Comprehension of L2 grammar in a bilingual preschool: A developmental perspective

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Abstract
This longitudinal study focuses on German (GE) preschoolers' comprehension of English (EN) grammatical structures, who were tested in a two-choice picture selection task. Its aim is to examine how these EN grammatical structures develop during a three year period in a bilingual GE-EN preschool, outside of which the children's ambient language is not EN. This study presents data from 14 GE preschool children (7 boys and 7 girls) who had been exposed to EN approximately 11, 18, 23 and 30 months at the time of the grammar comprehension task. Altogether, tested seven grammatical categories (i.e., SVO word order, determiner a(n)/many, +/- plural morpheme -s, personal pronoun he/she, possessive pronoun his/her, preposition in/on, and +/- negator not) were tested. As expected, the time of exposure to EN had a positive effect on the comprehension of L2 grammatical structures. However, children performed better on some grammatical categories than on others, a tendency which did not change as a function of increased contact duration to the L2 EN, thereby paralleling L1 and L2 acquisition processes. The large degree of inter-individual variation found in this study may be accounted for by the children's personalities and their preferences in their preschool activities.

1 Introduction
In 2003, the European Commission issued that all European children should have command of two foreign languages at a functionally adequate level (Commission of the European Communities 2003). However, this highly ambitious aim can only be reached when foreign language learning takes place as early as possible, preferably before school entry. Several preschools in Germany have therefore decided to offer bilingual programs: These programs may range from weekly courses, which last for an hour, to immersion programs, where the foreign language is used in all daily activities. As numerous studies have shown, immersion programs most effectively enable the children to learn a foreign language successfully (see review in Wesche 2002). The present study focuses on a bilingual preschool in Kiel/Melsdorf, which offers a partial immersion program: One of the two caretakers per group is a native speaker of German (GE), the other a native speaker of English (EN), and both abide by the so-called one person-one language principle (e.g. Döpke 1992, Baker 2000). The non-native language is used according to immersion principles, i.e., the children take their cues from the situation and the context and acquire the non-native language through the way it is being used. The caretakers, therefore, contextualise the use of EN as much as possible. The amount of exposure to EN is difficult to specify because the preschool in Melsdorf adheres to the "open group concept", i.e. the children do not have to stay in one room but are free to take part in activities in
other rooms as well. This may reduce (or increase) the amount of intake because the children can choose whether they are exposed to EN or to GE (e.g. Wode 2001). As the children’s ambient language outside preschool is German, their acquisitional situation is not comparable to being exposed to EN in a country where it is spoken as the first language (L1) (see e.g. Rohde & Tiefenthal 2002). To acquire a foreign language in such a bilingual preschool context therefore constitutes a special type of foreign language learning, which may pose particular problems to the learners.

Although there are studies available, which focus on the acquisition of the English lexicon in a bilingual preschool (e.g. lexical strategies, Rohde 2005, or fast mapping, Rohde & Tiefenthal 2002), hardly anything is known about the acquisition of English grammar in such a context. Because German children produce very few EN words and sentences during their preschool period (see Wode 2001, Steinlen 2008b), the focus of this study is on preschoolers’ comprehension abilities with respect to certain EN grammatical structures. Using a picture pointing task, this study compares the children’s performance at four points in time, namely in the first, second and third year of exposure to EN. Of special interest are the effects of sex and contact duration to EN on the children’s performance in this grammar comprehension task and, moreover, their correct identification of the EN grammatical categories over time.

Intuitively, it is not surprising that increased L2 contact duration improves the grammatical understanding of a foreign language. However, it has not been documented yet whether some grammatical categories are better identified than others. Studies by Au-Yeung et al. (2000) and Howell et al. (2003) showed that monolingual EN children did not perform equally well on different English grammatical categories: For example, the identification rates for the grammatical category “preposition in/on” were higher than the rates for SVO (word order) which in turn were higher than for inflectional plural marking (see also Fraser et al. 1963, Lovell & Dixon 1967; Nurrss & Day 1971). Unfortunately, there was little indication in the study as to why this was the case. Therefore, one aim of this study is to assess whether GE-EN preschoolers perform equally well on different English grammatical categories and whether their performance show similarities to native EN preschoolers.

