

# Verbal contents of repetitions in Swedish child-directed speech

Stina Andersson

Department of Linguistics  
Independent Project for the Degree of Master (One Year) 15 Higher  
Education Credits  
General Linguistics  
Spring Term 2016  
Supervisor: Tove Gerholm  
Examiner: Bernhard Wälchli  
Expert reviewer: Signe Tonér



Stockholms  
universitet

# Verbal contents of repetitions in Swedish child-directed speech

**Stina Andersson**

## Abstract

Repetitions in child-directed speech (CDS) have been shown to vary over time, and are suggested to affect first language acquisition. Correlations between verbal contents of repetitions in CDS and children's language development have been suggested. The verbal contents of repetitions in Swedish CDS have not yet been investigated.

The aim of this study was to examine the verbal contents of repetitions in Swedish CDS during the child's first 2 years and possible changes in proportions of repetitions during the same time span. Verbal contents of repetitions in parents' speech in 10 parent-child dyads as the children were 3, 6, 9, 12 and 24 months old were investigated focusing on word classes, sentence types and whole-constituent change. The results were compared to the children's productive vocabularies at the age of 30 months. Possible occurrences of item-based constructions and frequent frames in the repetitions were also examined.

The overall results revealed patterns concerning change in verbal contents in repetitions over time and correlations between verbal contents in repetitions and child language development. Two proposals were made: parents adjust the complexity of their speech to linguistic developmental stages of their children, and linguistic variation in the input increases as the child grows older.

### **Keywords**

Child-directed speech, repetitions, first language acquisition, word classes, sentence types, item-based constructions

# Det verbala innehållet i repetitioner i svenskt barnriktat tal

**Stina Andersson**

## Sammanfattning

Repetitioner i barnriktat tal (BRT) har visat sig variera över tid, och har föreslagits påverka förstaspåksinlärning. Även ett samband mellan det verbala innehållet i repetitioner i BRT och barns språkutveckling har föreslagits. Det verbala innehållet i repetitioner i svenskt BRT har inte undersökts tidigare.

Syftet med denna studie var att undersöka det verbala innehållet i repetitioner i svenskt BRT under barnets två första år och möjliga förändringar gällande andelen repetitioner under samma tidsperiod. Det verbala innehållet i repetitioner i föräldrars tal hos tio förälder-barn-dyader då barnen var 3, 6, 9, 12 och 24 månader gamla undersöktes med fokus på ordklasser, satstyper och förändringar gällande konstituenten. Resultaten jämfördes med barnens produktiva ordförråd vid 30 månaders ålder. Även den möjliga förekomsten av typbaserade konstruktioner (item-based constructions) och frekventa ramar (frequent frames) undersöktes.

De övergripande resultaten uppvisade mönster gällande förändringar inom det verbala innehållet i repetitioner över tid samt ett samband mellan det verbala innehållet i repetitioner och barns språkutveckling. Två antaganden gjordes: föräldrar justerar komplexiteten i sitt tal efter språkliga utvecklingsfaser hos sina barn, och den språkliga variationen i inputen ökar med barnets ålder.

### **Nyckelord**

Barnriktat tal, repetitioner, förstaspåksinlärning, ordklasser, satstyper, item-based constructions

# Contents

<b>1 Introduction .....</b>	<b>1</b>
<b>2 Background .....</b>	<b>2</b>
2.1 The nature of CDS and its impact on first language acquisition .....	2
2.2 Repetitions in CDS .....	2
2.2.1 Suggested reasons for the high amount of repetitions in CDS .....	3
2.2.2 Change over time in the proportions of repetitions in CDS .....	3
2.2.3 Correlations between child language development and repetitions in CDS .....	3
2.3 Measures of verbal contents .....	4
2.3.1 Word class use.....	4
2.3.2 Sentence type use.....	5
2.3.3 Constituent change .....	6
2.4 Item-based constructions and frequent frames .....	6
2.5 Investigation of repetitions in Swedish CDS.....	7
<b>3 Aims and research questions.....</b>	<b>8</b>
3.1 Aims .....	8
3.2 Research questions .....	8
<b>4 Method and data.....</b>	<b>9</b>
4.1 Research project context .....	9
4.2 Subjects .....	9
4.2 Data collection procedure.....	9
4.3 Ethical aspects.....	10
4.4 Coding the data .....	10
4.4.1 Selection of data .....	10
4.4.2 Coding of repetitions .....	10
4.4.3 Coding of word classes.....	11
4.4.4 Coding of sentence types .....	12
4.5 Data analysis.....	12
4.5.1 Examination of change in verbal contents over time .....	12
4.5.2 Comparing verbal contents in repetitions with children's own language use ...	13
4.5.3 Exploring relations between verbal contents in repetitions and SECDI scores at 30 months of age .....	13
4.5.4 Investigation of item-based constructions and frequent frames .....	14
4.5.5 Analysing the frequency of repetitions during the child's first 2 years.....	15
4.5.6 Statistical analysis.....	15
<b>5 Results .....</b>	<b>16</b>
5.1 Verbal contents in repetitions measured over time .....	16

5.1.1	Change in word class use over time .....	16
5.1.2	Repetitive word class use compared to small children’s word class use .....	18
5.1.3	Change in sentence type use over time .....	18
5.1.4	Repetitive sentence type use compared to children’s use of sentence types ...	21
5.1.5	Change in use of constituent change over time .....	21
5.2	Correlation between verbal contents and SECDI scores at 30 months of age .....	22
5.2.1	Correlation between word class use and SECDI scores .....	22
5.2.2	Correlation between sentence type use and SECDI scores .....	23
5.2.3	Correlation between use of constituent change and SECDI scores .....	25
5.3	Occurrence of item-based constructions and frequent frames in the data .....	26
5.3.1	Item-based constructions in the material .....	26
5.3.2	Frequent frames in the material .....	26
5.4	Proportions of repetitions in CDS during the child’s first 2 years .....	26
<b>6</b>	<b>Discussion .....</b>	<b>28</b>
6.1	Method discussion .....	28
6.1.1	Validity of the study .....	28
6.1.2	Reliability of the study .....	28
6.1.3	Further notes on limitations in the study .....	29
6.1.4	Generalisability .....	29
6.2	Results discussion .....	29
6.2.1	Discussion on word class use .....	29
6.2.2	Discussion on sentence type use .....	30
6.2.3	Discussion on use of constituent change .....	31
6.2.4	Discussion on occurrence of item-based constructions and frequent frames ...	32
6.2.5	Discussion on proportions of repetitions during the child’s first 2 years .....	32
6.3	Ethics discussion .....	32
6.4	Ideas for future studies .....	32
<b>7</b>	<b>Conclusions .....</b>	<b>34</b>
	<b>References .....</b>	<b>36</b>

# 1 Introduction

Adults tend to speak in a certain way to infants and small children, often called child-directed speech (CDS). Infants have been found to prefer CDS over adult-directed speech (ADS) (McRoberts et al., 2009), and several studies have shown positive effects of CDS on first language acquisition (e.g. Singh et al., 2009; Ma et al., 2011).

One of the defining traits of CDS is the high amount of repetitiveness, both verbally and phonetically. The study of verbal repetitions in CDS has mainly focused on proportions. Age-related change in the amount of repetitions was found by Kaye (1980, p. 498, 500) where the amount of immediate exact self-repetitions increased from the age of 6 to 26 weeks, and thereafter decreased to the age of 2 years. Similar patterns were found by Fernald and Morikawa (1993, p. 647): the proportions of exact self-repetitions were lower at 12 and 19 months of age compared to at 6 months of age. Proportional changes in repetitions in relation to the child's productive word use were found by Kavanaugh and Jirkovsky (1982, p. 305) resulting in a lower amount of exact immediate self-repetitions at the time of the child's first words. Hoff-Ginsberg (1985) examined the change in syntactic constituents between sets of repetitions in English CDS. To my knowledge, no further investigation of the verbal contents of repetitions in CDS has been made except from this.

In my bachelor thesis I investigated the proportions of repetitions in Swedish CDS during the child's first year and the effects of repetitions on the child's productive language level (Andersson, 2015). In the present study the aim was to continue the examination of repetitions in Swedish CDS, this time with a focus on the verbal contents of the repetitions. This has not been done for Swedish CDS before, and therefore filled a research gap concerning the knowledge about repetitions in CDS.

Some parts of the background in the present study were based on the same sources as in the bachelor thesis; a major part of the first step of the coding of repetitions in the method part in the present study (see 4.4.1-4.4.2) was conducted in the same way as was developed for the bachelor thesis. The first step of the coding of repetitions at 3, 6, 9 and 12 months for 8 of the 10 parent-child dyads in the present study was already done during the work with the bachelor thesis (see 4.4.2).

# 2 Background

First language acquisition<sup>1</sup> has been studied for over a century, but still several different theories exist in the area. All theories state verbal input as an important factor in language learning, but they differ in how influential this factor is considered to be and what role it plays. The present study is based on a functionalist usage-based perspective (Tomasello, 2003), where both verbal and gestural input plays a large role, and the child's ability to find patterns in the input is emphasised.

## 2.1 The nature of CDS and its impact on first language acquisition

Some of the defining ways in which CDS differs from ADS are a higher voice pitch, more varying intonation, a use of nouns instead of pronouns and a high rate of repetitions (see for instance Fernald et al., 1989 and Baron, 1990). The use of CDS has been found in many languages and cultures (Fernald et al., 1989; Kokkinaki, 2003), but there are also examples of cultures where adults are said not to use a certain way of speaking to small children. Ochs (1982) claims that parents in Samoa almost do not talk at all to their infant children. In the same way, Brown (1998) states that adult speakers of the Mayan language Tzeltal do not talk much to their children until they start walking at around the age of 18 months. According to Brown a minimal CDS register consisting of high pitch, slower speech and some special baby-words is sometimes used, but it is in no way always present in speech to infants and small children.

Based on the suggestion that CDS is not ubiquitous in adults' speech to infants and small children, the conclusion should be that CDS is not essential to first language acquisition. Yet the many studies that show a positive effect of CDS on first language learning indicate that CDS at least facilitates the acquisition. However, the question if all or just some of the defining traits of CDS promotes first language learning is still not clear.

## 2.2 Repetitions in CDS

The repetitive trait of CDS is present on many levels. Newman et al. (2015) measured repetitiveness in English CDS to 7-months-olds as a type/token ratio, and found that a higher rate of repetitions predicted a larger vocabulary size when the children were 2 years of age. A more common way to investigate repetitions in CDS has been to take into account the limitations of short-term memory. A limit is set for when a repetition must occur to be counted, usually measured in the number of utterances following the source (repeated) utterance. Typical limits for repetitions have been that they follow either immediately or within three following utterances after the source utterance (see Snow, 1972; Rondal, 1980; Kaye, 1980; Hoff-Ginsberg, 1985).

Repetitions in CDS occur both on a phonetic and a verbal level (Fernald & Simon, 1984), and not only adults but also siblings of small children use CDS with a high amount of verbal repetitions (Dunn &

---

<sup>1</sup> In the present study the term 'first language acquisition' refers to the acquisition of a spoken language.

Kendrick, 1982). In the present study focus lies on verbal self-repetitions in parents' speech to their children.

### **2.2.1 Suggested reasons for the high amount of repetitions in CDS**

Self-repetitions are often divided into exact and varying repetitions, where in the latter only parts of the source utterance is repeated. Different reasons for the high use of both kinds of repetitions in CDS have been suggested. Snow (1972) investigated repetitions in speech to 2-year-olds. Mentioning that children's short-term memory is limited she holds that exact repetitions help the child in understanding an utterance as they add more processing time. According to Snow varying repetitions also help the child in decoding sentences, since they make the borders between words in an utterance more visible (Snow, 1972, s. 562-563). A similar view is expressed by Hoff-Ginsberg (1985, s. 370) – varying repetitions make the structural properties of an utterance more detectable. Additionally, Hoff-Ginsberg & Shatz (1982, p. 15) propose that in varying repetitions minimally different utterances that describe the same meaning are presented to the child, and thereby help the child to understand syntactic structure. Kaye (1980) focused on repetitions in maternal speech to infants during their first 6 months, and suggests that repetitions to such small infants mostly serve as attention getters. Baron (1990, s. 38) suggests that repetitions in speech to children who themselves are not yet using syntax simply serve as a means for keeping the conversation going. Cameron-Faulkner et al. (2003) takes a broader perspective pointing out that in language learning, as in all kinds of skill learning, repetition and repetition with variation is crucial.

### **2.2.2 Change over time in the proportions of repetitions in CDS**

The proportions of verbal repetitions in CDS have been shown to change over time. Kaye (1980) showed that the proportion of exact immediate self-repetitions in English CDS increased between the ages of 6 and 26 weeks and then decreased to the age of 2 years. While investigating English and Japanese CDS, Fernald and Morikawa (1993, s. 647) observed higher proportions of exact self-repetitions in speech to children at the age of 6 months compared to at both 12 and 19 months of age. Andersson (2015) found that the proportions of exact self-repetitions in Swedish CDS were lower at 12 months of age than at 3, 6 and 9 months of age. A decrease in the proportions of exact immediate self-repetitions in English CDS at the time of the child's first words was found by Kavanaugh and Jirkovsky (1982, s. 305). Previous research thus seem to agree in that exact self-repetitions in CDS decrease as the child gets older except during the child's first 6 months.

