Background variables and extent of language problems in children with assumed language problems

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1. Introduction

The normal acquisition of speech and language abilities involves considerable variation, and it is not always easy to distinguish between language development at the lower range of normality and language development which deviates from the usual pattern [1,2,3]. To define a language problem normative data are required, not just about the average level of language ability at different ages (the age equivalent), but also about the range of the ability as determined by standard deviations.
In our opinion standard scores are more suitable for defining language problems than age equivalents. The distribution is the same for all children at all ages, which makes comparability between the children and comparability in time possible. In clinical practice a deviation of 1.3 SD from the mean is indicated as a "possible" language problem [3,4].
We were interested in the language scores of children referred for language problems. How many children fitted the formulated clinical standard of 1.3 SD from the mean? [5] Moreover we were interested in the background variables of these children. In literature various risk factors for language problems are mentioned and summarized [3,6]. They concern gender, premature birth, birth weight, family composition, parental education, language problems in the family, day-care and home-care.

2. Material and Methods

2.1. Participants

Children between two and five years of age, who, in 2002, were referred to four speech and hearing clinics because of assumed language problems, were included. The four clinics were situated in the northern (1 clinic), the southern (1 clinic) and the central (2 clinics) Netherlands. Exclusion only was made for non-Dutch speaking children. .
Half of the children (49,8%) was referred by general practitioners because of parental concern, and half of the children (50,2%) was referred by teachers and/or medical specialists because of failing screening procedures.

2.2. Language abilities

Both language comprehension and language production were measured by standardized language tests. Language comprehension was measured by an adapted and standardized Dutch version of the comprehension scales of the Reynell Developmental Language Scales: the Reynell Test for Language Comprehension [7]. This test can be used for children between 1.2 and 6.3 years of age.
Lnguage production was measured by the Sentence Development Test of the Schlichting Test for Language Production [4]. This test can be used for children between 1.8 and 6.3 years of age and measures active syntactic development using elicitation methods, mostly based on imitation. When a child scored an LCQ (language Comprehensive Quotient) or SDQ (Sentence Development Quotient) of 80 or less, the child was defined as having a language problem [8,3,4]. When a child was only capable of cooperating with one of the two language tests and when the child showed language problems on this test (LCQ or SDQ <=80), the language ability was interpreted according to this one test. If the child showed normal language abilities on this test (LCQ or SDQ >80) it was assumed that a language problem could be present according to the other test. In this case, the child was classified as "language

problem unknown." As a result, three different categories were distinguished: the child has no language problem (1), the child has a language problem (2) or the language problem is still unknown (3).

2.3. Risk factors for language problems

During an interview with the parents, the potential risk factors for language problems were compiled as categorical variables (gender, prematurity, birth weight, family composition, familial aggregation of language problems, parental education, and daycare/home care). Based on the literature, the decision was made to define low birth weight as a birth weight less than 2500 grams and premature birth as a birth prior to 37 weeks of gestation [3]. The levels of parental education were divided into "low" (only elementary school), "high" (university, polytechnics) and "middle" (everything in between) [4,7]. Figures with respect to the presence of potential risk factors in the Dutch population in 2002 – the year of inclusion of the children into our research – were derived from the CBS (Centraal Bureau voor de Statistiek, a.k.a. Statistics Netherlands: www.cbs.nl).

2.4. Statistics

Descriptive statistics (percentages, mean, range) were used to describe the characteristics of the children. In order to compare children with and without language problems, the Chi-Square Test was used for nominal or ordinal variables. Because of paired observations the McNemar test was used to compare the LCQ scores of the children with the SDQ scores. The binomial test was used to compare the presence of potential risk factors in all referred children with the presence of these factors in the Dutch population. A two-tailed p-value of <0.05 was considered to be significant.

Statistical analyses were performed with SPSS 12.0 for Windows (SPSS Inc.).

3. Results

3.1. Language abilities

A total of 240 children were included in the study: 174 boys (73%) and 66 girls (27%), aged between 1.11 and 5.04 years. A reliable Language Comprehension Quotient (LCQ) could be obtained for 206 children (86%). Adequate scores were present in 149 children (62%) and inadequate scores in 57 children (24%). A reliable Sentence Development Quotient (SDQ) could be obtained for 204 children (85%). Adequate scores were present in 111 children (46%) and inadequate scores in 93 children (39%).