“Girls outperform boys” – this seems to be the general finding in many studies on L1 (first language) or L2 (second language) acquisition (see e.g. Schmid-Schönbein 1978, Schlichting & Spelberg 2003, Bornstein et al. 2004, Radeborg et al. 2006). Studies concerned with foreign language performance in bilingual preschools, however, could not support such a notion (e.g. Natorp 1975, Rohde & Tiefenthal 2002, Steinlen 2008a). Since in general the gender issue in language learning has not been resolved yet, the present study also analyses whether boys and girls differ in terms of their comprehension of EN grammatical structures over time.

Moreover, this study closely examines the performance of two children with regard to how their correct identification rates of their comprehension of EN grammatical structures develop with increased L2 contact duration. One way to capture such inter-individual variations is to use data from children who were matched for sex, age, L2 contact and the preschool group that they belong to (see also Steinlen & Burmeister i. pr.), and to document their different paths of development.

Finally, with respect to the stated goal of the Commission of the European Communities that children at the end of their school career should have command of two foreign languages, this study wants to demonstrate that it is feasible to start to learn an L2 in a preschool context, using immersion methods.
2 Method

Altogether 14 GE children (7 girls and 7 boys) from the bilingual GE-EN preschool in Kiel/Melsdorf took part in this experiment. The children were tested four times – roughly half a year elapsed in between the tests. The children’s age range was 3-5 years (average: 4.05 years, SD = 7 months) at the time of Test 1, 4-6 years (average: 5.00 years) at the time of Test 2, 4-6 years (average: 5.05 years) at the time of Test 3 and 5-6 years (average: 6.00 years) at the time of Test 4. The children’s exposure to EN was 6-13 months at the time of Test 1 (average: 11.1 months, SD = 2.8 months), 13-20 months at the time of Test 2 (average: 18.1 months years), 18-25 months at the time of Test 3 (average: 23.1 months years) and 25-32 months at the time of Test 4 (average: 30.1 months years).

The grammar comprehension task, which was administered to these children, is a modified version of the Reception of Syntax Test (e.g. Au-Yeung et al. 2000, Howell et al. 2003). It was originally designed for children who stutter and for EAL (English as an Additional Language) children living in England to assess the children’s grammatical development.

The children in the preschool in Kiel/Melsdorf were tested individually in a quiet room they were familiar with (see Crain & Thornton 1998 on the importance of a child-friendly environment during an experiment). First, the child looked at two pictures on the touch screen of a laptop computer (see Friend & Keplinger 2003 on the advantage of a computer-based test over other procedures). The child then listened to a sentence that corresponded to one of the pictures. Responses were made by touching the picture which the child thought to be appropriate to the sentence. Before testing, the children were given four training items consisting of two pictures of different objects and an appropriate single word utterance to ensure they knew how to make the responses. The pictures in the grammatical pair contrasted only in the target grammatical dimension (e.g. absence / presence of the plural inflectional marker –s: cat-cats). Each pair of pictures was tested twice, and each picture was the correct answer on one of these two test occasions.

Following Au Yeung et al. (2000) and Howell et al. (2003) the children were tested on seven grammatical categories: DET (a/many), NEG (affirmative/negative sentences), PLU (+/- inflectional plural marker –s), POSS (his/her), PREP (in/on), PRO (he/she), and SVO (word order). In total, there were 42 test items (7 grammatical categories x 3 picture pairs x 2 test presentations per picture pair). The children were videotaped during the five minute session.