Considering the change in repetitive behaviour in CDS over time, McRoberts et al. (2009) investigated children's preferences for CDS directed to different ages. Children at 6 months of age preferred listening to CDS directed to 1-year-olds over listening to ADS only when the proportion of verbal repetitions in the CDS was adjusted to the level characterising CDS directed to 6-month-olds. No similar procedure was necessary to catch the attention of younger children. McRoberts et al. argue that this indicates that it is at 6 months of age that verbal repetitions become an important factor of preference for the children, and point out that this sensitivity coincides with the age at which infants start to segment speech input into words.

### **2.2.3 Correlations between child language development and repetitions in CDS**

Some effects of repetitions in CDS on child language development have been observed. Hoff-Ginsberg (1985, s. 375) found that a certain sort of varying self-repetitions in mothers' speech to their

children at 2.5 years of age was correlated with the children's growth in verb usage 2 months later. Andersson (2015) found a correlation between parents' low use of exact self-repetitions at 6 and 9 months of age and a high productive child vocabulary size at 18 months of age. Yet no correlations were found between repetitions in mothers' CDS during the children's first 6 months and the children's language level at the age of 26 and 30 months (Kaye, 1980, s. 499; Kaye and Charney, 1981).

## **2.3 Measures of verbal contents**

The verbal contents of CDS can be investigated in many ways. For this study word classes, sentence types and constituents were examined.

### **2.3.1 Word class use**

In Swedish as in English, the proportions of word classes in children's first words follow the same pattern: a majority of nouns, some verbs and low proportions of other word classes (for Swedish see Richthoff, 2000; Lange, 1974, 1975, 1976; for English see Bates et al., 1994, p. 99.). In adult speech on the other hand, nouns are not in majority. As reported by Allwood (1998, p. 26), in a corpora of spoken Swedish pronouns and verbs were the most common word classes while nouns was the seventh most common word class, followed only by interjections. The London-Lund Corpus (Svartvik, 1990, p. 185) reports a different distribution in spoken English, where verbs, pronouns and nouns respectively hold the three top positions on the list. Still, word class proportions in adult speech in both Swedish and English differs considerably from word class proportions in the speech of 2-year-old children.

One suggested reason for the domination of nouns in small children's vocabulary is the focus in early parent-child interaction on naming things (Bates et al., 1994, p. 103). Brown (1998, p. 198) points out that the semantics of nouns usually is more clear and easier to link to their referents, than the semantics of verbs. The common phenomena in CDS to replace pronouns with nouns is another way in which nouns are more salient in CDS than in ADS (Snow, 1972, s 555; Baron, 1990, p. 27 ff.). Moreover, Cameron-Faulkner et al. (2003, p. 852) showed that nouns occurred as single-word utterances around six times more often than verbs did in English CDS directed to children in the ages of 24 to 30 months.

In Lange's investigation of the word class use in one Swedish-speaking child at the ages 20 to 27 months (Lange, 1974, 1975, 1976), interjections was the third most frequent word class used after nouns and verbs at the age of 20 to 22 months. At 25 to 27 months of age not only nouns and verbs were more frequent than interjections but also adverbs and pronouns. Hoff-Ginsberg (1986, p. 158) writes about interjections that they "serve to direct attention or acknowledge prior declaratives". Interjections in that study was measured as a kind of sentence form, but probably the same could be said about interjections in the sense of word class.

A change over time has been shown in small children's use of open-class and closed-class words. The definition of open and closed word classes is based on productivity – open classes are more likely to accept new words, while closed classes are more static and rarely accept new words. The categorising of word classes into open or closed differs some between languages. In Swedish, nouns, verbs, adjectives and some adverbs are considered to be open-class words (Hultman, 2003, p. 37-38).

Bates et al. (1994, p. 98-99) investigated the productive vocabularies of 1 803 English speaking children at the ages 8 to 30 months. They found that open-class words were by far dominant compared to closed-class words, and that it was not until a child's productive vocabulary had reached a size of about 400 words that the closed-class vocabulary started to grow substantially. In the productive vocabularies of three Swedish speaking children (25, 25 and 28 months old), Richthoff (2000, p. 63-64) found a majority of open-class over closed-class words, though the difference was smaller than in Bates et al. A reason for this, except for possible differences between Swedish and English, is that Bates et al. used data from a checklist containing fewer closed-class words than open-class words (Bates et al., 1994, p 98), while Richthoff investigated all words uttered by the children during recordings. Yet an increase in the use of closed-class words correlated to age was found in Richthoff as in Bates et al.

The semantics of closed-class words (for example pronouns and determiners) is probably harder to understand and link to referents than the more meaning-related open-class words. Richthoff (2000, p. 67) means that this is one of the reasons why open-class words develop before closed-class words in children's vocabularies. She further states the fact that closed-class words often are pronounced phonologically reduced to be another reason. Shi et al. (1999) stress the acoustic differences between open-class and closed-class words and show how even new-borns have the ability to discriminate between the two classes.

One could argue against the examination of word class use in small children's speech since, as Clark points out (2011, p. 38-39), a word often can function as a word from another word class. Clark gives the example 'door', a noun that a small child for instance can use in a verb-like function meaning 'open the door'. Despite this, the fact that the distribution of word classes in small children's productive vocabulary differs so greatly from that of adult speakers makes it a relevant topic to investigate further.

There is no former account of word class use in repetitions in Swedish CDS, and one of the purposes of the present study was to fill this gap.

### **2.3.2 Sentence type use**

The use of different kinds of sentence types varies between ADS and CDS, and between CDS directed to children at different ages.

Kavanaugh and Jirkovsky (1982, p. 303) investigated sentence type use in mothers' and fathers' speech to their children at 8-16 months of age. Out of declaratives, imperatives, wh-questions and yes-no-questions, declaratives were by far the type most used. Yes-no-questions were more frequent than wh-questions, which was interpreted as a consequence of the parents simplifying their speech.

When comparing the proportions of sentence types in ADS and in CDS directed to children at the ages of 12 to 27 months, Newport et al. (1977, p. 125) found that imperatives and questions accounted for 62 percent of the utterances in CDS but only 11 percent of the utterances in ADS. Declaratives accounted for 30 percent of utterances in CDS, and 87 percent of utterances in ADS. They also showed how the use of sentence types changed as the child's own language developed (fewer directives and more declaratives).

A correlation between mothers' use of sentence types and children's language development was shown by Hoff-Ginsberg (1985, p. 380), where a high proportion of wh-questions to 2-year-olds correlated with positive growth in the children's use of auxiliaries 4 months later.

Children's own use of sentence types was investigated by Vasilyeva et al. (2008). They registered a change in the proportions of sentence types in productive simple sentence use from 22 to 42 months of age. At the age of 22 months the majority of sentences were imperatives, at the age of 28 months the proportions of imperatives and declaratives were at approximately the same level, and at the age of 42 months declaratives were in majority. Questions only accounted for some percent of the children's utterances at all ages measured.

No former study of sentence type use in repetitions in Swedish CDS has been found, and the present study therefore fills a research gap in the field.

### **2.3.3 Constituent change**

In varying repetitions the source utterance and the repeating utterance can differ more or less from each other. One way to investigate how they differ is to measure constituent change. This was done by Hoff-Ginsberg (1985), who made an elaborate investigation of immediate self-repetitions in CDS directed to 2-year-old children. Addition and/or deletion of both whole constituents and parts of constituents were measured. Results showed that the frequency of whole-constituent change correlated positively with children's use of verbs 4 months later, and part-constituent change involving verbs correlated positively with noun phrase complexity 4 months later.

The present study is the first one investigating constituent change in repetitions in Swedish CDS.

## **2.4 Item-based constructions and frequent frames**

From a functionalist usage-based perspective, repetitive patterns in CDS are considered an important means for first language acquisition. Tomasello (2003, s 117 ff.) claims that so called item-based constructions play an important part in small children's way to a productive language use. These constructions are frequently occurring patterns of word combinations, where one or more words stay intact over variations. Examples of these constructions are '*Cut \_\_\_\_\_*', or '*Draw \_\_\_\_\_ on \_\_\_\_\_*'. Children learn that they can fill the open slots with different words from the same category, a crucial step on the way to master the ability to combine words into sentences. Cameron-Faulkner et al. (2003) investigated the speech of mothers to their children at the age of 2 years in search for these constructions. All item-based constructions that were used four or more times by half or more of the mothers were called core frames. The findings showed that 52 core frames accounted for 51 percent of the beginnings of the mothers' all utterances. Examples on some of the most frequent frames were '*What's*', '*Are you*', '*Do you*', and '*That's*'. Many of the constructions that the mothers used were also used by their own children. In a follow-up study, Stoll et al. (2009) investigated the rate of sentence-initial frames (item-based constructions occurring at least four times in the speech of at least one mother) in English, German and Russian CDS. This was done bearing in mind the much freer word order in Russian compared to English and German. The results showed that Russian had a lower frequency of sentence-initial frames – 70 percent compared to 80 percent in German and 86 percent in English (Stoll et al, 2009, p. 83). Despite the difference in frequency, Stoll et al. considered the percentage to be relatively high in all three languages and assessed the result as showing that the sentence-initial position indeed is important for constructional frames in Russian as well as in English and German.

Mintz (2003) takes a somewhat different approach to a similar phenomenon. He introduces the concept of frequent frames, “ordered pairs of words that frequently co-occur with exactly one word position intervening” (p. 93). The aim of his study was to investigate if word class categorisation could be made based on the words that occurred in the same frequent frames. After examining all frames that occurred with at least three different words in the centre position, the results showed that this assumption was highly accurate. Mintz’s conclusion is that frequent frames could be a way for children to learn and categorise new words.

Tomasello (2003, s. 125) hypothesises that if highly similar utterances with a certain type/token variation are repeated to children, this will help them to understand how to fill slots in constructions.

A suggested combination of the two concepts would be: item-based constructions help children to understand that slots can be filled with many different words from the same category, and frequent frames help them to understand what words that belong to the same categories and thereby can occur in the same slots.

Based on the assumption that the general frequency of item-based constructions and frequent frames is crucial for their usefulness in first language acquisition, it is legitimate to ask if these also occur frequently in sets of varying repetitions. Taking children’s limited short-term memory into account, if item-based constructions or frequent frames occur repeatedly within the short time span of a repetition, this could be assumed to affect the child’s learning even more. In the present study, a first attempt was made to investigate if item-based constructions and frequent frames can be found within sets of adjacent varying repetitions in Swedish CDS.

## **2.5 Investigation of repetitions in Swedish CDS**

As mentioned above, the proportions of repetitions in Swedish CDS during the child’s first year were examined by Andersson (2015). In that study parents’ exact self-repetitions were significantly lower at 12 months of age than at earlier ages.<sup>2</sup> Confirming comparisons were made to Kaye (1980), though the decrease over time in exact self-repetitions reported in Kaye’s study was measured between 26 weeks and 2 years of age. As a minor aim in the present study a follow-up investigation of the proportions of repetitions in Swedish CDS at 2 years of age was made, trying to make a more accurate comparison to Kaye’s results.

The main goal of the present study was to broaden the knowledge about repetitions in Swedish CDS by investigating their verbal contents. The question still remains whether adults adjust the amount of repetitions in CDS to the perceived capacity level of children, or if the amount and nature of repetitions in CDS at different ages affect children’s language development. In the present study this question was related to by investigating the correlation between the verbal contents of repetitions in CDS both to children’s language development in general and to the productive language level of the children in the study. The former was done by comparing the results of the present study to child language development as described by previous research. For the latter the children’s vocabularies were measured by SECDI (Berglund & Eriksson, 2000), the Swedish version of The MacArthur-Bates Communicative Development Inventory (Fenson et al., 2007). Communicative development inventories are standardised checklists, filled out by parents based on their estimation of the vocabularies of their own children.

---

<sup>2</sup> In Andersson (2015) both parents’ self-repetitions and repetitions of child utterances were investigated. In the present study follow-up measurements were only done for parents’ self-repetitions.

# 3 Aims and research questions

## 3.1 Aims

The main aim of the present study was to examine the verbal contents of repetitions in Swedish CDS during the child's first 2 years and possible relations between these repetitions and children's productive language at 30 months of age. This was done while focusing on three grammatical, pragmatic and syntactic verbal traits: word classes, sentence types and constituents.

The second aim was to investigate if the proportions of repetitions in Swedish CDS change during the child's first 2 years.

## 3.2 Research questions

Question 1

- i) Could any change considering verbal contents of repetitions in CDS be shown during the child's first 2 years?
- ii) Could proportions of verbal contents of repetitions in CDS during the child's first 2 years be related to productive language use of small children?

Question 2

Could any correlations be found between possible variations in verbal contents in parent's repetitions at any ages and the children's productive language level at 30 months of age?

Question 3

Could item-based constructions and frequent frames be found in sets of adjacent varying repetitions?

Question 4

Does the proportions of repetitions in CDS change during the child's first 2 years?

