Parent-reports of children’s vocabulary skills

How consistent are parents’ estimates of their children’s vocabulary skills?

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Abstract
The study examined how consistent parents’ reports are of their child’s verbal skills. Parents to 17 children participated and completed the toddler version of the MacArthur-Bates Communicative Development Inventory (CDI). It was found that the correlation between the reports made by the mothers and the fathers was very strong. All in all the parents had a very similar understanding of their child’s verbal skills.

Key words: MacArthur-Bates CDI; vocabulary size; verbal skill; lexical development.

Sammanfattning
Denna studie undersökte hur väl föräldrars rapport av deras barns språkförmåga stämmer överens. Föräldrarna till 17 barn deltog och fyllde i toddler-versionen av the MacArthur-Bates Communicative Development Inventory (CDI). Korrelationen mellan mammornas och pappornas rapportering var mycket stark. Överlag så hade föräldrarna en mycket liknande uppfattning av deras barns språkförmåga.

Nyckelord: MacArthur-Bates CDI; ordförrådsstorlek; språkförmåga; språklig utveckling.

Preface
My thanks to Mårten Eriksson who gave advise and guidance throughout this research. Thanks to Thomas Klee who gave me access to the Brittish version of the MacArthur-Bates CDI. Sincere thanks to all parents and children who made this research possible.
How a new born child learns to speak and express him or herself is a subject that has been the focus of much research since the 1950’s (Hoff, 2009). Children start to respond to their own name around the age of 6 months, other people’s names and titles are among the first words being used: mum, dad, the pet’s name etc. (Hoff, 2009). Most children start using other words around the age of one. The majority of the first words are nouns (Stolt, Haataja, Lapinleimu & Lehtonen, 2008). Predicates (verbs and adjectives) start to be used after the child has learnt between 100 – 200 words, function words (question words, prepositions, pronouns) are rarely used before the vocabulary size has reached 300 – 500 words (Bates et al. 1994; Stolt et al. 2008).

How fast a child learns and how many words he or she uses vary a lot from one individual to the next (Bernhardt, Kemp & Werker, 2007). This makes it difficult to say what a normal language development should look like. Some children simply learn later than others, but there are also some children who are in need of help and support to develop their language skills properly. The sooner this need is identified and help is put in place the better (Lovas, 2010).

The most common way to assess a young child’s language development is to ask the parents. The MacArthur-Bates Communicative Development Inventories (CDI) is a questionnaire widely used for this purpose. CDI is developed to measure a child’s lexical abilities at the time of testing, not necessarily as a tool to predict the child’s later development (Bernhardt et al. 2007). There are two CDI questionnaires, the first is aimed at children aged 8 – 15 months (words and gestures) the second questionnaire is aimed at children aged 16 – 30 months (words and sentences) (Bates et al. 1994). Research has shown a strong reliability for the CDI questionnaire (Fenson et al. 2000) and a high stability when the questionnaire is completed by mothers and fathers of the same child (Bornstein, Putnick, & De Houwer, 2006).

The validity of parent-reports depends on the parents’ ability to observe the child’s use and understanding of language (Wehberg et al. 2007). Research has shown that most parents know their child’s verbal skills fairly well, they know the words the child uses (Wehberg et al. 2007). However the parents are not as reliable when it comes to knowing the child’s understanding of words (Dale, Price & Bishop, 2003), in fact after the child reaches an age of 16 months most parents are unable to keep a track of the child’s understanding of words (Bates et al. 1994). The use of nouns is often reported more correctly by parents, than the use of verbs (Wehberg et al. 2007). The validity of parental reports also seems to depend on the parents’ education and the socio-economic status of the family (Bernhardt et al. 2007). Parents with only a basic education often overestimate
their child’s lexical development in contrast to parents with higher education (Bernhardt et al. 2007). However research has shown that there can be large differences between children’s verbal skills, even when the children are of the same age and have the same socio-economic background (Bates et al, 1994).