3 Results

3.1 General Results

A comparison of the results obtained in Test 1, Test 2, Test 3 and Test 4 (i.e. at a L2 exposure of 11, 18, 23, and 30 months, respectively) showed an increase of over 25% in the correct identification of pictures: 58.3% of the pictures were correctly identified in Test 1, 72.8% in Test 2, 73.8% in Test 3 and 83.7% in Test 4. A one-way ANOVA revealed significant differences between the results of the four tests (F (3,55) = 15.987, p<0.05). Post-hoc Tukey tests showed significant differences between the results of Test 1 and Test 2 and between the results of Test 3 and Test 4 (p<0.05 for each) but not between Test 2 and Test 3 (p>0.05). This finding suggests that the time of exposure to EN has a positive effect on the overall correct identification rate (see Figure 1). The acquisition process, though, is not necessarily a linear one, as the stagnating scores between Test 2 and Test 3 show.
3.2 Grammatical categories

The data presented in Figure 2 show the percentage of correct identification according to the grammatical categories that were tested (i.e., DET, NEG, PLU, POSS, PREP, PRO, SVO). Not all grammatical categories were identified with the same degree of confidence: In Test 1, the highest identification rate was obtained for the grammatical category NEG and the lowest rates for PRO and POSS. Similar results, albeit higher rates, were obtained in Test 2, 3, and 4. Four separate one-way ANOVAs for Test 1 (F (6, 97) = 3.976), Test 2 (F (6, 97) = 3.395), Test 3 (F (6, 97) = 9.014) and Test 4 (F (6, 97) = 16.890; p<0.05 for all) confirmed this impression. Planned post-hoc tests for Test 1 revealed significant differences between the grammatical category PREP as compared to PLU, PRO and POSS (p<0.05 for all). However, there were no significant differences between the scores of the other categories (p>0.05 for all). For Test 2, post-hoc tests showed significant differences between the grammatical categories PRO vs. PREP / NEG, and POSS vs. NEG (p<0.05 for all). In Test 3, significant differences were found between POSS vs. SVO, DET, PLU, PREP, NEG and between PRO vs. DET, PLU, PREP, NEG (p<0.05 for all). Similar results were found for Test 4, with the addition of PRO vs. SVO (p<0.05 for all). These results indicate that even after a longer exposure to EN, not all grammatical categories are comprehended equally well.
As Figure 2 also shows, the identification rates of all grammatical categories were higher in Test 4 than in Test 1. The highest increase in performance between Test 1 and Test 4 was found for the categories DET, NEG, PLU and SVO (30-35%), the other categories POSS, PREP, PRO showed an increase between 6-21%. Separate one-way ANOVAs revealed that these differences were significant for the grammatical categories DET, NEG, PLU, PRO and SVO (DET: F (3,55) = 7.219; NEG: F (3,55) = 9.100; PLU: F (3,55) = 8.401; PRO: F (3,55) = 4.625; SVO: F (3,55) = 5.103; p<0.05 for all) but not for POSS and PREP (POSS: F (3,55) = 1.423; PREP: F (3,55) = 2.121, p>0.05 for both). These results suggest that extended contact duration to EN improves the comprehension of many grammatical categories but not of all.

### 3.3 Sex

In the literature, there are divergent findings with respect to the effect of the children’s sex on their performance in comprehension tasks (e.g. Fraser et al. 1963, Lovell & Dixon 1967, Natorp 1975, Schmid-Schönbein 1978, Au-Yeung et al. 2000, Howell et al. 2003). Although in the present study, boys seemed to perform better than girls in most of the tests (Test 1: 60,9%-55,8%, Test 2: 74,5%-71,1%, Test 3: 76,5%-71,1%, Test 4: 83,7%-83,7%), this impression could not be supported in separate one-way ANOVAs for each test (Test 1: F (1,13) = 1.488, p>0.05), Test 2: F (1,13) = 0.289, p>0.05, Test 3: F (1,13) = 0.646, p>0.05), Test 4: F (1,13) = 0.000, p>0.05). In this grammar comprehension task, hence, boys and girls performed equally well at all times (see Figure 3).
3.4 Individual variation