# 4 Method and data

## 4.1 Research project context

All the data in the study was taken from the MINT project<sup>3</sup> at the Department of Linguistics, Stockholm University. The MINT project is an ongoing 5 year project aiming to model infant language acquisition during children's first 3 years of life. A large part of the project consists of building up a multimodal corpus of parent-child interaction. This is done by video recording parent-child dyads in interaction in a studio at the department every third month during the child's first 3 years. The recorded material is being coded with information about both behavioural and contextual constituents by trained research assistants using the annotation tool ELAN<sup>4</sup>. Elaborate annotation conventions have been developed in the project for this purpose, and the transcribers meet once a week discussing questions encountered concerning assessment of the material. In the present study transcripts of vocal interaction from this project were used, and the possibility to access video files from the recordings was used whenever needed for clarification.

## 4.2 Subjects

The subjects in the project were voluntary respondents to an invitation letter, sent out to a randomised sample of 2000 parents of new-borns born in August and September 2013 in the Stockholm area. 85 children and their parents joined the study, 72 were still participating at 30 months of age. For the present study, the recordings of 10 children (5 boys) were chosen. The families of these 10 children were considered middle-class based on education and income level. Six of the children had different parents present at different ages (out of the 50 recordings 41 were with mothers present and 9 with fathers). This was not considered to affect the results given that all children spend time with both their parents at home.

## 4.2 Data collection procedure

All recordings were made in a room at the department, equipped with video cameras and microphones<sup>5</sup>. Three cameras were attached to the walls of the room and the parents were equipped with an action camera on their chest. One omnidirectional microphone was used for syncing of all videos and sounds, and the parent and child were both wearing lavalier microphones. Some toys and books, appropriate to the child's age, were available for the child and parent to use, and they were instructed to play freely and act "like at home". The recordings lasted 15-20 minutes.

---

<sup>3</sup> *MINT: Modelling infant language acquisition from parent-child interaction, funded by the Marcus and Amalia Wallenberg Foundation (MAW 2011.007).*

<sup>4</sup> <http://tla.mpi.nl/tools/tla-tools/elan/> Max Planck Institute for Psycholinguistics, The Language Archive, Nijmegen, The Netherlands

<sup>5</sup> *Three Canon HDMI cameras, model XA10; one GoPro Hero3 action camera. Two lavaliers: Sennheiser model eW 100 G2, and one AKG SE 300 B microphone.*

## 4.3 Ethical aspects

The MINT project has been approved by the Swedish Ethical Review Board. The invitation letter to the parents told about the aim of the study: to examine the way children learn to speak the language spoken in their social environment. The parents were informed that the participation in the study was entirely voluntary, and that they had the right to withdraw their participation at any time. Additionally they were informed that the material collected in the study was to be de-identified and not able to trace back to individual participants.

## 4.4 Coding the data

### 4.4.1 Selection of data

For every child in the subgroup of ten, transcripts of 5 minutes were taken from the recordings at 3, 6, 9, 12 and 24 months of age. The choice of age groups was primarily based on the availability of already transcribed material. Three reasons were considered for using material recorded at the age of 2 years instead of only during the child's first year. Firstly, a large part of previous research on verbal contents in CDS has been done at or around the age of 2 years. Secondly, the time span between the ages of 1 and 2 years was considered to be sufficiently large to ensure yet another developmental stage in the child's language acquisition, which would possibly be reflected in the parents' use of repetitions. Thirdly, results from the age of 2 years would allow for a comparison to the use of repetitions at 2 years of age in Kaye (1980).

The 5-minute extracts were chosen from the material where the parent and child were alone in the room. Parents' utterances from these extracts were all counted as CDS. In one file at 24 months of age the parent used both Swedish and a second language while talking to the child. The extract of totally 5 minutes was therefore chosen from the parts with the least amount of the other language. The utterances spoken in the second language were counted as utterances, totally 12 utterances out of 116. One of those was a repetition, but was not counted as repetition in the data<sup>6</sup>. This was judged not to affect the results negatively.

The sound quality of the recordings was high, and almost no words were unintelligible. The very few utterances that contained unintelligible words were not disqualified from the data. Utterances were measured as continuous audio streams separated from each other by a pause. Run-on sentences in continuous speech were counted as separate utterances judging from intonation (see Snow, 1972, p. 550, for a similar practice). Utterances where parents were singing or rhyming were excluded since children's songs and rhymes usually have a high proportion of repetitions. Utterances only containing sneezing, laughter and the likes were also excluded from the material.

### 4.4.2 Coding of repetitions

The transcriptions of the recordings contained a tag for repetitions. The definition of repetitions in the annotation conventions for the MINT project is not as strict as the definition used in the present study. Therefore all 50 transcription files had to be checked manually and changes be made where necessary to attain as high agreement as possible. This procedure had already been done for the recordings from 3, 6, 9 and 12 months of age for 8 of the 10 children as part of the data coding for Andersson (2015) as

---

<sup>6</sup> The utterances in the second language were translated by a research assistant who speaks that language fluently.

mentioned in the introduction of this study. The remaining 18 recordings (two at 3, 6, 9 and 12 months respectively; 10 at 24 months) were checked in the same way, following the definitions explained below.

To be counted as a repetition in this study, the repetition had to occur within the three following utterances after the source utterance and within a time limit of 10 seconds. Non-linguistic vocal sounds were counted as valid data (as in Kaye, 1980), but were only included in the data when answering research question 4 (see 3.2) to make comparisons to Kaye (1980) and Andersson (2015) possible. In the data used to answer research questions 1-3 only verbal repetitions were included.

Both exact and varying repetitions were counted. Exact repetitions had to repeat a whole utterance, with or without the addition/deletion of all variations of the words *ja* 'yes' and *nej* 'no' (see Hampson & Nelson, 1993, p. 341, for a partly similar practice). Varying repetitions had to repeat one or more head elements from the source utterance with addition and/or deletion of other words/sounds. Head elements could consist of one or more words and occurred in different forms, e.g. nouns, noun phrases, verb, verb phrases, adjectives or non-linguistic sounds. Repetitions that repeated all words from the source utterance but in another order were counted as varying repetitions. Some examples of varying repetitions are shown below (example 1-4).

(1) *lampa*  
'lamp'

*var är lampan?*  
'where is the lamp?'

(2) *vart ska du gå?*  
'where are you going?'

*ska du gå någon annan stans?*  
'are you going somewhere else?'

(3) *var den där fin?*  
'was that one nice?'

*var den där rolig?*  
'was that one fun?'

(4) *det är kossan*  
'that is the cow'

*är det kossan?*  
'is that the cow?'

Semantic repetitions that repeated the meaning but not the words in a source utterance were not counted as repetitions.

#### 4.4.3 Coding of word classes

In all verbal repetitions, every repeated word was manually assigned with a code for word class and word class group. As in Richthoff's investigation of word class use in the speech of Swedish children (2000, p. 43) nouns, adjectives and verbs were counted as open-class, and all the rest as closed-class words. Copulas and auxiliaries were not included in the verb group (see Bates et al., 1994, p. 96, for a somewhat similar approach). Onomatopoeic sounds as 'woff woff' and 'moo' for dogs' and cows'

sounds were coded as interjections. Though semantics was taken into account to decide word class in ambiguous cases (e.g. words where nouns and verbs have the same form), words in idioms and the likes were coded based only on the individual meaning of each word regardless of the meaning of the whole phrase.

#### **4.4.4 Coding of sentence types**

In all verbal repetitions where both the source utterance and the repetition were full clauses (including subject and predicate), all utterances were manually assigned with a code for sentence type if they were i) a declarative, ii) an imperative, iii) a wh-question or iv) a yes-no-question. In the imperative category both affirmative and negative imperatives were included. Utterances labelled as wh-questions were those that included the Swedish equivalents of interrogative words such as ‘why’, ‘who’, ‘what’, ‘how’ and the likes. Exclamative utterances were not included in the study. As in Vasilyeva et al. (2008, p 88), the categorisation of utterances into sentence types was based on syntax and not on pragmatics.

## **4.5 Data analysis**

### **4.5.1 Examination of change in verbal contents over time**

In answering the first part of research question 1 – if any change in verbal contents could be measured over time – word class use, sentence type use and constituent change were investigated.

Word class use was calculated as the mean number of repeated words in respective class per verbal repetition. This frequency was measured on word class level for nouns, verbs, adjectives and interjections, and on class group level for open and closed class. All six variables were investigated for age effects. Moreover, change in the distribution between repeated closed-class and open-class words over time was calculated and investigated for age effects.

Sentence type use was measured in two ways. First, each sentence type was measured separately. For every sentence type, the number of repetition sets where the source and/or repetition utterance were coded as the type concerned was calculated as a percentage of all verbal repetitions. Secondly, the number of repetition sets where the source utterance and the repetition utterance were of the same type or of different types were calculated respectively as a percentage of all verbal repetitions. All six variables were investigated for age effects.

Measuring of constituent change within sets of adjacent repetitions was inspired by the method developed for the purpose by Hoff-Ginsberg (1985), with the exception that in this study only the additions and/or deletions of whole constituents were measured. Following Hoff-Ginsberg, the only sets counted were the ones where a noun and/or a verb in the source utterance was repeated in the following utterance. In this study additions or deletions of a child’s name said only with a vocative function (e.g. ‘look at the doggie, Lisa’) were not counted as constituent changes. Subjects, verbs, direct objects, indirect objects and predicative nominals were counted as constituents, dummy pronouns were not. In cases where an utterance contained both independent and dependent clauses, only changes in the independent clause were measured.

Following are some examples on utterances with (5-6) and without (7-8) constituent change.

(5) *väljer du kossan?*  
'are you choosing the cow?'

*väljer du bilen?*  
'are you choosing the car?'

(6) *ger du muggen till mamma?*  
'are you giving the mug to mom?'

*ger du muggen till kossan?*  
'are you giving the mug to the cow?'

(7) *det är en bil*  
'that is a car'

*det är en rosa bil*  
'that is a pink car'

(8) *vart ska du gå?*  
'where are you going?'

*vart ska du gå nu?*  
'where are you going now?'

The number of whole-constituent additions and deletions was measured separately and in total for each repetition set and calculated as mean for all adjacent repetitions where a noun and/or verb was repeated. All three variables were investigated for age effects.

#### **4.5.2 Comparing verbal contents in repetitions with children's own language use**

In answering the second part of research question 1 – whether proportions of verbal contents in repetitions during the child's first 2 years could be related to productive language development in small children - word class use and sentence type use were investigated.

Significant results considering change in frequency of repetitive word class use were compared to the change over time in small children's use of word classes as outlined in section 2.3.1.

Keeping in mind the overall higher use of nouns than of verbs in small children's productive language (2.3.1), possible differences in the rate of repetitive use of verbs and nouns in the parent's speech was investigated at all ages. The same was done with the rate of open-class and closed-class words, since open-class words were reported in previous research to be more common in small children's productive language than closed-class words (2.3.1).

Significant results considering change in frequency of repetition sentence type were compared to change over time in small children's use of sentence types (2.3.2). Significant differences in proportions of repetition sentence types at 24 months of age were compared to the proportions of sentence types in small children's speech at 22 and 26 months of age (2.3.2).

#### **4.5.3 Exploring relations between verbal contents in repetitions and SECDI scores at 30 months of age**

To answer research question 2 – trying to find correlations between possible variations in the verbal contents of parent's repetitions on a group level and children's productive language at 30 months of age – the use of word classes, sentence types and constituent change was investigated.

The children's productive vocabularies at 30 months of age were measured by the parental reports in SECDI II part I, "Words that children use". The SECDI data was accessed from the MINT project, where parental reports are collected every third month. The distribution of individual SECDI scores in the subject group is presented in the result section (5.2, fig. 7).

The use of repetitions in CDS in the MINT project data has been found to show large variation between subjects (Andersson, 2015, p. 16). Due to this and the fact that the subject group in the present study consisted only of 10 subjects, the correlation between verbal contents and SECDI scores was tested in two ways: based on individual SECDI scores and based on SECDI score level groups. The five subjects with the highest scores were assigned to the "high score group" and the five subjects with the lowest scores were assigned to the "low score group". The main reason for the division of subjects into groups of five was to have an equal number of subjects in each group.

The six variables in the word class data (nouns, verbs, adjectives, interjections, closed-class and open-class), the six variables concerning sentence types (declaratives, imperatives, wh-questions, yes-no-questions and same type or different types in repetition sets) and the three variables regarding constituent change (additions, deletions and total change) were all investigated at all available ages for correlations to SECDI scores.

#### **4.5.4 Investigation of item-based constructions and frequent frames**

The approach for investigation of possible item-based constructions and frequent frames in the repetitions (research question 3) was chosen with the limitations of the material in mind. In Cameron-Faulkner et al. (2003) 24 hours of CDS were analysed (12 mothers, 2 hours per subject), totally comprising of approximately 16 800 utterances. In Mintz (2003) speech to six children containing a total of 103 191 utterances was investigated. In the present study the total amount of utterances was 5 572. Therefore – in contrast to previous research in the area – no minimum number of occurrences per parent-child dyad was required for item-based constructions to be counted, neither was any requirements set on the quantity of words that had to occur in a certain frequent frame for it to be counted. Additionally, due to the fact that the search for item-based constructions and frequent frames was only one part of the present study and therefore needed to be limited, not only item-based constructions but also frequent frames were only calculated if they occurred in the beginning of utterances. Considering that Swedish has a rather restricted word order, roughly comparable to that of English and German, and having in mind the research of Stoll et al. (2009) where both English and German had a rather high rate of sentence-initial frames, this was considered a valid limitation. Finally, since the material was small, item-based constructions and frequent frames were investigated for all ages together.

