

THE EFFECT OF PROSODY ON THE ACQUISITION OF MORPHEMES: AN EXPERIMENTAL STUDY WITH GERMAN, ITALIAN AND GERMAN-ITALIAN CHILDREN

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ABSTRACT

Prosodic structures often condition the realizations of morphemes in early child speech. Gerken ([5, 6]) found that English children are more likely to produce weak syllables that carry morphological material if they can be parsed into trochaic feet. So far, there have been only a few studies on how the acquisition of morphology is conditioned by prosody with two competing lexica (e.g. [10] on Spanish speech data by Spanish-German bilinguals). We contribute to this debate by investigating the interplay of prosody and morphology in two trochaic languages: German (a relatively strict trochaic language) and Italian (a language that allows more variant prosodic patterns). Our longitudinal production study involves three groups of children (aged 2;10-6;05): monolingual Germans, monolingual Italians, and bilingual German-Italians. Our results suggest that weak syllable deletions in lapse positions in German sentences uttered by monolinguals and bilinguals are due to the fact that children prefer an alternating pattern of strong and weak syllables. In the Italian speech data we hardly ever find omission of weak syllables. This suggests that Italian-speaking children are less sensitive to rhythm compared to German-speaking children.

Keywords:

1. INTRODUCTION

Previous studies on first language acquisition show that very young infants are sensitive to the rhythmic pattern of their mother language in both perception and production. Jusczyk et al. [7, 8] found that 7.5- and 9-month-olds prefer listening to words that consist of a sequence of a strong (s) and a weak (w) syllable (e.g., *baby*) rather than to ws-words (e.g., *guitar*). Similar results were found in production studies with English and Dutch children, whose early utterances contain sw-words rather than ws-words (e.g., [1, 2, 3] for English child speech and [4] for Dutch child speech).

German and Italian are considered to be trochaic languages as words in isolation predominantly consist of a strong and a weak syllable, e.g. German *Drache* and Italian *drago* 'dragon' (for German see e.g. [15]; for Italian e.g. [9]). Children are not only exposed to isolated words but also to phrases. We therefore examined a sample from 'The Little Prince' ([13, 14]; chapters XVIII–XXI) in order to compare the basic rhythmic patterns of these two languages. Below we present two examples of attested rhythmic patterns ('The little prince'):

(1) German: *Der kleine Prinz*

w s w s

Italian: *Il piccolo principe*

wswwsww

We divided the text into phonological phrases (PPh) and counted the amount of lapses (i.e. two adjacent weak syllables) and no lapses (i.e. w-sequences). The sample suggests that Italian allows more lapse-sentences compared to German (see Table 1 below).

Table 1: Amount of lapse- and no lapse-phrases in Italian and German (sample from 'The Little Prince')

	PPh	no lapses	lapses
Ital.	N=209	100 (= 47.9%)	109 (= 52.1%)
Ger.	N=218	134 (= 61.5%)	84 (= 38.5%)

With respect to the position of suffixes and articles in German and Italian, we note that they are often realized in a prosodically weak position. Some examples are:

(2) weak suffix:

Italian: *mettono* 'put-PRES.3PL' ('they put')

(me.tto)no

s w w

German: *fütterte* 'feed-PAST.3SG' ('fed')
(füt.ter)te
s w w

(3) weak article:

Italian: Luca mangia la carne. 'L. eats meat.'
(Lu.ca) (man.gia) la (car.ne)
s w s w w s w

German: *Lukas füttert den Bären.* 'Lukas feeds
the bear.'
(Lu.kas) (fü.ttert) den (Bä.ren)
s w s w w s w

Based on our observations that Italian children hear lapse-phrases more frequently in their input compared to German children (see Table 1) and that most morphological information is expressed in prosodically weak positions, we would like to put forward the following research questions:

1. Do Italian children have less difficulty realizing word-initial weak syllables and prosodically weak articles in lapse positions compared to German children?
2. When two prosodically different languages are acquired simultaneously, how do they influence each other? Are bilingual German-Italian children influenced by the prosodic input of both of their first languages to the same extent?

2. PRODUCTION STUDY

2.1. Design

Participants

We selected three groups of participants. Group 1 consists of 12 monolingual German children from Konstanz, Southwestern Germany. They are split up into two age groups as follows: AG1: 1;9-2;6; AG2: 2;10-3;10. Group 2 comprises 6 monolingual Italian children whose utterances are recorded in Piedimonte Matese, Southern Italy. The children are divided into two age groups: AG2: 3;3-3;10; AG3: 4;0-6;5. Group 3 consists of 9 bilingual German-Italian from Stuttgart, Southwestern Germany; AG2: 2;10-3;10; AG3: 4;0-6;4.¹ The parents filled out a vocabulary test and a language questionnaire. It revealed that the bilingual children receive approximately the same

¹ We would like to thank the parents of the Italian children recorded in Piedimonte Matese. Our thanks are also due to the Kinderhaus of the University of Konstanz and the Kindergarten St. Stephan (in Konstanz) for providing the opportunity to test monolingual German children, as well as the Kinderhaus Il Girasole (Stuttgart) where we recorded the bilingual children.

amount of input in German and Italian. At least one of their parents is a native speaker of Italian and the caretakers in their Kindergarten are native speakers of German and Italian.