For 123 children (51%) a language problem was found. This means that the LCQ or SDQ or both scores were <=80, see Table 1.

Problems with language production occurred more often than problems with language comprehension (39% versus 24%) (p=0.002). In 27 children (11%) both language production and language comprehension were inadequate. In 51 children (21%) language production was the only problem. In 23 children (10%) language comprehension was the only problem. In 7 children (3%) with an inadequate LCQ the SDQ was missing and in 15 children with an inadequate SDQ the LCQ was missing. These children were defined as having a language problem.

The results indicate that not all participating children showed language problems: 83 children (35%) showed language capacities within normal range (LCQ + SDQ > 80). In 34 children (14%) the language problem could not be objectified: 14 children (6%) without LCQ and SDQ scores, 15 children with an adequate LCQ and SDQ missing, and 14 children with an adequate SDQ and LCQ missing.

3.2. Potential risk factors in children with and without language problems

We first analyzed the influence of potential risk factors on children with and without language problems, see Table 2. We found that children with language problems were significantly more likely to have a family member with speech and/or language problems (p=0.010). We also found that significantly more children with language problems did not attend daycare (p= 0.032) and came from families with low parental education (p=0.010). In both groups, more boys than girls were present and most children were born full-term with normal birth weight. Also, family composition did not differ between the two groups.

3.3. Potential risk factors in the total group of referred children as compared to the Dutch population

Secondly, we compared the risk factors in the 240 referred children with possible language problems to those of the total Dutch population in 2002 (the year of inclusion), see Table 3. Compared to the Dutch population, the referred children were more often boys than girls (p=0.000). More referred children had low birth weight (p=0.046), more often lived in a two-parent family (p=0.000), more often had no siblings (p=0.023), more often had parents with middle and high education (p=0.000) and more often attended daycare (p=0.000).

4. Discussion

In four speech and hearing clinics in the Netherlands children were analyzed because of assumed language problems. According to standardized tests, language development was scored and background variables were compiled.

4.1. Children without language problems

In 35% (n=83) of these children adequate language development was found. This underscores the idea that parents easily become concerned about language development, and also that normal variations in language development are often difficult to interpret. Taking into account that the referred children, as compared to the Dutch population, more often lived in a two-parent household, more often had no siblings and more often had parents with middle and high education, it can be hypothesized that the familial setting is of importance. When there are no siblings, comparison with other children is less easy. Furthermore, in a two-parent middle-class or upper-class household, language development possibly is more often discussed because of its assumed relationship with social and cognitive development [8, 3]. The referred children also more often attended daycare. This might indicate that not only the parents, but also professional caregivers are easily worried about language development. From previous research, we know that the prevalence of language problems in young children is overestimated by workers in youth health care [1]. From 140 respondents estimations of the number of Dutch children with language problems diverged from 1% to 40%. Most of the respondents (n=68, 49%) gave estimations between 5–10%. Some of the respondents (n=40, 29%) estimated the percentage to exceed 10%. A smaller proportion (n=20, 14%) estimated the percentage at below 5%.

4.2. Children with language problems

The children who really showed a language problem (n=123, 51%) differed from the children without language problems with regard to family aggregation. This supports the idea of a genetic influence on language learning [6]. The children also more often came from families with a lower educational level and more often attended daycare. It can be hypothesized that parents with a lower educational level use a more restrictive language code instead of an elaborated language code [9]. Following the restricted code, parents tend to be more directive, they forbid and command more and talk to their children less frequently. For language development this is less stimulating than the elaborated code, which is more explanatory. The elaborated code is connected to parents from a higher social class. They tend to name and verbalize objects and situations, and speak more frequently to their children. As a consequence they also have higher expectations of their children's language abilities, which sometimes do not take into account normal variations in language development (see above). The fact that the parental educational level of the total referred group was different from that of the total population might imply that lower-class parents seek help less often than do parents from other educational levels.

The attendance of daycare, in our study, has a positive influence on language development. This possibly can be explained by more interactions with peers and individual contact with language competent adults, other than the parents.