Using the same subset of repetitions as in investigating constituent change, all adjacent sets of varying repetitions repeating a noun and/or verb from the source utterance were searched for sentence initial item-based constructions and frequent frames. Thus in repetition sets where both utterances started with either the same two words or with the same two words with a third word in between, the two-word combinations were documented and labelled as either item-based constructions or frequent frames. As in Stoll et al. (2009), utterances that began with the Swedish equivalents of 'and', 'or' and 'but' were counted as if they started with the subsequent word. The same was done for the equivalents of 'yes' and 'no'. The number of each unique item-based construction and frequent frame was calculated.

#### **4.5.5 Analysing the frequency of repetitions during the child's first 2 years**

The goal in answering research question 4 was to do follow-up research on the study of proportions of repetitions in Swedish CDS during the child's first year made by Andersson (2015) in examining vocal self-repetitions in parents' speech during the child's first 2 years. Since not all subjects were the same in the present study as in Andersson's study, the proportions of repetitions in the present study were calculated for all ages. Proportions were measured for exact and varying vocal self-repetitions separately and together.

#### **4.5.6 Statistical analysis**

Bivariate regression analysis was used for investigating variables for effects of age (for instance change in word class use over all ages), and for investigating possible correlations between variables and individual SECDI scores. Paired samples t-tests were used while investigating variables with focus on possible differences between two ages. Independent samples t-tests were used in measuring possible differences concerning variables between the two SECDI score groups.

# 5 Results

## 5.1 Verbal contents in repetitions measured over time

In this section the results of research question 1 are presented in the following order: word class use, sentence type use and constituent change.

### 5.1.1 Change in word class use over time

The mean numbers of repeated nouns, verbs, adjectives and interjections per verbal repetition in the parents' speech to their children at the ages of 3, 6, 9, 12 and 24 months are presented in table 1.

Table 1. Mean number of words for each measured word class per verbal repetition in parents' speech at 3, 6, 9, 12 and 24 months of age.

	3 months	6 months	9 months	12 months	24 months
<i>Nouns</i>	0,38	0,46	0,45	0,43	0,48
<i>Verbs</i>	0,40	0,46	0,40	0,39	0,31
<i>Adjectives</i>	0,17	0,09	0,07	0,04	0,05
<i>Interjections</i>	0,22	0,28	0,33	0,22	0,20

The repetitive use of all four measured word classes was investigated for age effects. For nouns, verbs and interjections, no significant age effects were found. A significant moderate negative effect of age on repetitive use of adjectives was found over all ages ( $r = 0.386$ ,  $t(49) = -2.899$ ,  $p < .01$ ). Measured only over the child's first year, a significant strong negative effect was found between the same variables ( $r = 0.565$ ,  $t(39) = -4.225$ ,  $p < .001$ ). No significant difference between the repetitive use of adjectives was found between the ages of 12 and 24 months. In figure 1 on the next page, the distribution of mean number of repeated adjectives per age is displayed.

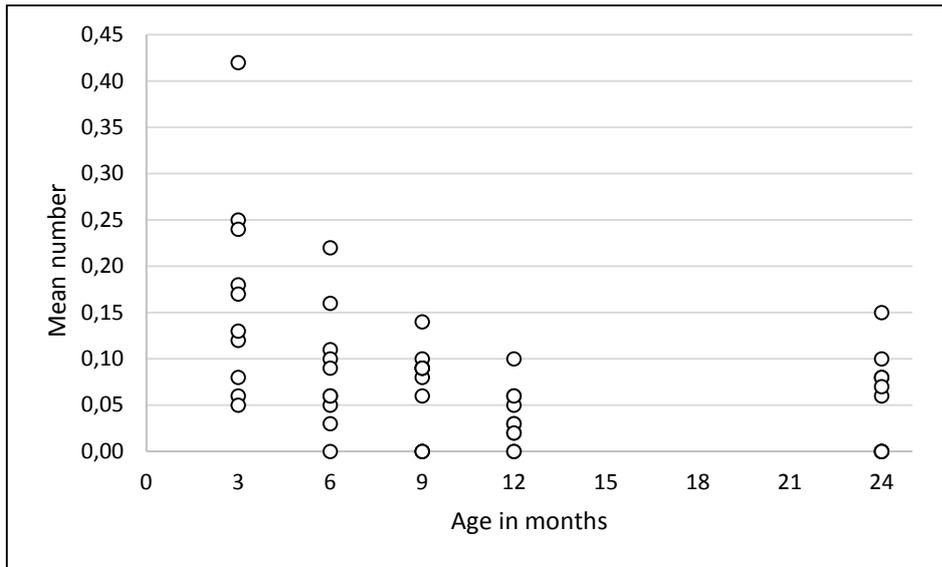


Fig. 1. The distribution of mean number of repeated adjectives per verbal repetition in parents' speech at 3, 6, 9, 12 and 24 months of age.

The mean number of repetitions of open-class and closed-class words per verbal repetition in the parents' speech to their children at the ages of 3, 6, 9, 12 and 24 months is presented in table 2.

Table 2. Mean number of words for open-class and closed-class words per verbal repetition in parents' speech at 3, 6, 9, 12 and 24 months of age.

	3 months	6 months	9 months	12 months	24 months
Open-class	0,95	1,01	0,91	0,86	0,85
Closed-class	1,53	1,23	1,12	0,97	1,37

The mean number of repetitions of open-class and closed-class groups was investigated for age effects. No significant age effects were found over all ages for open-class or closed-class words. The change in the mean number of repetitions of closed-class words between the ages of 9 and 12 months was investigated with a t-test showing a significant decrease ( $t(9) = 2.644, p < .05$ ). The same was done for the difference in repetitive closed-class use from 12 to 24 months of age. A significant increase of closed-class words from 12 to 24 months could be shown ( $t(9) = -2.373, p < .05$ )

The distribution of mean number of repeated closed-class words per age is displayed in figure 2 on the next page.

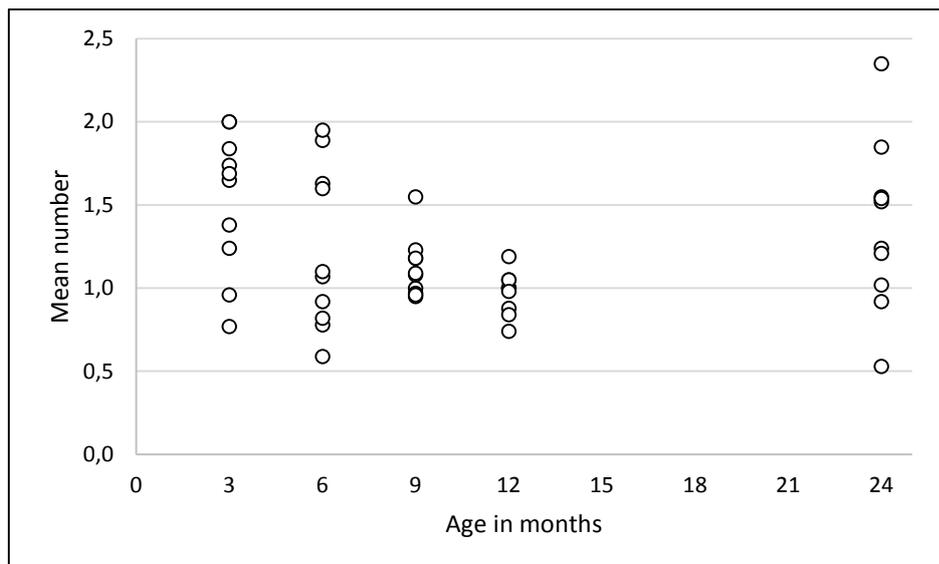


Fig. 2. The distribution of mean number of repeated closed-class words per verbal repetition in parents' speech at 3, 6, 9, 12 and 24 months of age.

### 5.1.2 Repetitive word class use compared to small children's word class use

The decrease over time in parents' repetitive use of adjectives had no correlation to small children's use of word classes as outlined in section 2.3.1.

The distribution between repetitive use of verbs and nouns in the parent's speech did not show any significant effects at any age, and consequently no parallels could be drawn to differences in the rate of nouns and verbs in small children's vocabularies as described in 2.3.1.

The examination of the distribution between repeated open-class and closed-class words over all ages generated no significant results. However, t-tests showed that the amount of closed-class words were significantly higher than the amount of open-class words at 3 months of age ( $t(9) = 3.146$ ,  $p < .05$ ), 9-months of age ( $t(9) = 2.565$ ,  $p < .05$ ) and 24-months of age ( $t(9) = 2.728$ ,  $p < .05$ ). No significant difference in number of repeated open-class and closed-class words was found at the ages of 6 or 12 months of age. This higher amount of repeated closed-class words than open-class words in parents' speech at 3, 9 and 24 months of age do not correlate with small children's use of open-class and closed-class words as presented in 2.3.1.

### 5.1.3 Change in sentence type use over time

In table 3 on the next page the number of repetition sets where the source and/or repetition utterance were coded as the measured sentence types is presented as a percentage of all verbal repetitions. The presented numbers were calculated on each age level.

Table 3. The number of repetition sets in parent's speech with source and/or repetition utterance coded as the measured sentence type, measured as percentage of all verbal repetitions, calculated per age.

	3 months	6 months	9 months	12 months	24 months
Declaratives	28,18	25,79	20,37	18,10	20,78
Imperatives	2,56	8,05	5,79	8,66	0,13
Wh-questions	8,34	9,82	8,70	14,31	25,36
Yes-no-questions	28,53	14,88	25,33	21,78	28,78

Each sentence type was investigated in search for age effects. The only type showing a significant result was wh-questions measured over all ages. A significant strong positive relationship ( $r = 0.589$ ,  $t(49) = 5.049$ ,  $p < .001$ ) predicted a higher amount of wh-questions as the children got older. However, no effect of age was shown of wh-questions measured only over the child's first year. The difference between 12 and 24 months of age was measured with a t-test but turned out to be only marginal ( $t(9) = -2.123$ ,  $p = .063$ ). The distribution concerning wh-questions per age group is displayed below in figure 3.

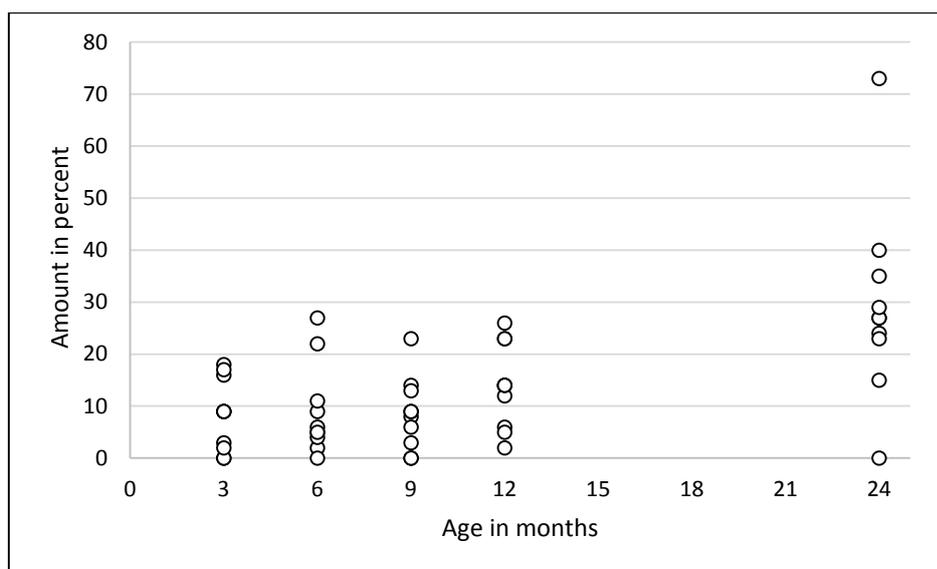


Fig. 3. The distribution of use of wh-questions in sets of repetitions presented as a percentage of the total amount of verbal repetitions in parents' speech at 3, 6, 9, 12 and 24 months of age.

The number of repetition sets with utterances of the same or different sentences types is presented in table 4 as percentage of all verbal repetitions, calculated on each age level.

Table 4. The distribution of repetition sets with utterances of the same and different sentences types as a percentage of all verbal repetition in parents' speech at 3, 6, 9, 12 and 24 months of age.

	3 months	6 months	9 months	12 months	24 months
Same types	44,02	38,95	35,51	29,55	38,62
Different types	11,77	9,44	12,23	16,40	20,77

A significant moderate negative effect of age on the use of same sentence types in repetition sets during the child's first year was found ( $r = 0.396, t(39) = -2.662, p < .05$ ). No age effect on same type use was found over all ages. The distribution of same sentence type use per age group is displayed in figure 4.