Material

The material used in the study consists of sentences of the following types, which are divided into two conditions:

Italian sentences:

Condition 1: weak word-initial syllable
no lapse: *Cris mangiò patate.* 'C. ate potatoes.'
lapse: *Luca mangia patate.* 'L. eats potatoes.'

Condition 2: prosodically weak article

no lapse: *Anna fa la spesa.* 'A. goes shopping.'
lapse: *Anna mangia la pasta.* 'Anna eats pasta.'

German sentences:

Condition 1: weak word-initial syllable (*Ge-/Be-*)
no lapse: *Peter malt Gesichter.* 'Peter draws faces.'
lapse: *Peter kitzelt Gespenster.* 'Peter tickles ghosts.'

Condition 2: prosodically weak article

no lapse: *Peer sucht den Ball.* 'P. looks for the ball.'
lapse: *Peter findet den Ball.* 'P. finds the ball.'

Procedure

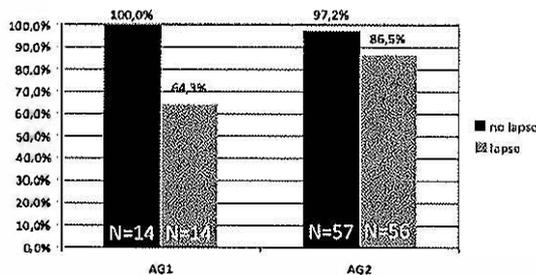
We used an elicited imitation method in a longitudinal production study. Sentence imitation is an established method to test young children's language skills as it reflects their syntactic and semantic processing [11, 12]. The German speech data were collected by the first author, whereas the Italian data were accumulated by the second author. In order to avoid interference of one language to the other, the bilingual children in our study were never tested in German and Italian on the same day. They were recorded separately in a quiet room at their kindergarten every four to six months. The sentences were elicited with the help of picture books and puppets and recordings were made with a portable two-channel digital recorder (Microtrack 24/96), stored as wav-files. Each child received a small gift for participation.

2.2. Results

We consider the German speech data first. Our results show that the monolinguals produce more correct utterances in no lapse-sentences compared to lapse-sentences and the older age group

performs better than the younger one (see Figure 1 below).²

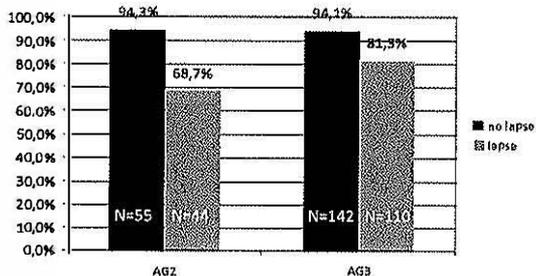
Figure 1: Correct utterances for German children (percentages)



Monolingual German children apply the following strategies to modify a sentence with lapses: In Condition 1 (word-initial *Ge-/Be-*), either the initial weak syllable is deleted (e.g., *Peter kitzelt spenster.*; AG1: 16.7%; AG2: 13.3%), or another syllable is inserted (e.g., *Peter kitzelt da Gespenster.* 'Peter tickles ghosts there.' or *Peter kitzelt die Gespenster.* 'Peter tickles the ghosts.'). AG1: 16.7%; AG2: 0%), or the preceding verb-final syllable is omitted (e.g., *Peter kitz l Gespenster.*; AG1: 0%; AG2: 6.7%). In Condition 2 (weak article), either the article is deleted (AG1: 14.3%; AG2: 0%), or the preceding verb-final syllable is omitted (AG1: 14.3%; AG2: 4.5%).

With regard to the bilinguals speaking German, we also find more correct utterances in no lapse-sentences compared to lapse-sentences and the older age group performs better than the younger one (see Figure 2 below).

Figure 2: Correct utterances for German-Italian children speaking German (percentages)



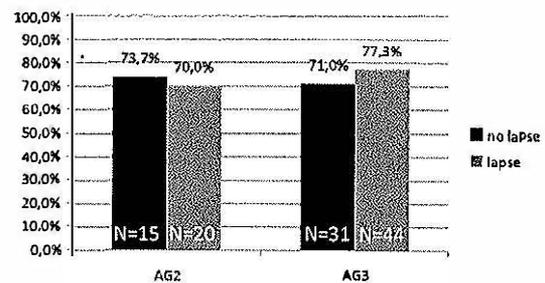
The repair strategies for the bilingual children are the following: In Condition 1 (word-initial *Ge-/Be-*), either the initial weak syllable is deleted (AG2: 35.7%; AG3: 4.3%), or another syllable is

² By 'correct utterances' we mean the realizations of all syllables as given in the child's input. We do not consider small pronunciation errors in the realizations of consonants and vowels. 'N' refers to the amount of the children's lapse- and no lapse phrases included in the analysis.

inserted (AG2: 7.1%; AG3: 13.0%), or the preceding verb-final syllable is omitted (AG2: 0%; AG3: 4.3%). In Condition 2 (weak article), either the article is deleted (AG2: 36.8%; AG3: 3.1%), or the weak verb-final syllable preceding the article is omitted (AG2: 21.1%; AG3: 18.8%).