Gender differences are small but consistent in language research. Even though some research indicates that there is no gender difference (Holdgrafer, 1991) it is widely accepted that females have an advantage when it comes to learning language (Eriksson, et al, 2012). Females make better eye contact during their first year, speak sooner, and develop larger vocabularies (Lovas, 2011). Whether this difference is purely biological or influenced by cultural and social preconceptions is not clear yet. Research has shown that mothers and fathers interact differently with sons and daughters (Lovas, 2011; Macaulay, 1977). Mothers speak more to daughters than to sons, they also speak different to daughters, they make more interpretations during the daughters first attempts at speech, talk more about feelings and wishes with daughters than with sons (Lovas, 2011).

These different ways of speaking to boys and girls are not apparent only in the first years of a child’s life but continue into adolescence where the daughters are made more aware of internal feelings and social interactions than sons and the sons are made more aware of action – consequence and problem solving than daughters (Lovas, 2011).

The cultural influence is also evident in that boys have better reading and speech results than girls in some cultures, Nigeria and Germany for example while the girls hold the lead in other cultures, Canada and the United States for example (Downing, 1973).

From a biological point of view the advantage that females hold when it comes to language acquisition might be a result of earlier maturation and physical growth which results in a stronger verbal ability (Stolt et al. 2008). The left cerebral hemisphere controls many of the speech functions (Macaulay, 1977). Research has shown that this part of the brain develops quicker in girls than in boys (Macaulay, 1977).

The purpose of this study is to examine how reliable parents’ estimate is of their child’s verbal skills. This will be done by using the MacArthur-Bates CDI questionnaire which will be given to both parents/caretakers of a child. Gender differences will also be a part of the research. The research questions are:

1. What is the agreement between reports on language skills from the mother and the father?
2. Is there a general pattern where one of the parents (e.g. the mother) consistently score their child’s language skills higher than the other (e.g. the father)?
3. Is there a gender interaction so that a parent score same sex children differently from opposite sex children?

**Method**

**Participants**

The selection of participants was a convenience sample. Parents at local toddler groups were asked to participate. A total of 17 children and their parents participated in this study, 17 mothers and 17 fathers. Eight of the children were boys and nine were girls. The age ranged from 16 to 30 months, three children were 16 months, one was 17 months, four were 18 months, two were 20 months, one was 24 months, one was 25 months, one was 26 months and four were 30 months old. All were British citizens with English as their first language. Information about the socio-economic situation of the families and education background of the parents were all achieved informally through personal contact with the individuals.

**Material**

The questionnaire that was used was The MacArthur-Bates Communicative Development Inventories (CDI). It is a questionnaire widely used when studying children’s lexical development. CDI has been translated into several languages. CDI is based on a child’s expected vocabulary size at different stages of development, the toddler version was used in this research.

The toddler questionnaire consists of two parts. Part I focus on the child’s use of words and is split into section A and B (Bates et al. 1994). Section A is a checklist of 680 words. Section B deals with the child’s use of words, whether or not the child has started talking about things that will happen, things that have happened etc.

The second part, Part II deals with early grammar (Bates et al, 1994). It is sectioned into A, B, C, D and E. A deals with the child’s use of word endings such as –ed, -ing etc. B deals with word forms, nouns and verbs. C is dealing with the proper use and mistakes when using word endings. D is asking for the three longest sentences the child has said recently. E deals with the complexity of the child’s verbal skill, for example, does the child say ”two foot” or ”two feet”? (For a more thorough description of the parts included in this study see Attachment 1).

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This study included: Part I A, Part I B and Part II A. A majority of the parents did not complete Part II B – E wherefore those parts have been excluded in the report.

**Procedure**
An introduction letter (Attachment 2) was given, together with two CDI questionnaires, to each child's parents at two local toddler groups. The questionnaires were collected at the same toddler groups the following week.