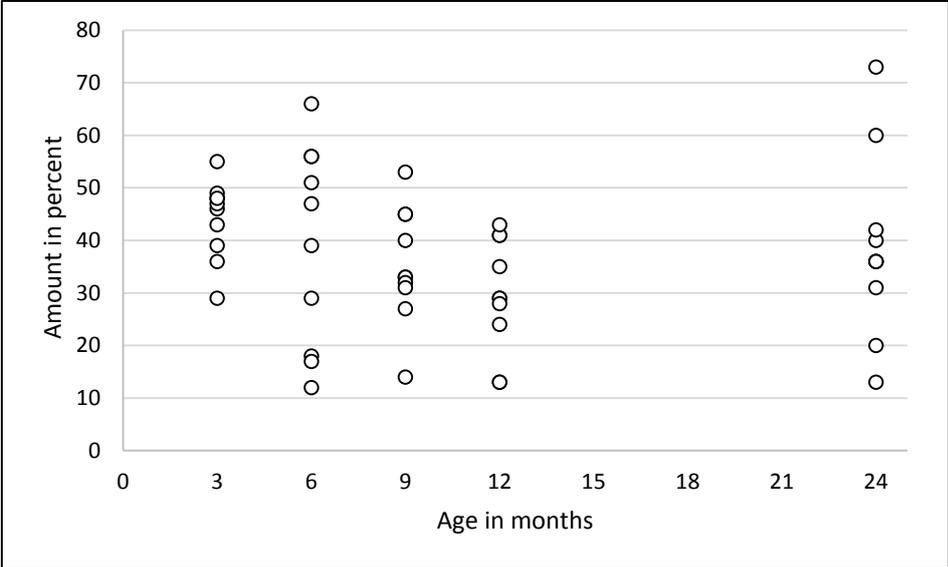


Fig. 4. The distribution of use of same sentence type in repetition sets presented as a percentage of the total amount of verbal repetitions in parents' speech at 3, 6, 9, 12 and 24 months of age.

The use of different sentence types measured over all ages showed a significant strong positive relationship with age ( $r = 0.406, t(49) = 3.078, p < .01$ ). No significant relationship was found when different sentence type use was measured over the first year only. The distribution of use of different sentence types per age group is presented in figure 5.

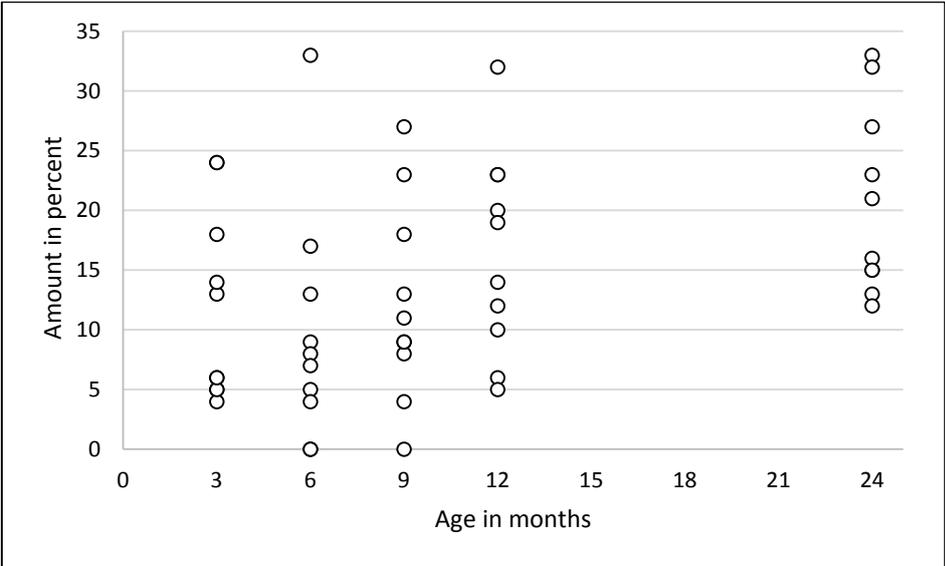


Fig. 5. The distribution of different sentence type use in sets of repetitions presented as a percentage of the total amount of verbal repetitions in parents' speech at 3, 6, 9, 12 and 24 months of age.

### 5.1.4 Repetitive sentence type use compared to children’s use of sentence types

The increase over time of wh-questions in parents’ repetitions was in line with the increase over time in use of questions in children’s productive language at 22 to 42 months of age (see 2.3.2).

Only the use of imperatives differed significantly from the use of other sentence types in repetitions at 24 months of age. Imperatives were used more seldom than both declaratives ( $t(9) = 5.553, p < .001$ ), wh-questions ( $t(9) = 4.297, p < .01$ ) and yes-no-questions ( $t(9) = 6.221, p < .001$ ). The proportions of repetitive sentence use at 24 months of age are illustrated in figure 6.

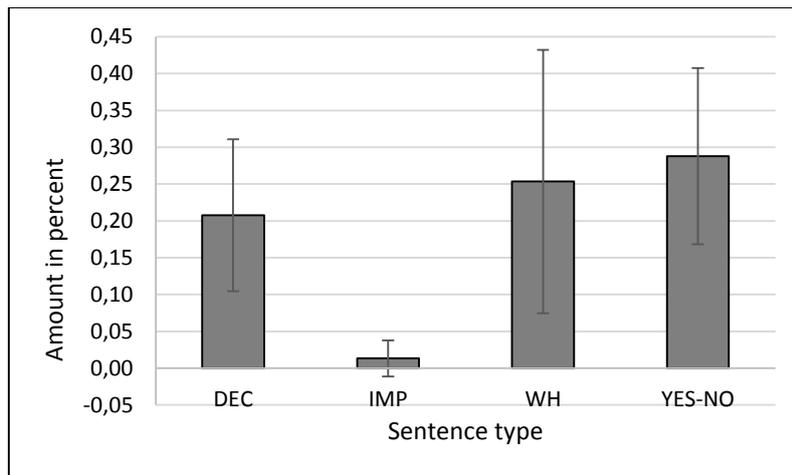


Fig. 6. The proportion of repetitive sentence use in sets of repetitions at 24 months of age calculated as a percentage of all verbal repetitions. Error bars represent +/- 1 standard deviation.

The low use of imperatives in parents’ repetitions did not correspond to the high use of imperatives in children’s productive language at 22 and 26 months of age (see 2.3.2). The comparably high use of questions in parents’ repetitions stood in contrast to the low use of questions in children’s own speech at the ages 22 to 26 months (see 2.3.2).

### 5.1.5 Change in use of constituent change over time

The mean numbers of whole-constituent addition and deletion per repetition in adjacent repetition sets are presented separately and together in table 5 below.

Table 5. Mean number of whole-constituent change per repetition in adjacent repetition sets.

	3 months	6 months	9 months	12 months	24 months
Addition	0,52	0,38	0,64	0,86	0,91
Deletion	0,47	0,44	0,63	0,66	0,74
Total change	0,99	0,82	1,27	1,51	1,65

Significant age effects could be found for all three variables. The tests were showing strong positive relationships between age and whole-constituent additions ( $r = 0.441, t(49) = 3.401, p < .01$ ) and age and total whole-constituent change ( $r = 0.443, t(49) = 3.422, p < .01$ ), and a moderate positive relationship between age and whole-constituent deletions ( $r = 0.332, t(49) = 2.436, p < .05$ ).

## 5.2 Correlation between verbal contents and SECDI scores at 30 months of age

In this section, the results concerning research question 2 are presented. Correlations between variables and SECDI scores calculated for the two score groups are only reported if no correlations calculated on individual SECDI scores could be found.

The distribution of individual SECDI scores in the group at 30 months of age, measured as the number of unique words reported to be used by each child, is illustrated in figure 7 below.

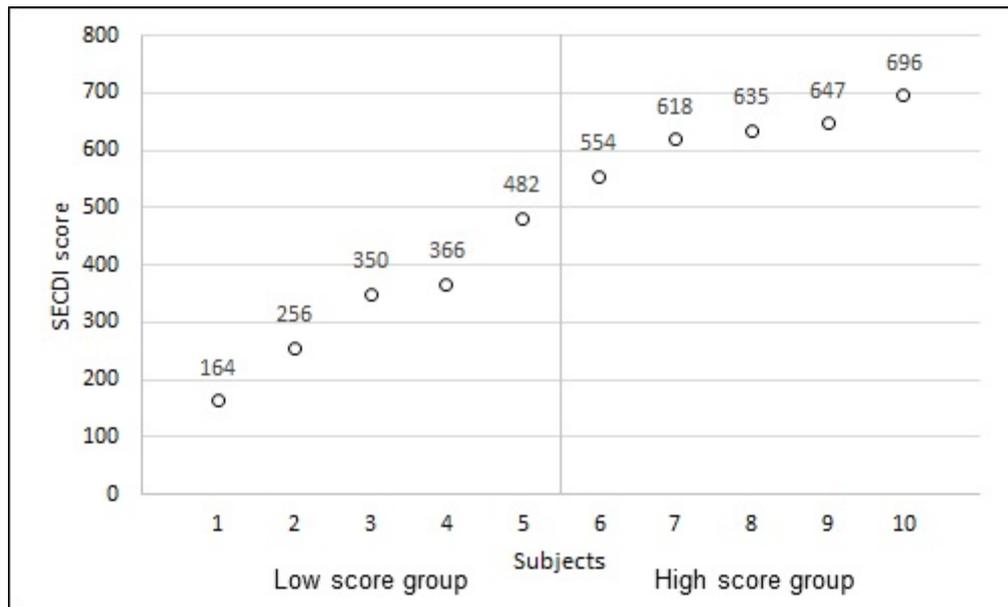


Fig. 7. The distribution of individual SECDI scores at 30 months of age, measured as the number of unique words the children were reported to use productively.

The difference in score between the high score group and the low score group was investigated with an independent-samples t-test and was proven to be highly significant ( $t(8) = 5.246, p < .01$ ).

### 5.2.1 Correlation between word class use and SECDI scores

No significant correlations between the repetitive use of words from different word classes or open/closed word class and productive child language at 30 months of age could be found based on individual SECDI scores.

When investigating the same variables on score group level, a t-test showed a significant difference concerning interjections at the age of 24 months ( $t(8) = -3.262, p < .05$ ). Parents of children in the high score group repeated interjections to a lesser degree than parents of children in the low score group. The distribution between SECDI groups concerning mean numbers of interjections per verbal repetition in parent's speech at 24 months is presented in figure 8 on the next page.

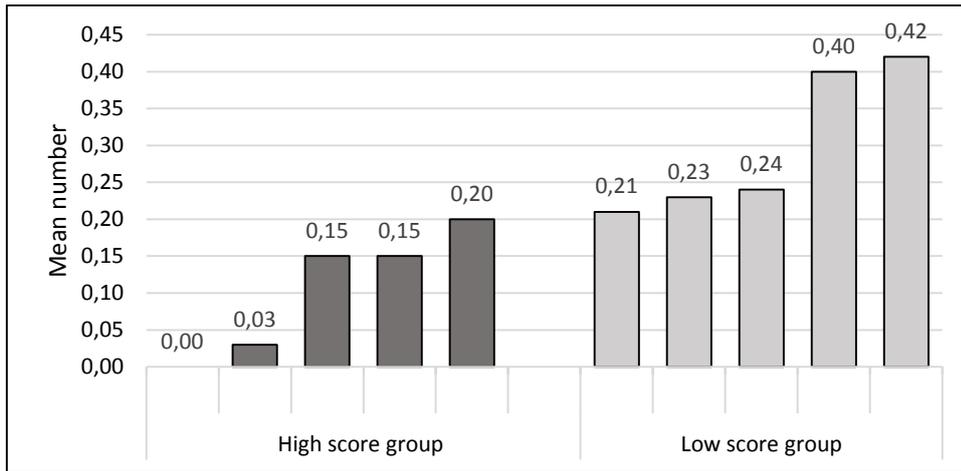


Fig. 8. The mean number of interjections per verbal repetition in parent's speech at 24 months of age, presented by SECDI score group.

### 5.2.2 Correlation between sentence type use and SECDI scores

Tests revealed two different significant correlations between sentence type use in sets of variation and individual SECDI scores at 30 months of age. A strong positive relationship was observed between the use of wh-questions at the age of 3 months and individual SECDI scores. ( $r = 0.633$ ,  $t(9) = 2.315$ ,  $p < .05$ ). The mean numbers of wh-questions in sets of repetitions at 3 months of age related to individual SECDI scores are illustrated in figure 9.

