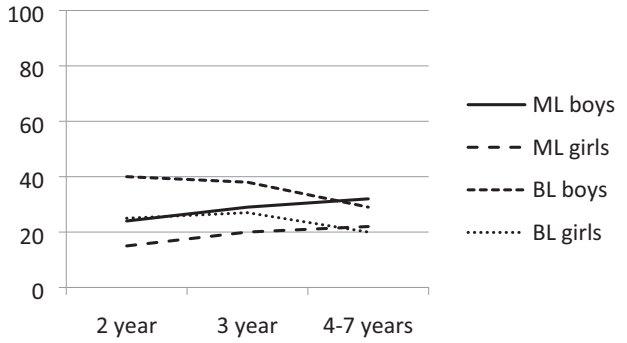

Figure 6. Behavioural problems in children with language disorder (LD) and additional problems.

Discussion

This study investigated caseload characteristics such as age of referral, gender, bilingualism and nature of developmental problems of 11,450 Dutch children who were referred to a speech and hearing centre for further assessment of their language. The children were assessed by a multidisciplinary team that evaluated their language, behaviour, cognition and other aspects such as physical and family characteristics.

About two-thirds of the children in this data set were referred early, at ages 2 or 3 years. As reported in many studies (e.g., Law *et al.* 2000), our cohort contained more boys than girls (3:1). This is also in accordance with the 70% boys in Broomfield and Dodd's (2004) study on age of referral to paediatric speech and language therapy services.

Our results showed that 13% of the children did not have any language problems. Of the children in which the language disorder was confirmed, one-third of the referred children were classified as having DLD and two-thirds of the children did have a language disorder with additional developmental problems such as cognitive and behavioural problems. Note that we used the term 'DLD' for the whole age range (ages 2–7) of children in the database, including 2 and 3 year olds who might be better referred to as 'late talkers' since it is difficult to predict if their language problems will persist.

About half the children had expressive difficulties only and half had both receptive and expressive language difficulties. This was true for the subgroup of children with DLD and the subgroup with additional problems. Children with both receptive and expressive language problems more often also had additional problems compared with children with mainly expressive language difficulties. This may indicate that some of the receptive and expressive language can be explained by additional problems such as an intellectual disability. However, it could also be the case that the more complex language disorder is causing frustration and behavioural problems.

Subgroups of children with language disorders have been identified according to the expressive–receptive distinction in other studies (Leonard 2014). In contrast with our study, in a group of kindergarten children, 28% had receptive problems only, whereas the prevalence of both receptive and expressive problems and expressive problems only was 35% (Tomblin *et al.* 2003). In our cohort, a delay in only receptive language was rare, only 2% of the children had poor receptive language scores with average expressive language. This difference might be explained by the fact that Tomblin *et al.* (2003) used an epidemiological sample rather than a sample of children who already were identified such as the children in our database and the use of more complex receptive language tasks by Tomblin *et al.*, such as comprehension of narration. Their relative high percentage of children with isolated receptive language problems suggests that language production problems might be predominant for parents and child healthcare professionals and receptive language problems might be missed in referrals. Tomblin *et al.* further show that subclassification is important since it predicted stability of the language disorder. In a 4-year period, children with both a receptive and expressive language deficit were less likely to 'catch up' and more often had a persisting language disorder

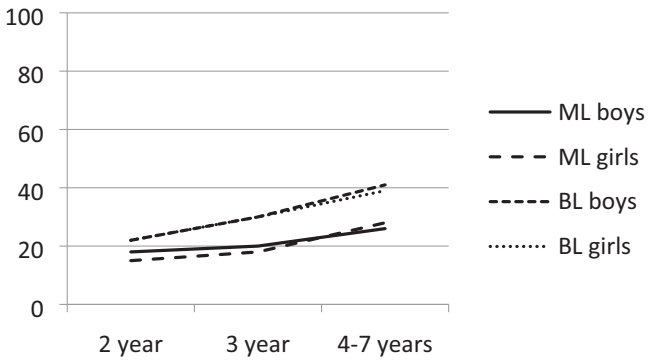

Figure 7. Cognitive problems in children with language disorder (LD) and additional problems.

than children in the other two subgroups. Studies addressing classification of children with (developmental) language disorders have identified additional subtypes, but also report that half the children move from one subtype to another over only a year as their specific strengths and weaknesses change (Conti-Ramsden *et al.* 1997; Conti-Ramsden and Botting 1999).