**Design and data analysis**
The collected data was analysed using the SPSS program. Mean, standard deviation and Pearson's correlation were used to calculate the data for the first research question. Paired samples t-test was used to calculate the second and third research question.
Results

The parts of the CDI that were used were Part I A and B, and Part II A, the statistics for each part are presented below. The mean and standard deviation for each part are presented in Table 1.

**Table 1.** Mean and standard deviation for each part of the CDI

<table>
<thead>
<tr>
<th>CDI – Part</th>
<th>Parent</th>
<th>M</th>
<th>sd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part I A</td>
<td>Mother</td>
<td>Girl</td>
<td>257.67</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Boy</td>
<td>140.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>202.53</td>
</tr>
<tr>
<td></td>
<td>Father</td>
<td>Girl</td>
<td>221</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Boy</td>
<td>128.25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>177.35</td>
</tr>
<tr>
<td>Part I B</td>
<td>Mother</td>
<td>Girl</td>
<td>6.33</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Boy</td>
<td>5.38</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>5.88</td>
</tr>
<tr>
<td></td>
<td>Father</td>
<td>Girl</td>
<td>5.89</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Boy</td>
<td>5.13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>5.53</td>
</tr>
<tr>
<td>Part II A</td>
<td>Mother</td>
<td>Girl</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Boy</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>3.39</td>
</tr>
<tr>
<td></td>
<td>Father</td>
<td>Girl</td>
<td>4.11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Boy</td>
<td>2.63</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>3.41</td>
</tr>
</tbody>
</table>
The first research question dealt with the agreement between reports on verbal skills from the mother and the father. The correlations are presented in table 2. The correlation for Part I B was almost a perfect correlation ($r = 0.99$). All correlations were very strong which showed a strong agreement between the mothers’ and fathers’ understanding of their children’s verbal skills.

**Table 2. Correlations**

<table>
<thead>
<tr>
<th>CDI – Part</th>
<th>Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part I A</td>
<td>0.96</td>
</tr>
<tr>
<td>Part I B</td>
<td>0.99</td>
</tr>
<tr>
<td>Part II A</td>
<td>0.92</td>
</tr>
</tbody>
</table>

Paired samples t-tests and was used to investigate the second research question to see if there was any general pattern where one of the parents (e.g. the mother) consistently score their child’s language skills higher than the other (e.g. the father). The significance level was at 0.05. The Mothers’ report of their children’s use of words, Part I B, reached a significant level ($t(16) = 2.4; p = 0.029$), there was a small effect size ($d = 0.13$). None of the other parts reached a significant level.

Paired sample t-tests was performed in relations to the third research question to investigate if there was a gender interaction so that a parent score same sex children differently from opposite sex children. The t-tests were done on the parents for girls and boys separately for each part of the CDI. None of the parts reached a significant level.

**Discussion**

The purpose of this study was to examine how consistent parents’ estimates are of their child’s verbal skill. This was done using the toddler version of the MacArthur-Bates Communicative Development Inventories (CDI) which is widely used to assess children’s lexical development (Bernhardt et al. 2007).

All in all there was a fairly strong agreement between the parents’ reports, this is very clear when looking at the correlation results: Part I A ($r = 0.96$), Part I B ($r = 0.99$) and Part II A ($r = 0.92$). The agreement was, in other words, very strong between mothers and fathers when reporting their child’s use of words. This is also supported in other studies where the CDI has been proven reliable and the reports made by parents are found to be very similar (Fenson et al. 2000; Bornstein et al. 2006).
Paired samples t-test was chosen to investigate the second and third research question even though each parent only participated once. The mothers and fathers are reporting verbal skills for the same child and they are likely to influence each other’s estimates. Hence, they should be matched and a paired samples t-test is appropriate (Howell, 2008).