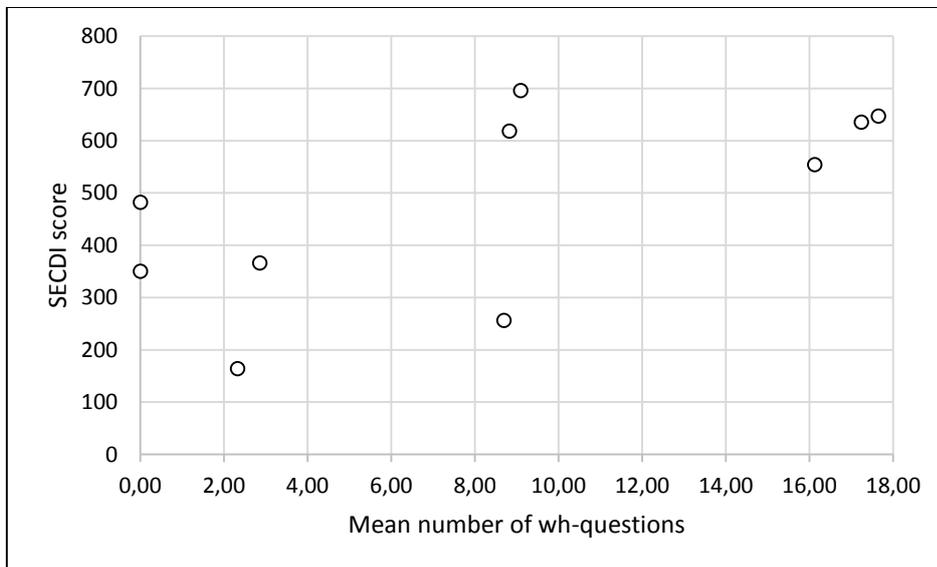


Fig. 9. The mean number of wh-question use in sets of repetitions presented as a percentage of the total amount of repetitions in parent's speech at 3 months of age, related to individual SECDI scores.

A very strong positive relationship between the use of different sentence types in repetition sets at the age of 3 months and individual SECDI scores was also found ( $r = 0.707$ ,  $t(9) = 2.909$ ,  $p < .05$ ). The mean numbers of different sentence types at 3 months of age related to individual SECDI scores are illustrated in figure 10 on the next page.

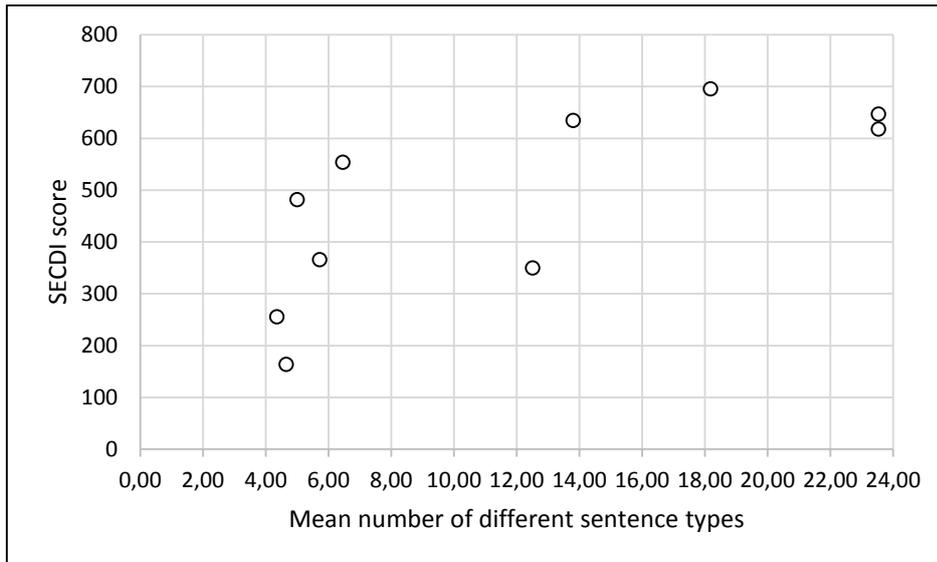


Fig. 10. The mean number of different sentence type use in sets of repetitions presented as a percentage of the total amount of repetitions in parent's speech at 3 months of age, related to individual SECDI scores.

Differences in sentence type use between the two SECDI score groups were significant in three cases: concerning declaratives at 6 and 9 months of age and yes-no-questions at 6 months of age. Children in the high score group had parents whose repetition sets consisted of less declaratives at the age of 6 months ( $t(8) = 2.606, p < .05$ ). The distribution between SECDI groups concerning mean numbers of declaratives in sets of repetitions at 6 months of age is presented in figure 11.

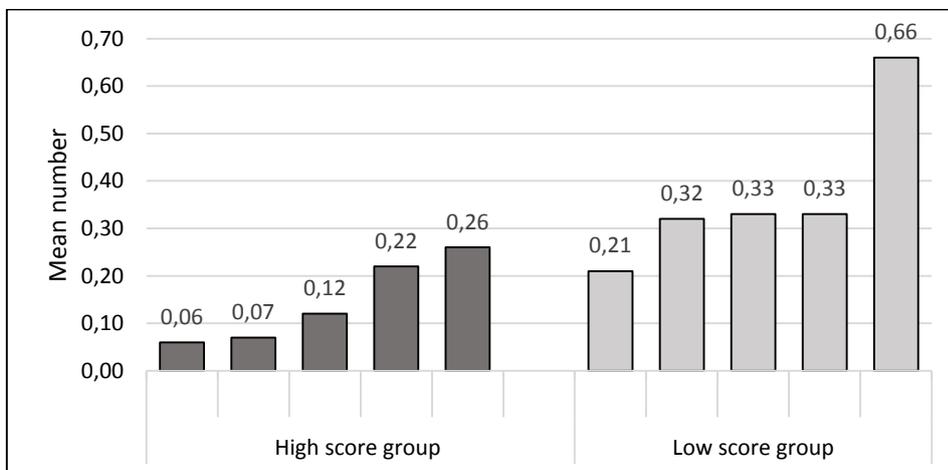


Fig. 11. The mean number of declaratives in sets of repetitions in parent's speech at 6 months of age, presented by SECDI score group.

The opposite was found for declaratives at the age of 9 months – the children in the high score group had parents whose repetition sets consisted of more declaratives ( $t(8) = 2.377, p < .05$ ). The distribution between SECDI groups concerning mean numbers of declaratives in sets of repetitions at 9 months of age is presented in figure 12 on the next page.

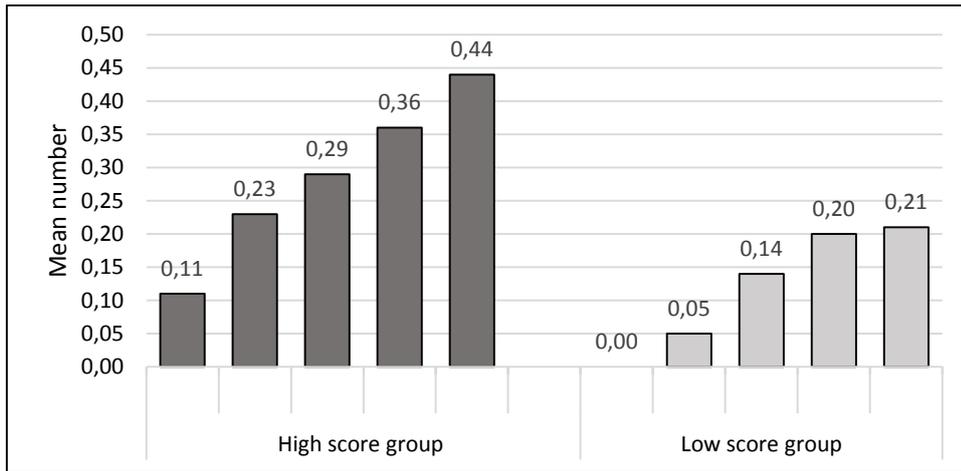


Fig. 12. The mean number of declaratives in sets of repetitions in parent's speech at 9 months of age, presented by SECDI score group.

Finally, a higher use of yes-no-questions in repetition sets at 6 months of age was found among parents of children in the high score group ( $t(8) = 2.466, p < .05$ ). The distribution between SECDI groups concerning mean numbers of yes-no-questions in sets of repetitions at 6 months of age is presented in figure 13.

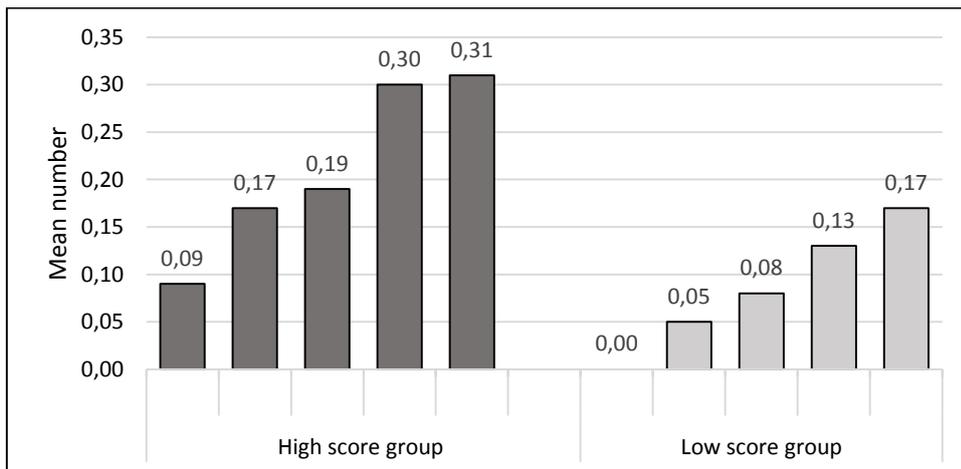


Fig. 13. The mean number of yes-no-questions in sets of repetitions in parent's speech at 6 months of age, presented by SECDI score group.

### 5.2.3 Correlation between use of constituent change and SECDI scores

No significant correlations could be found between constituent change in parents' speech and their children's SECDI scores at 30 months of age, neither compared to individual SECDI score levels nor to SECDI score groups.

## 5.3 Occurrence of item-based constructions and frequent frames in the data

### 5.3.1 Item-based constructions in the material

In the measured sets of adjacent varying repetitions, a total amount of 18 different item-based constructions was found, altogether occurring 30 times. The five constructions that occurred more than one time are presented in table 6, as well as literal translations and word classes.

Table 6. Item-based constructions that occurred in the material at least two times.

Occurrences	Construction in Swedish	Literal translation	Word class
6	ska vi __	shall we __	auxiliary, pronoun
4	det är __	that is __	pronoun, copula
3	ska du __	shall you __	auxiliary, pronoun
2	var den __	was it __	auxiliary, pronoun
2	vart tog __	where took __	adverb, verb

The constructions *ska vi* \_\_ ('shall we') and *ska du* \_\_ ('shall you') were totally used 10 times, all followed by verbs and aiming on an activity. Four of the five most used constructions were beginnings of questions, three yes-no-questions and one wh-question (*vart tog*, literary 'where took' but semantically the beginning of the expression *vart tog X vägen*, 'where did X go').

### 5.3.2 Frequent frames in the material

Totally 13 frequent frames were found in the measured sets of adjacent varying repetitions. Only one frame occurred more than one time, *nu* \_\_ *jag*, 'now \_\_ I', which occurred four times. All four times the slot-filling words were *kommer*, 'come' in the first utterance and *tar*, 'take', in the second utterance. All four occurrences of this frame was found in the same recording at 6 months of age, and were parts of a playful repetition of the phrases *nu kommer jag och tar dig* and *nu tar jag dig* (roughly 'I'm coming to get you' and 'gotcha').

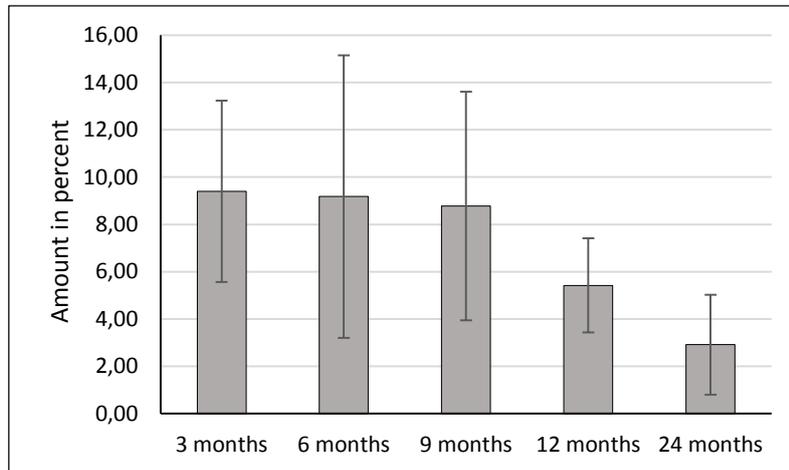
## 5.4 Proportions of repetitions in CDS during the child's first 2 years

The percentage of all utterances in parents' speech that were vocal self-repetitions at the ages of 3, 6, 9, 12 and 24 months of age is presented below in table 7.

Table 7. The percentage of all utterances in parents' speech that were vocal self-repetitions at the ages of 3, 6, 9, 12 and 24 months of age.

	3 months	6 months	9 months	12 months	24 months
Total amount of repetitions	27,73	31,59	30,55	29,08	23,76
Exact repetitions	9,40	9,18	8,78	5,42	2,91
Varying repetitions	18,33	22,41	21,78	23,66	20,84

The amount of exact repetitions showed a significant strong negative relationship to age ( $r = 0.527$ ,  $t(49) = -4.297$ ,  $p < .001$ ). The difference in use of exact repetitions at 12 and 24 months was investigated with a t-test and was found to be significant ( $t(9) = 2.677$ ,  $p < .05$ ). The distribution of exact repetitions at all ages is illustrated in figure 14 below.