In accordance with the literature (e.g. Wong Fillmore 1979, Tabors & Snow 1994, Paradis 2005), this study also found that children differed greatly on their way to target-like mastery of the L2. In order to describe these differences in more detail, two children of this sample were selected and matched for sex, age and exposure to EN (see also Steinlen & Burmeister i.pr. for a similar method). The children were girls, 41 months old, and exposed to EN for six months at the time of Test 1. As the general results of their test scores show, the two girls followed a very different path of development (Figure 4): At the time of Test 1, child M48 scored as high as the average of the group, even though she was younger than the average child and had less exposure to EN. However, her performance stagnated across Test 2 and Test 3. Only in Test 4 did her test scores improve, although now they were considerably lower than the group average scores.
Figure 4. Percentage of correct identification across four tests for two children, M43 and M48, who were matched for sex, age and exposure to EN. The group’s average identification rate (‘average’) has been added.

A different picture can be drawn for child M43: She started with test scores slightly below 50%, i.e. at chance level. Her test results, though, improved consistently over time, with an increase of 8% between Test 1 and Test 2, which then went up to 15% between Test 3 and Test 4 where she fared even slightly higher than group average. These results point to individual paths of development in foreign language acquisition, which include different identification scores at the beginning and a different development over time. With regard to the latter, two distinct patterns were discernable, i.e. a constant linear progression vs. a long lasting stagnating performance and progression at the end.

4 Discussion

The results of this study clearly demonstrate that it is feasible to learn a second language in preschool, using immersion methods: The preschoolers from Kiel/Melsdorf performed significantly better in Test 4 than in Test 1 (which took place in the first and in the third year of exposure to EN, respectively). Thus, the children's ability to identify grammatical categories in a picture pointing task improved as a function of contact duration to the L2. Although similar findings have been reported for the comprehension of grammatical structures by monolingual L1 English and EAL children (e.g. Au-Yeung et al. 2000, Howell et al. 2003) as well as for the production abilities in L2 tutored and non-tutored acquisition (see Wode 1993 for an overview), this study for the first time showed such a development for GE children in a bilingual GE-EN preschool. However, this progression in the children’s performance was not a linear one as no significant improvement in the children's correct identification scores was found between Test 2 and Test 3, i.e. between 18 and 23 months of exposure to EN. It is not yet clear why this is the case: It is unlikely that the children did not receive enough English input as no special events (e.g. long-term absence of staff or children) took place during that period. However, it is of importance to always supplement general results with more detailed analysis: A closer look at the grammatical categories, however, indicates that some categories were indeed better identified in Test 3 than in Test 2 (i.e. DET and NEG), whereas the correct identification rates of the majority of categories (i.e. PLU, POSS, PREP, PRO, SVO)
did not improve. It is imperative, though, to keep in mind that the language learning process may not always be a linear one (see e.g. Larsen-Freeman 1997).

An additional result of this study was that children performed better on certain grammatical categories than on others. For example, in all tests, the grammatical categories PREP and NEG were better identified than PLU or DET. Similar results were obtained in a study on L2 grammatical comprehension of Turkish and Cantonese EAL children in London (Howell et al. 2003) and in parallel tests administered to monolingual EN children (Au-Yeung et al. 2000, Howell et al. 2003). Apparently, some grammatical categories are more difficult to master than others, independent of the language acquisition setting, i.e. L1 acquisition or the acquisition of a foreign language which may or may not be the children's ambient language outside the preschool context (see also Steinlen 2008a). One possible explanation may be found in the input that the children receive: For example, the GE preschoolers in the present study performed poorly on the grammatical categories POSS and PRO, which were identified at chance level in Test 1 and which, in contrast to the other grammatical categories, showed no significant improvement in Test 2, 3 or 4. Grammatically speaking, the use of nouns instead of pronouns is a strategy for reinforcing people's names (Laura's cat instead of her cat). In the literature, such substitutions are reported for 1st or 2nd person singular pronouns (e.g. Snow & Ferguson 1977, Snow 1986) but have not been mentioned with regard to 3rd singular pronouns. Therefore, a preliminary analysis of recorded interactions between the native EN speakers and the children was conducted in Kiel/Melsdorf. It showed that the use of PRO and POSS with respect to 3rd person singular was underrepresented in the input, i.e., the native EN speakers rather referred to a person's name instead of using a pronoun. This is one of the contextualisation strategies (see e.g. Baker 2000, Burmeister 2006, Steinlen 2008b) to ensure that children actually understand who the EN speaker is referring to when talking about a third person. Based on these observations, it is not surprising that the preschoolers did not correctly distinguish between masculine and feminine personal and possessive pronouns. Moreover, the grammatical category PLU received identification rates just above chance level in Test 1. In the EN input, plural nouns are often preceded by an ordinal number or by a quantifier; the plural marker is then redundant and/or acoustically not salient for the learner. Data from L1 EN grammatical comprehension tests and from L1 and L2 EN speech also showed that the inflectional marker was identified less confidently and was produced later than other functors (e.g. Brown & Fraser 1963, Fraser et al. 1963, Brown 1973, Wode 1993, Au-Yeung et al. 2000, Howell et al. 2003). In the present study, the identification rates of PLU in Test 2, 3 and 4 were considerably higher than in Test 1. Thus, contact duration to the L2 and, possibly, variegated L2 input, increased the children’s awareness with respect to the correct identification of the plural marker (see also Steinlen 2008a).