4.3. Comparison of the referred children with the Dutch population

Compared to the Dutch population, significantly more referred children were boys rather than girls. For the children with and without language problems there was no significant difference between boys and girls. The ratio of boys to girls of 70:30% is normally expected in a clinical population [6]. This perhaps indicates that the language learning capacity for boys is often weaker than for girls. This cannot explain why, in the referred group, more boys are also present in the children without language problems.

For the total referred group, birth weight was also different from the Dutch population (more children with low birth weight). For children with and without language problems this difference was not present. Perhaps parents with low birth weight children are more likely to be concerned about the development of their child. From this study we cannot support the idea of monitoring the language development of these children.

5. Conclusions

Parents with a low level of education more frequently have children with language problems. However, parents with a middle and high level of education are easily concerned about the language development of their children. Their concerns are not always justified.

Overestimation of language problems is a real issue in clinical practice. That's why the use of standardised tests, where the boundary between normal and deviant development is clearly defined, is very important. In clinical practice 1.3 SD from the mean is used as a standard.

The analysis of compiled background variables indicates that language problems are genetically influenced (gender and family aggregation). Language input is also of importance (interactions with a language competent parent or care-taker and peers): children with language problems less often attended daycare.

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Table 1
LCQ and SDQ scores

Language Scores	SDQ>80 N (%)	SDQ≤80 N (%)	SDQ missing N (%)	Total N (%)
LCQ > 80	83 (35%)	51 (21%)	15 (6%)	149 (62%)
LCQ ≤80	23 (10%)	27 (11%)	7 (3%)	57 (24%)
LCQ missing	5 (2%)	15 (6%)	14 (6%)	34 (14%)
Total	111 (46%)	93 (39%)	36 (15%)	240 (100%)

123 Children with a language problem

LCQ = language comprehension quotient
SDQ= sentence development quotient.

Table 2
Potential risk factors in children with and without language problems

Potential risk factors	Language problems N=123	No language problems N=83
Gender		
Boys	70% (86)	75% (62)
Girls	30% (37)	25% (21)
Total	100% (123)	100% (83)
Premature birth		
Yes (<37 weeks)	10% (12)	7% (6)
No (>36 weeks)	90% (108)	93% (77)
Total	100% (120)	100% (83)
Birth weight		
< 2500 gram	8% (10)	4% (3)
> 2499 gram	92% (109)	96% (78)
Total	100% (119)	100% (81)
Family composition		
Two parents	93% (114)	93% (77)
One parent	7% (9)	7% (6)
Total	100% (123)	100% (83)
Siblings		
Yes	82% (101)	81% (67)
No	18% (22)	19% (16)
Total	100% (123)	100% (83)
Parental education *		
Low	17% (21)	5% (4)
Middle	52% (64)	65% (54)
High	31% (38)	30% (25)
Total	100% (123)	100% (83)
Language problems in family *		
Yes	51% (62)	33% (27)
No	49% (59)	67% (56)
Total	100% (121)	100% (83)
Daycare *		
Yes	80% (99)	92% (76)
No	20% (24)	8% (7)
Total	100% (123)	100% (83)

* $p < 0.05$

Table 3
Potential risk factors in children with and without language problems referred to a speech and hearing clinic and in the Dutch population

Potential risk factors	Total N=240	Dutch population[1]
Gender *		
Boys	73% (174)	51%
Girls	27% (66)	49%
Total	100% (240)	100%
Premature birth		
Yes (<37 weeks)	9% (21)	8%
No (>36 weeks)	90% (216)	92%
Total	99% (237)	100%
Birth weight *		
< 2500 gram	8% (18)	5%
> 2499 gram	90% (215)	95%
Total	98% (233)	100%
Family composition *		
Two parents	93% (223)	84%
One parent	7% (17)	16%
Total	100% (240)	100%
Siblings *		
Yes	82% (198)	77%
No	18% (42)	23%
Total	100% (240)	100%
Parental education *		
Low	12% (29)	27%
Middle	57% (137)	45%
High	31% (74)	28%
Total	100% (240)	100%
Language problems in family		
Yes	43% (102)	Unknown
No	57% (136)	
Total	100% (238)	
Daycare *		
Yes	84% (201)	70%
No	16% (39)	30%
Total	100% (240)	100%

* $p < 0.05$
[1] www.CBS.nl