The paired sample t-tests that were performed in regards to the second research question showed a significant level on the child’s use of words, Part I B, where the mothers reported a higher use of words for the children than the fathers. This is in line with other studies where there has been a difference between the parents’ reports, it tends to be the parent who spends most time with the child (often the mother) who reports the highest use of words, because this parent has a better understanding of the child’s actual ability (Lovas, 2010; Stolt et al. 2008). None of the other parts reached a significant level.

The third research question was investigated using Paired sample t-test. It was performed on the parents of the boys and girls separately for each part of the CDI. None of the parts reached a significant level. In other words, no gender difference was found in this research for either of the parts included. There has been other research made where such has been found but these tend to be large sample studies (Eriksson, et al, 2012). Because this study was limited to the parents of 17 children it was unreasonable to expect a significant gender difference.

One of the major weaknesses of this study was the small sample size. The sample was a mix between middle- and working-class and a mix of different ethnical backgrounds, though all were British citizens with English as their first language. So despite the small sample size it was a fair mix of academic, economical and ethnic groups that are widely represented in the UK (Office for National Statistics, 2011). An other weakness was the inability to control the parents’ potential cooperation and discussion of the CDI before it was completed. In the introduction letter (Attachment 2) the parents were asked not to discuss it before completion, but that is not to say that no couple of parents actually did discuss it. Assumingly, all parents had discussed their children’s development in language at some time as well as their children’s development in other areas.

The question of a possible interaction between child and parent of the same sex compared with the opposite-sex parent is something that has not been studied before and could be considered a strength of the study. The results were not significant but it would be worth investigating further with a bigger sample.
Reference


Attachments

Attachment 1

CDI questionnaire description

The MacArthur Bates Communicative Development Inventory is protected by copyright wherefore the contents of the parts included in the study are described, rather than displayed, below.

Part I consists of the of the child’s use of words and is split into section A and B. Section A is a checklist with a total of 680. The word-list is divided into 22 different categories: 1. Sound effects and animal sounds has 12 words; 2. Animals (Real or Toy) has 43 words; 3. Vehicles (Real or Toy) has 14 words; 4. Toys has 18 words; 5. Food and Drink has 66 words; 6. Clothing has 28 words; 7. Body Parts has 26 words; 8. Small Household items has 46 words; 9. Furniture and Rooms has 32 words; 10. Outside things has 31 words; 11. Places to go has 22 words; 12. People has 29 words; 13. Games and Routines has 25 words; 14. Action words has 103 words; 15. Descriptive words has 63 words; 16. Words about time has 12 words; 17. Pronouns has 25 words; 18. Question words has 7 words; 19. Prepositions and locations has 26 words; 20. Quantifiers and Articles has 17 words; 21. Helping Verbs has 21 words; 22. Connecting words has 6 words. Each word marked by the parent is simply counted which gives a total number of words that is used in the report.

Part I B deals with the child’s use of words, whether or not the child has started talking about things that will happen, things that have happened etc. There is a total of five questions that all have three possible answers: Not Yet, Sometimes and Often. A total score is calculated by giving Not Yet – answers 0 points, Sometimes – answers 1 point and Often – answers 2 points. The possible total score range from 0 – 10.

Part II A deals with the child’s use of word endings such as –ed, -ing etc. There is a total of four questions that all have three possible answers: Not Yet, Sometimes and Often. A total score is calculated by giving Not Yet – answers 0 points, Sometimes – answers 1 point and Often – answers 2 points. The possible total score range from 0 – 8.
Attachment 2

Do you want to take part in a study on child language?

Fathers and mothers to children aged 16 to 30 months are both asked to fill in a questionnaire on their child’s communicative skills. The reports will be compared to see if fathers and mothers have the same understanding of their child’s verbal skills. It is therefore important that you don’t discuss the questionnaires with each other until both questionnaires are completed.

When writing the report the children and parents will only be identified by allocated numbers, no name will be given. All participation is entirely voluntary.

This research is done as a part of my psychology studies at Gävle university, a Swedish university.

Yours sincerely,
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