This study yielded clear results with respect to the question whether the children's performance in comprehension tasks is affected by their sex because no significant differences were found in all tests. Unfortunately, studies on L1 and EAL grammatical comprehension did not report on whether boys and girls performed differently (e.g. Fraser et al. 1963, Lovell & Dixon 1967, Au-Yeung et al. 2000, Howell et al. 2003). However, it is often claimed that girls perform significantly better than boys (e.g. Schmid-Schönbein 1978, Schlichting & Spelberg 2003; but see Natorp 1975, Rohde & Tiefenthal 2002), which is usually accounted for in terms of behavioural factors, e.g. girls' identification with female caretakers as well as their greater adaptability.

With respect to the way how children learn to comprehend grammatical categories, a large amount of individual variation was found in this study: A comparison of two children which were matched for age, sex and time of L2-exposure showed that inter-individual variation included differences regarding the correct
identification rates of the grammatical categories at the beginning of the tests. Furthermore, these two girls’ paths and patterns of development differed greatly: One girl followed a constant linear path (i.e. her scores increased for each test), the other girl’s scores stagnated and a progression was not observed until the last test. How can these inter-individual differences be explained? Among the many factors to be considered, personality traits may serve as one explanation (see Wong Fillmore 1979): Although both girls were rather shy at the beginning of their preschool time, one of the girls developed into a more outgoing person who actively sought out the company of the English speaking caretaker. The other girl, on the contrary, remained rather introverted and did not spend much time with the English speaker. These results correspond to findings from other studies where preschoolers’ foreign language abilities were assessed: For example, Paradis (2005) showed that individual English language learners were acquiring English at variable rates, which was evident from the sizable standard deviations and ranges in the accuracy scores in the grammatical morphology test. In addition, researchers looking at other aspects of early L2 development in preschool and first grade also reported substantial individual differences between children, even between those who began and continued to learn English in the same class (Tabors & Snow 1994; Wong Fillmore 1979). It is therefore imperative to consider the child’s biography, its character and its relationship to native and non-native speakers in the preschool context in order to adequately account for these individual variations (see also Steinlen & Burmeister i. pr.).

5 Conclusion

The results of this grammar comprehension task strongly indicate that preschoolers can indeed learn a new language without any conscious effort and formal instruction and that their receptive abilities improve greatly over time. These results are even more significant as EN was not the ambient language of these children and their contact to EN was restricted to a preschool context only. This study could also draw parallels to L1 acquisition and naturalistic L2 acquisition. Such a bilingual context as found in the preschool in Kiel/Melsdorf may therefore rightfully be considered a natural L2 setting: The language learning abilities that are activated in this situation seem to be the same as those activated for non-tutored foreign language acquisition.

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References