*Fig. 14. The proportions of exact vocal self-repetitions in parent's speech during the children's first 2 years, presented as a percentage of all parental utterances. Error bars represent +/- 1 standard deviation.*

No significant relations were found between either age and varying repetitions or age and total amounts of repetitions.

# 6 Discussion

## 6.1 Method discussion

### 6.1.1 Validity of the study

All through the process of working with the present study, the possibility to double check the transcripts with the video files has been available. This should be considered a methodological strength of the study.

There might be some differences in the characteristics of CDS depending on the situation – whether parent and child are alone or in the company of others, at bath time, play time or at the dinner table, and so on. The goal in the present study was to capture verbal behaviour as it usually appears in interaction between parent and child at home. In order to obtain this, parents were instructed to act freely and “like at home” and were left alone with their children in the recording room. Still it is hard to tell if and how the results would have been different if the recordings would have been done in the homes and during other types of activities. Cameron-Faulkner et al. (2003, p. 851) compared the use of construction types in toy-oriented play to the use during other activities, and found the differences to be small. However it should be emphasised that none of the material in their comparison was recorded in a studio, but all at home.

Another aspect of the recording situation is that the limitations on possible activities in the studio might have affected the results. For instance, having only a restricted amount of toys and books to play with, the proportions of showing and naming objects might be higher in the recorded material than what is the average in child-parent interaction.

The common practice of using parental reports such as CDIs, in this case the SECDI, as a means to measure the vocabulary of children is cheap and easy but has some disadvantages. The parents fill out the forms completely without supervision, and there is no way to check if the scores given correlate with the true vocabularies of the children. Nevertheless, evaluation of the method has proved it to be a valid and efficient measure (Law & Roy, 2008), and the fact that CDIs have been translated into many languages simplify the comparison of research on CDS in different languages. Despite this, the results in the present study might have been more precise if comparisons had been made for instance to the children’s vocabulary and language use as they appear in the recordings.

### 6.1.2 Reliability of the study

In the present study, the coding of all variables was done manually. In addition to being extremely time-consuming there is always a risk for mistakes due to the so called human factor. The present study could have benefitted from using for instance an automatically part-of-speech tagged material.

The use of SECDI as a measurement of the children’s vocabulary can come with some reliability issues, once again due to it being filled out by the parents at home. Depending on whether the same parent fills out the form at each time and if said parent is able to do this undisturbed or not could affect the outcome.

### **6.1.3 Further notes on limitations in the study**

The present study aimed to investigate verbal repetitions in CDS during the child's first 2 years. To be able to thoroughly account for changes over this time period, the most desirable method would be to use material recorded at regular time intervals. The reason this was not done in the present study was, as mentioned in 4.4.1, the lack of available transcriptions of the recorded material at some ages. Due to this, results considering change over time in the present study are not as detailed as they would have been if recordings at 15, 18 and 21 months of age had been included in the material. Possible changes in parents' verbal repetitive behaviour at those ages could not have been discovered in the present study.

### **6.1.4 Generalisability**

Several aspects are important to have in mind while discussing the possible generalisability of the results in the present study. Most of them concern definitions and limitations.

In the investigation of word classes, the definition of closed-class and open-class words can differ between and within languages. In the present study, adverbs were labelled as belonging to closed-class words. This might not be the case in all investigations of word classes neither in Swedish nor in other languages.

When investigating the use of different sentence types, the categorisation can be done based on for instance syntax, pragmatics and intonation. Depending on the choice, the results can turn out rather different. In the present study, the coding of utterances as different sentence types was only made based on syntax. This fact is important to remember while trying to compare the results of the present study to other studies in the same field.

Concerning the examination of item-based constructions and frequent frames in the material of the present study, the limitations of the investigated material has to be emphasised. In contrast to both Cameron-Faulkner et al. (2003), Stoll et al. (2009) and Mintz (2003), the search for item-based constructions and frequent frames in the present study was only done in adjacent sets of varying repetitions where a noun and/or a verb was repeated. Only the beginnings of utterances were searched for both item-based constructions and frequent frames, and the material consisted in total of only 250 minutes of recordings. Consequently, the findings show a lesser amount of matches than searches made in all repetitions or in all utterances would have done.

Finally, in the present study only a small sample of middle-class children was investigated. A similar study with a larger number of subjects from different economic backgrounds could possibly generate different results.

## **6.2 Results discussion**

### **6.2.1 Discussion on word class use**

The negative effect of age on repetitive use of adjectives found over all ages could be related to parents' beliefs of their children's language level (see LeVine et al., 1996, p. 262, for findings on how parents' beliefs about their children's abilities affect their own interaction with the child). As Kavanaugh and Jirkovsky (1982, p. 303) stated, parents simplify their speech while talking to their children in the ages of 8 to 16 months. Following the findings of LeVine et al., parents would feel the need to simplify their language more as their child starts speaking, which usually happens in the end of

the child's first year. To use less adjectives would be one way for the parent to simplify their language. The fact that the negative effect of age on adjectives was stronger during the child's first year than over the whole period of 2 years would strengthen this theory, since the need for simplified speech decreases as the child's language competence develops.

The lack of significant differences in the rate of repetitions of nouns and verbs in parents' speech points to other reasons than frequencies in the input for making nouns dominant in small children's vocabularies. For instance, as Brown (1998, p. 198) underlined, the fact that the semantics of nouns is clearer and more referable to objects in the child's environment than the semantics of other word classes could be a major reason.

The mean number of repetitions of closed-class words was found to decrease between 9 and 12 months of age and then increase between the ages of 12 and 24 months. This could also be a sign of how parents change their language at the age of the child's first words. In putting focus on repeating the words with the most easily referable content, close-class words get repeated more seldom. As the child's vocabulary becomes larger, the proportions of closed-class words in parents' repetitions start increasing again.

The results concerning the ratio between open-class and closed-class words in parents' repetitions might seem contradictory to how small children's vocabulary in the beginning consists of very few closed-class words. This does not need to be the case. As argued by Richthoff (2000, p. 67), closed-class words are usually pronounced less prominent than open-class words. This would mean that even if the ratio of closed-class words in repeated elements of CDS is larger than the ratio of open-class words, the open-class words are probably more phonetically salient and thereby easier for children to perceive and eventually learn to use. Moreover, the more clear semantics of open-class words compared to closed-class words makes them more salient and easier to comprehend.

The negative correlation between parents' repetitive use of interjections at 24 months of age and their children's productive vocabularies at 30 months of age is probably depending on the child's language level at 24 months and not the opposite. A high use of interjections can be considered a trait of a more simple language with large proportions of onomatopoeic sounds, attention-getting devices and confirming expressions. In Lange (1974, 1976) the proportions of interjections decreased considerably in a child's vocabulary as her language level rose. This leads to the assumption that in parent-child interaction including more linguistically advanced children, the interjections would be fewer both in repetitions and on a general level.

### **6.2.2 Discussion on sentence type use**

The strong positive relationship between wh-questions in repetitions and child age could be explained by referring to Kavanaugh and Jirkovsky (1982, p. 303) who suggest that wh-questions are less simple than yes-no-questions. As the children get older, understand more and are more able to answer open questions, the proportions of wh-questions in parents' repetitions increase. The larger variance in the group at 24 months of age than at earlier ages could then be caused by the probably larger variance concerning the children's productive language level at 24 months of age than during the first year. Furthermore, the increase in use of wh-questions in parents' repetitions over time corresponds to the increasing use of questions in children's own speech as reported by Vasilyeva et al. (2008, p 88).

The use of same sentence types in pairs of repetitions decrease during the child's first year and the use of different sentence types in pairs of repetitions increase over all ages. It should be noted that the proportions of same and different sentence types in repetition sets were calculated as a percentage of

the total amount of verbal repetitions. Not all verbal repetitions were parts of repetition sets since they were not full clauses. Thereby, the total amount of same and different sentence types would not add up to 100%, and the proportions of the two categories are not mutually dependent. The results concerning the repetitive use of same and different sentence types point to the same conclusion – the variation in repetitions gets larger as the child gets older. One reason for this could be that as the child responds more and becomes more involved in verbal interaction with the parent, the parent feels a need for more complicated and varying verbal input to the child.

The low repetitive use of imperatives in parent's speech at 24 months of age stands in contrast to the high use of imperatives in children's speech at 22 to 26 months (as described by Vasilyeva et al, 2008, p. 90). However the nature of verbal interaction should be taken into account while discussing sentence types. Usually an utterance of one sentence type is responded to with an utterance of another sentence type. With this in mind, finding opposites in the proportions of use of sentence types in parents' and children's speech would be more or less expected. In that way the high use of both kinds of questions in parents' repetitions at 24 months corresponds to the rather high use of declaratives in children's speech at 26 months of age (Vasilyeva et al, 2008, p. 90). Suggested interactive patterns could be parents asking and children answering, or children making statements and parents asking follow-up questions.

A positive relationship between the use of different sentence types in repetitions in parents' speech at 3 months of age was correlated to high SECDI scores at the age of 30 months. Likewise, a high amount of wh-questions in repetitions at 3 months of age correlated to high SECDI scores at 30 months of age. Hoff-Ginsberg (1985, p. 380) did indeed find a positive correlation between parents' use of wh-questions and children's language level, only that the wh-questions were part of parental input at 2 years of age and the correlated language growth was measured 4 months later. It is hard to explain why parents' use of certain sentence types as early as at 3 months of age should affect the productive language level of the child at 30 months of age, particularly since there is no studies that suggest that children can segment speech at such an early age as 3 months. A perhaps farfetched explanation for these results could be the different styles of parents' verbal input to their children. Maybe the use of wh-questions and different sentence types in sets of repetitions represents a more talkative, varying style of CDS? In that case this conversation style would promote verbal interaction between parent and child and facilitate language learning. These speculations would have to be investigated further in order to be sorted out.

Results at 6 and 9 months concerning the repetitive use of sentence types are hard to relate to previous research as well. Children of parents who at 6 months of age used less declaratives and more yes-no-questions belonged to the high score group at 30 months of age. Children of parents who used more declaratives at 9 months of age had higher SECDI scores at 30 months of age. As McRoberts et al. (2009) described, it is at the age of 6 months that children both have developed a preference for repetitions in CDS and start segment words from speech. Maybe therefore different kinds of sentence type use can affect language learning already at this early age. The fact that these results are from a small subset of an already small sample should however be taken into consideration.

### **6.2.3 Discussion on use of constituent change**

The amount of constituent change in adjacent sets of repetitions turned out to increase over time for all measured variables; additions and deletions separately and combined. This could be related to the reported decrease in exact repetitions over time (Andersson, 2015; Kaye 1980). Despite the finding of Hoff-Ginsberg (1985) suggesting that whole-constituent change correlate positively with children's

language development, no significant correlations were found in the present study between constituent change and child language development. However, what Hoff-Ginsberg found correlated to the use of constituent change was a growth in children's use of verbs, and in the present study no specific inventory was done of verbs in children's vocabulary.

#### **6.2.4 Discussion on occurrence of item-based constructions and frequent frames**

Despite the restrictions concerning the investigated material (see 6.1.4, fourth paragraph), 30 occurrences of item-based constructions were found in the examined repetition sets, out of which 18 were unique ones. 16 occurrences of frequent frames were found, with only one frame occurring more than one time. This should be considered a first step in examining the existence of item-based constructions and frequent frames in Swedish CDS, only this time limited to certain kinds of repetitions.

#### **6.2.5 Discussion on proportions of repetitions during the child's first 2 years**

The finding that the proportions of exact self-repetitions in Swedish CDS decrease from 12 to 24 months of age confirms the results of Kaye (1980). The large variance in the group at 3-9 months of age could indicate that some parents are more prone than others to use exact repetitions as a means of getting the conversation going while talking to preverbal children (see Baron, 1990, 2.2.1). The lack of significant relations between age and varying repetitions or age and total amounts of repetitions over the child's first 2 years correlate with the findings of Andersson (2015) concerning the proportions of repetitions during the child's first year, and shows that the same holds for the child's second year.

The proposition of Snow (1972) that exact repetitions help 2-year-old children in understanding utterances while giving them more processing time seems to be of less importance since such a small amount of repetitions at that age consists of exact repetitions. On the other hand, if a repetition does not need to be entirely exact to fulfil the purpose of giving extra processing time, the proposition could still be valid at the age of 2 years.

### **6.3 Ethics discussion**

No problems concerning ethical aspects arose during the work on the present study.

### **6.4 Ideas for future studies**

For future research the following issues would be of interest:

Repetitions in the speech of children could be explored and compared to repetitive verbal behaviour of their parents. Self-repetitions in children's speech could for instance be examined on the basis of suggested causes for the use of self-repetitions in CDS (e.g. being attention getters). Children's repetitions of parents' utterances could also be of interest, for example in relation to parents' expansions of children's utterances where possible turn-takings of repetitions between parent and child might be found.

The utterances of children in the material used in the present study could be investigated concerning word class use, sentence type use and the presence of item-based constructions and frequent frames. This would add a whole new level possible to compare with the results in the present study.