Gender

This study confirmed the bias in age of referral and diagnosis found in a subset of our database in Uilenburg *et al.* (2018). In Uilenburg *et al.*, boys were referred to speech and hearing centres 10 months younger than girls in the Amsterdam area of the Netherlands. In our national database, boys were referred 5 months younger than girls. This was true for ML and BL children. There also was a gender difference in the type of language disorder, showing that boys more often have both receptive and expressive language difficulties than girls. This is true for boys with DLD and with language disorder with additional problems. Bishop (1997) explains this by suggesting that boys are seen as more conspicuous as they more often have additional behavioural and attentional problems than girls. Uilenburg *et al.* (2018) use this argument to explain the age difference; they argue that boys are referred earlier because their language disorder is expressed by more externalizing behaviour (e.g., aggression, hyperactivity) compared with more internalizing behaviour in girls (e.g., withdrawn, anxious, inhibited). Our findings are in line with this explanation: language disorder in combination with behavioural problems was more prevalent in boys than girls. There were no gender differences in the cognitive domain.

Bilingualism

There was a bias in age of referral in that BL children were referred 3 months later than ML Dutch speaking children. In addition, referred BL children more often had both a receptive and an expressive language deficit: 65% had receptive and expressive language disorder compared with 48% in the ML group. Additional behavioural and cognitive problems were more prevalent in the BL than the ML children. The BL subgroup in our database consisted of children from different language/ethnic backgrounds such as Turkish, Moroccan or Polish, the three largest minority ethnic populations in the Netherlands, but also contained children with a Dutch background who spoke one of the old Dutch language/dialects such as Frisian or Limburgian. The BL/ethnic bias in age of referral is expected to be larger in the minority ethnic children, not only because of cultural differences but also because children with Dutch background are probably more exposed to Dutch language. For example, children with Dutch background watch Dutch television programmes, whereas children from minority ethnic groups might watch mainly television programmes in their home language. Unfortunately, we were not able to test this hypothesis with our database since information on the children's ethnic background and languages spoken at home was not registered. On the other hand, we have to be cautious with the diagnosis of language disorder on the basis of only one assessment instead of monitoring their language input and language learning performance. BL children, by definition, are exposed to less input in each of their languages and therefore especially at younger ages have fewer vocabulary items. Many of the tests we used (e.g., cognitive tests, behavioural tests) involve vocabulary. BL children (even in their dominant language) are at a disadvantage in these standardized tests as their vocabulary in each of their languages may be context dependent (e.g., food items in one language such as a home language; and academic vocabulary in another language, such as a school language).

The delay in referral and the more complex language disorder of the referred BL children seem to reflect the challenges of identifying language difficulties in young children who are exposed to a different home language than the majority language, here Dutch. Children with less complex language disorders might be more difficult to identify. As a result, children who speak other languages are at risk of not being identified at all or being identified at older ages and therefore do not have the same degree of access to services as ML Dutch children. Stow and Dodd (2003, 2005) report similar findings in the UK and stress the need for training of referral agents and a good screening procedure. In addition, it might be worthwhile to assign speech and language therapists with experience with BL/cultural children in a regional mentoring function to support referral agents and parents. A Dutch pilot study showed that when a language screening instrument was introduced, the number of language difficulty referrals doubled, the age of referral was younger, and that more referrals were accurate and confirmed with standardized language assessment (Van Schie *et al.* 2011). This procedure uses parental report of language milestones. Parents with other language backgrounds are instructed to report on the age of acquisition of milestones in all languages to which their child is exposed. Unfortunately, the effects of this language screening procedure on referral of BL children are not reported.

In conclusion, this study revealed that there is a gender and language/ethnicity bias in the age of referral of children with (a suspicion of) language disorder. Boys were referred earlier than girls, and ML children were referred earlier than BL children. In addition, BL children seemed to have more complex problems: they

more often had problems in both receptive and expressive language, and more often had a language disorder with additional developmental problems. This suggests that girls and BL children from ethnically diverse backgrounds with less complex problems might be missed. Since 2013, a universal language screening protocol has been implemented in the Netherlands. It contains questions for parents about language milestones and instruction of interpretation of responses and referral by the primary healthcare professional. As part of the national implementation process of this protocol, primary care practitioners are trained in identifying developmental language and communication disorders. Our study indicates that it is important to address specifically the bias in age of referral of girls and BL children in this training.

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