Turning now to the correct sentences in Italian child speech, we see that lapse sentences and no-lapse sentences pose the same amount of difficulties for the monolingual children (see Figure 3 below). The differences between the two rhythmic patterns and age groups do not reach statistical significance.

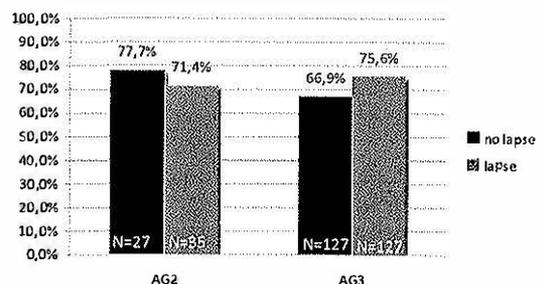
Figure 3: Correct utterances for Italian children (percentages)



Monolingual Italian children do not delete any weak word-initial syllables in Condition 1 and no articles in Condition 2. The erroneous utterances can be explained when we consider sentences without an article (in Condition 1) in contexts where an article is possible, e.g. generic *Anna mangia pasta.* ('Anna eats pasta.') for a non-generic sentence (*Anna mangia la pasta.*). We assume that children's article insertions in these contexts are due to specificity. Figure 3 shows that error rates are not related to a particular rhythmic pattern.

In the utterances by the bilinguals speaking Italian, we also find article insertion in lapse- and no lapse-sentences. Both age groups behave similarly (see Figure 4 below).

Figure 4: Correct utterances for German-Italian children speaking Italian (percentages)



Neither the monolingual Italian children, nor the bilinguals speaking Italian delete a weak word-initial syllable in lapse sentences. The strategies to create a trochaic pattern that the bilinguals use under Condition 2 are the following: (i) The article is deleted (two observations as in *Rosa taglia la siepe*. → *Rosa taglia _ siepe*. 'Rosa cuts the hedge. '; only found for AG3) or (ii) the weak verb-final syllable is omitted (e.g., *Luca mangia la carne*. → *Luca mangia la carne*. 'Luca eats meat. '; AG2: 3.7%; AG3: 2.9%). The fact that we find more article insertions for AG3 in no lapse-sentences compared to lapse-sentences may be attributed to the more specific interpretation of the perfect tense (*mangiò le patate*) in relation to the more general reading (*mangia patate*) of the present tense, which is mastered by the older bilinguals better than by younger bilinguals.

2.3. Comparison

Generally speaking, realizing word-initial weak syllables or articles in the no lapse-sentences do not pose difficulties for the children in our study. The lapse-sentences on the other hand lead to repair strategies especially in the German utterances. Monolingual Italians insert articles for semantic reasons at the cost of prosodic structure.

When an unstressed verb-final syllable is followed by an unstressed word-initial syllable, the younger German children and the young bilingual children speaking German delete the unstressed syllable of the noun rather than the unstressed syllable of the verb. In the environment where an unstressed verb-final syllable is followed by an unstressed definite article, the younger mono- and bilingual children tend to delete either one of the adjacent weak syllables when they speak German, whereas older mono- and bilingual children rather delete the verb-final syllable than the article. In other words, to maintain an sw-pattern, older German children tend to keep the article at the cost of verbal information.

Bilingual children speaking Italian behave more or less like their monolingual peers. The very low rates of prosodic repairs and the low statistical differences concerning the correct utterances within both conditions indicate the bilinguals' non-sensitivity to rhythm. The correctness values in no lapse and lapse input sentences vary from 66.9% to 77.7 % for child Italian utterances. The reason why the scores are not higher seems to be that children prefer to insert an article in input sentences with a generic interpretation, so that the objects in the picture book or the objects that the puppets showed will get a specific interpretation ('Anna eats meat.'

→ 'Anna eats the meat.' as in the picture which is shown to the children).

3. CONCLUSION

In accordance with the observation that Italians are exposed to more phrases with lapses than Germans, we found that Italian children are not inclined to delete weak syllables in lapse sentences, whereas young German children tend to omit weak syllables in that particular prosodic context. Thus, children's speech data reflects what they are exposed to in their input in that Italian children are less sensitive to rhythm compared to German children. Mono- and bilinguals who speak Italian hardly have any problems with lapses. Older mono- and bilinguals speaking German are at an intermediate level. Younger mono- and bilinguals speaking German prefer no-lapse patterns.

For German-speaking children, weak syllable deletion is conditioned by rhythm. Italian children allow more lapses compared to their German peers and even insert articles irrespective of the rhythmic pattern of the sentences they utter, presumably because they prefer a specific interpretation of the verbal phrase to a generic one. Our bilingual children behave like monolinguals, which suggests that they have separate systems for both languages.

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