A more thorough investigation of item-based constructions and/or frequent frames could be done for Swedish CDS. An interesting approach would be to compare the use of constructions overall and in repetitions. This could be compared to the constructions used by children, as a follow-up study to Cameron-Faulkner et al. (2003).

# 7 Conclusions

The aim of the present study was twofold: to examine the verbal contents of repetitions in Swedish CDS during the child's first 2 years and possible correlations to productive child language at 30 months of age, and to investigate possible changes in proportions of repetitions in Swedish CDS during the same time span. The verbal categories investigated in the study were word classes, sentence types and constituents. Moreover a small investigation was conducted of item-based constructions and frequent frames in the repetitions.

Following are the significant results for each research questions.

## Question 1

i) Several variables considering verbal contents of repetitions showed change over time:

- Repetitive use of adjectives decreased over all ages
- The mean number of repetitions of closed-class words decreased between the ages of 9 and 12 months and increased between the ages of 12 and 24 months
- Repetitive use of wh-questions increased over all ages
- The use of same sentence types in adjacent sets of varying repetitions decreased during the child's first year
- The use of different sentence types in adjacent sets of varying repetitions increased over all ages
- All kinds of whole-constituent change in adjacent varying repetitions increased over all ages

ii) Proportions of verbal contents of repetitions were related to productive language use of small children in the following ways:

- The increase over time of wh-questions in parents' repetitions was in line with the increase over time in use of questions in children's productive language at 22 to 42 months of age.
- A low repetitive use of imperatives in parent's speech at 24 months of age stood in contrast to a high use of imperatives in children's speech at 22 to 26 months. This was interpreted as an interactive pattern between parent and child.

## Question 2

The following correlations were found between verbal contents of parents' repetitions and a high level of productive vocabulary in the children at 30 months of age:

- A lower amount of interjections in repetitions at 24 months of age
- A higher amount of wh-questions in repetitions at the age of 3 months
- A higher use of different sentence types in repetition sets at the age of 3 months
- A higher use of yes-no-questions in repetition sets at 6 months of age
- A lower amount of declaratives in repetitions at 6 months of age

- A higher amount of declaratives in repetitions at 9 months of age

#### Question 3

Occurrences of both item-based constructions and frequent frames were found in sets of adjacent varying repetitions, some of which were used several times in different repetition sets.

#### Question 4

The proportion of exact self-repetitions was decreasing during the child's first 2 years.

In the discussion of the results of the present study two proposals were made concerning repetitions in CDS.

The first proposal concerns how parents adjust the complexity of their speech to different linguistic developmental stages of their children. As the child starts to show signs of understanding the verbal input and eventually starts speaking, the parents tend to simplify their child-directed speech. Then gradually as the child's language ability develops, the complexity of the verbal input from the parents starts to increase again. Some indications of this adaptation in parents' speech to their children's linguistic competence were pointed out in the result section. Repetitions of adjectives decreased during the first year. The repetitive use of closed-class words decreased from 9 to 12 months of age, yet by 24 months of age it had increased again. Parents were using more wh-questions in repetitions as the child grew older. This was all interpreted as reflecting temporal complexity change in CDS.

The second proposal points out a pattern shown over time in parents' repetitions: linguistic variation in the input increases as the child grows older. This was shown in the results on many areas. The use of the same sentence type in repetition sets decreased during the child's first year, while the use of different sentence types in repetition sets increased over all ages. All kinds of whole-constituent change in adjacent sets of varying repetitions increased over time. And finally, the proportions of exact repetitions decreased as the child grew older. This all points to the assumption that repetitive behaviour in CDS gets more varying over time.

Some suggestions for further research included the study of repetitions in the speech of young children, as well as a more thorough investigation of item-based constructions and frequent frames in repetitions in Swedish CDS.

# References

- Allwood, J. (1998). Some Frequency based Differences between Spoken and Written Swedish. In *Proceedings of the 16th Scandinavian Conference of Linguistics, Turku University, Department of Linguistics* (pp. 18-29).
- Andersson, S. (2015). *Repetitioner i barnriktat tal under det första levnadsåret* (Bachelor's Essay). Stockholm: Department of Linguistics, Stockholm University. Retrieved from <http://urn.kb.se/resolve?urn=urn:nbn:se:su:diva-118649>
- Baron, N. S. (1990). *Pigeon-Birds and Rhyming Words: The Role of Parents in Language Learning*. Englewood Cliffs, N.J.: Prentice Hall Regents.
- Bates, E., Marchman, V., Thal, D., Fenson, L., Dale, P., Reznick, J. S., & Hartung, J. (1994). Developmental and stylistic variation in the composition of early vocabulary. *Journal of Child Language*, 21(01), 85-123. doi:10.1017/S0305000900008680
- Berglund, E., & Eriksson, M. (2000). Communicative Development in Swedish Children 16-28 months old: The Swedish Early Communicative Development Inventory - Words and Sentences. *Scandinavian Journal of Psychology*, 41(2), 133-144. doi:10.1111/1467-9450.00181
- Brown, P. (1998). Conversational structure and language acquisition: The role of repetition in Tzeltal. *Journal of Linguistic Anthropology*, 8(2), 197-221. doi:10.1525/jlin.1998.8.2.197
- Cameron-Faulkner, T., Lieven, E., & Tomasello, M. (2003). A construction based analysis of child directed speech. *Cognitive Science*, 27(6), 843-873. doi:10.1016/j.cogsci.2003.06.001
- Clark, E.V. (2011). *The lexicon in acquisition* [Cambridge Books Online]. Cambridge: Cambridge University Press. Retrieved from <http://dx.doi.org.ezp.sub.su.se/10.1017/CBO9780511554377>
- Dunn, J., & Kendrick, C. (1982). The speech of two-and three-year-olds to infant siblings: "Baby talk" and the context of communication. *Journal of Child Language*, 9(3), 579-595. doi:10.1017/S030500090000492X
- Fenson, L., Marchman, V. A., Thal, D. J., Dale, P. S., Reznick, J. S. & Bates, E. (2007). *MacArthur-Bates Communicative Development Inventories: User's guide and technical manual*, 2nd ed. Baltimore: MD: Brookes.
- Fernald, A., & Morikawa, H. (1993). Common themes and cultural variations in Japanese and American mothers' speech to infants. *Child Development*, 64(3), 637-656. doi:10.2307/1131208
- Fernald, A., & Simon, T. (1984). Expanded intonation contours in mothers' speech to newborns. *Developmental Psychology*, 20(1), 104-113. doi:10.1037/0012-1649.20.1.104
- Fernald, A., Taeschner, T., Dunn, J., Papousek, M., de Boysson-Bardies, B., & Fukui, I. (1989). A cross-language study of prosodic modifications in mothers' and fathers' speech to preverbal infants. *Journal of Child Language*, 16(03), 477-501. doi:10.1017/S0305000900010679
- Hampson, J., & Nelson, K. (1993). The relation of maternal language to variation in rate and style of language acquisition. *Journal of Child Language*, 20(02), 313-342. doi:10.1017/S0305000900008308
- Hoff-Ginsberg, E. (1985). Some contributions of mothers' speech to their children's syntactic growth. *Journal of Child Language*, 12(2), 367-385. doi:10.1017/S0305000900006486
- Hoff-Ginsberg, E. (1986). Function and structure in maternal speech: Their relation to the child's development of syntax. *Developmental Psychology*, 22(2), 155-163. doi:10.1037/0012-1649.22.2.155
- Hoff-Ginsberg, E., & Shatz, M. (1982). Linguistic input and the child's acquisition of language. *Psychological Bulletin*, 92(1), 3-26. doi:10.1037/0033-2909.92.1.3
- Hultman, T.G. (2003). *Svenska akademiens språklära*. (1. uppl.) Stockholm: Svenska akademien.
- Kavanaugh, R. D., & Jirkovsky, A. M. (1982). Parental Speech to Young Children: A Longitudinal Analysis. *Merrill-Palmer Quarterly* 28(2), 297-311.
- Kaye, K. (1980). Why we don't talk 'baby talk' to babies. *Journal of Child Language*, 7(03), 489-507. doi:10.1017/S0305000900002804
- Kaye, K., & Charney, R. (1981). Conversational asymmetry between mothers and children. *Journal of Child Language*, 8(01), 35-49. doi:10.1017/S0305000900002993

- Kokkinaki, T. (2003). A longitudinal, naturalistic and cross-cultural study on emotions in early infant-parent imitative interactions. *British Journal of Developmental Psychology*, *21*(2), 243-258. doi:10.1348/026151003765264066
- Lange, S. (1974). *En preliminär grammatisk analys av språket hos Freja från 20 till 41 månaders ålder*. D. 1, Freja 1-5. Ålder 20-22 månader. Stockholm: Stockholms universitet, Institutionen för nordiska språk.
- Lange, S. (1975). *En preliminär grammatisk analys av språket hos Freja från 20 till 41 månaders ålder*. D. 2, Freja 6-10. Ålder 22-24 månader. Stockholm: Stockholms universitet, Institutionen för nordiska språk.
- Lange, S. (1976). *En preliminär grammatisk analys av språket hos Freja från 20 till 41 månaders ålder*. D. 3, Freja 11-15. Ålder 25-27 månader. Stockholm: Stockholms universitet, Institutionen för nordiska språk.
- Law, J., & Roy, P. (2008). Parental report of infant language skills: A review of the development and application of the Communicative Development Inventories. *Child and Adolescent Mental Health*, *13*(4), 198-206. doi:10.1111/j.1475-3588.2008.00503.x
- LeVine, R. A., Miller, P. M., Richman, A. L., & LeVine, S. (1996). Education and mother-infant interaction: A Mexican case study. In S. Harkness; C. M. Super (Eds.), *Parents' cultural belief systems*, (pp. 254-269). New York, NY: Guilford Press.
- Ma, W., Golinkoff, R. M., Houston, D. M., & Hirsh-Pasek, K. (2011). Word learning in infant-and adult-directed speech. *Language Learning and Development*, *7*(3), 209-225. doi:10.1080/15475441.2011.579839
- McRoberts, G. W., McDonough, C., & Lakusta, L. (2009). The Role of Verbal Repetition in the Development of Infant Speech Preferences from 4 to 14 Months of Age. *Infancy*, *14*(2), 162-194. doi:10.1080/15250000802707062
- Mintz, T. H. (2003). Frequent frames as a cue for grammatical categories in child directed speech. *Cognition*, *90*(1), 91-117. doi:10.1016/S0010-0277(03)00140-9
- Newman, R. S., Rowe, M. L., & Ratner, N. B. (2015). Input and uptake at 7 months predicts toddler vocabulary: the role of child-directed speech and infant processing skills in language development. *Journal of child language*, 1-16. doi:10.1017/S0305000915000446
- Newport, E., Gleitman, H., & Gleitman, L. (1977). Mother, I'd rather do it myself: some effects and non-effects of maternal speech style. In C. E. Snow; C. A. Ferguson (Eds.), *Talking to children: Language input and acquisition*, (pp. 109-149). Cambridge: Cambridge University Press.
- Ochs, E. (1982). Talking to children in Western Samoa. *Language in Society*, *11*(01), 77-104. doi:10.1017/S0047404500009040
- Richthoff, U. (2000). *En svensk barnspråkskorpus: Uppbyggnad och analyser* [A Swedish Child Language Corpus – Set-up and Analyses] (Licentiate dissertation). Gothenburg: Department of Linguistics, University of Gothenburg.
- Rondal, J. A. (1980). Fathers' and mothers' speech in early language development. *Journal of Child Language*, *7*(02), 353-369. doi:10.1017/S0305000900002671
- Shi, R., Werker, J. F., & Morgan, J. L. (1999). Newborn infants' sensitivity to perceptual cues to lexical and grammatical words. *Cognition*, *72*(2), B11-B21. doi:10.1016/S0010-0277(99)00047-5
- Singh, L., Nestor, S., Parikh, C., & Yull, A. (2009). Influences of Infant-Directed Speech on Early Word Recognition. *Infancy*, *14*(6), 654-666. doi:10.1080/15250000903263973
- Snow, C. E. (1972). Mothers' Speech to Children Learning Language. *Child Development*, *43*(2), 549-565. Retrieved from <http://www.jstor.org.ezp.sub.su.se/stable/1127555>
- Stoll, S., Abbot-Smith, K., & Lieven, E. (2009). Lexically Restricted Utterances in Russian, German, and English Child-Directed Speech. *Cognitive Science*, *33*(1), 75-103. doi:10.1111/j.1551-6709.2008.01004.x
- Svartvik, J. (Ed.). (1990). *The London-Lund Corpus of Spoken English: Description and Research*. Lund: Lund University Press.
- Tomasello, M. (2003). *Constructing a language: A usage-based theory of language acquisition*. Cambridge, Mass.: Harvard University Press.
- Vasilyeva, M., Waterfall, H., & Huttenlocher, J. (2008). Emergence of syntax: Commonalities and differences across children. *Developmental Science*, *11*(1), 84-97. doi:10.1111/j.1467-7687.2007.00656.x



Stockholm University  
SE-106 91 Stockholm  
Phone: 08 – 16 20 00  
[www.su.se](http://www.su.se)



**Stockholms  
universitet**