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Not Eating *Kein* Veggies: Negative Concord in Child German

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The goal of this paper is to probe the interpretation of sentences with two negations in German speaking children. We situate our investigation into the more general discussion surrounding children's and adults' interpretation of such constructions, specifically in regards to the cross-linguistic differences with respect to possible interpretations. We begin the paper with some brief background on the possible interpretations of sentences with multiple negative words, in both adult and child language, along the way reviewing a recent experimental study of children's interpretation of the relevant constructions in English. We motivate our own study of German speaking children in the second part of Section 1, and present a novel experimental design as well as the results of this experiment in Section 2. In Section 3 we discuss our analysis and implications of our study, and Section 4 concludes.

1 Background

1.1 Negative Concord and Double Negation Languages

The distribution and interpretation of negative words is a source of great linguistic variation. Much research, both typological and theoretical, has been done in this area (e.g., Laka 1990; Zanuttini 1991; Haegeman 1995; Giannakidou 2000; Giannakidou & Zeijlstra 2017; Herburger 2001; de Swart & Sag 2002; Zeijlstra 2004). Languages have generally been classified based on how two or more negative words (neg-words henceforth) interact with each other. One language type is constituted by strict negative concord languages. In these languages, multiple negative expressions yield an interpretation with only one negation; the neg-words are said to enter into concord with each other and the sentential negation. Most Slavic languages belong to this group, as do Albanian, Greek, Hebrew, Hungarian, Romanian and several East Asian languages (e.g., Japanese, Korean). Consider the following example from Romanian.

- (1) *George nu a vorbit cu nimeni.*
George not has spoken with nobody
'George didn't speak with anybody.'

The distinguishing characteristic of these languages is that neg-words cannot occur without an accompanying sentential negation.

- (2) a. **George a vorbit cu nimeni.*
George has spoken with nobody
cannot mean 'George didn't speak with anybody.'
b. **Nimeni a vorbit cu George.*
nobody has talked with George
cannot mean 'Nobody talked with George.'

There are also non-strict negative concord languages, such as Italian and Spanish as well as some dialects of Spanish and Portuguese, which behave just like strict negative concord languages

as far as neg-words in post-verbal position are concerned but unlike them when the neg-word occurs in a pre-verbal position. Specifically, in a pre-verbal position a neg-word can occur without sentential negation; consider the example in (3) from Italian in contrast with (2b).

- (3) *Nessuno ha telefonato.*
 Nobody has phoned.
 ‘Nobody called.’

In fact, inserting a negation in (3) would result in ungrammaticality, unless the sentence was uttered in an appropriate context and the neg-word carried focal stress, in which case it could only convey that everybody came.

- (4) *NESSUNO non ha venuto.*
 Nobody not has come.
 ‘Nobody didn’t come.’ *Lit:* Everyone came.

The distribution of neg-words in pre-verbal position in non-strict negative concord languages parallels the distribution of neg-words more generally in languages like standard German and Dutch, which are dubbed double negation languages. In these languages, neg-words contribute semantic negation on their own, regardless of their position in the sentence, unlike in strict and non-strict negative concord languages. We illustrate this with an example from German with the neg-word *nichts* ‘nothing.’

- (5) *Hans hat nichts gelesen.*
 Hans has nothing read
 ‘Hans read nothing.’

Like pre-verbal neg-words in non-strict negative concord languages, when a neg-word co-occurs with a sentential negation, no concord is established between them and thus each element contributes its own semantic negation. Below we illustrate this with the neg-determiner *kein*, which for all intents and purposes behaves like any other neg-word.

- (6) *Hans hat kein Buch nicht gelesen.*
 Hans has no book not read
 ‘Hans did not read no book.’ *Lit:* Hans read every book.

The same is true also of Dutch (Zeijlstra, 2004):

- (7) *Ik heb niet niemand gezien.*
 I have not nobody seen
 ‘I didn’t see nobody.’ *Lit:* I saw somebody.

It is worth pointing out that just like in the case of pre-verbal neg-words in non-strict negative concord languages, such constructions are marked and are only acceptable in an appropriate context and with special prosody, such as accent on the sentential negation (p.c. Manfred Krifka, Uli Sauerland) to mark the contrast. The source of the markedness is presumably the availability of a more economical way of expressing that same meaning; for (6) via the use of a universal quantifier, and for (7) via the use of the existential quantifier.

Standard English is also claimed to be a double negation language by virtue of the purported unacceptability of sentences such as those in (8) to express negative concord interpretations. Note that other varieties of English, including but not limited to African American English and Appalachian English, are considered negative concord and speakers of these varieties would show no hesitation in using such constructions.

- (8) a. John didn’t see nobody.
Double negation interpretation: John saw someone.
Negative concord interpretation: John didn’t see anybody.

- b. Nobody didn't bring their backpacks.
Double negation interpretation: Everybody brought their backpacks.
Negative concord interpretation: Nobody brought their backpacks.

A recent series of experimental studies investigating adults' interpretation of such sentences found that even speakers who never use negative concord in their speech have reliable intuitions about these constructions (Blanchette, 2017), suggesting, as Blanchette argues, that these speakers have NC grammars despite the absence of the construction from their usage. In a graded acceptability task, speakers ranked sentences like (8) below the median for all items but still above the unacceptable controls. And interestingly, for certain configurations, namely those with object negative words as in (8a), the same speakers were shown to prefer the negative concord over the double negation interpretations. These results received further support from a follow-up study by Blanchette & Lukyanenko (2019) where it was shown that despite not producing these constructions, speakers find negative concord interpretations of negative object sentences easier to generate than double negation interpretations.

We next turn to a discussion of children's understanding and interpretation of doubly negated sentences, with a focus on an acquisition study of standard-English-speaking children.

1.2 Children's Interpretation of Doubly Negated Sentences

Thornton et al.'s (2016) study investigated how standard-English-speaking children interpret constructions with a neg-word in the presence of sentential negation. The experiment tested 24 standard-English-speaking children (3;6–5;8, $M = 4;7$). Children were presented with a story where some contexts made the double negation reading true, while some made the negative concord reading true, e.g., (9)-(10). A puppet described the situation using a test sentence with 2 negations.¹ The children were then asked if the puppet was right or wrong. In each of the contexts below we indicate in italics the crucial parts making the relevant interpretations available.

- (9) **Condition 1: Double negation** *The girl who skipped didn't buy nothing.*
 The girls are playing at home. One is practicing skipping tricks. She invites the other girl to join her but the second girl doesn't want to skip. Instead, she wants to go out to buy some flowers for their mum's birthday. The second girl leaves, but on her way home to the flower shop she meets a friend at a cafe and stops to have a drink. Meanwhile, a young boy comes by the flower shop and buys a bouquet. There is now only one bouquet left at the shop. *Just then, the skipping girl decides she's practiced enough tricks, and she wants to rush to the shops before closing time. She goes straight to the flower shop and buys the last bouquet.* The girl at the cafe (the girl who didn't skip) suddenly remembers she has to get to the flower shop, but when she arrives there are no flowers left, so she ends up buying nothing.
- (10) **Condition 2: Negative concord** *The mouse who dressed up didn't cook nothing.*
 Two mice and a cat are attending animal preschool. At school the teacher suggests that the animal children can either choose to play in the dress-ups corner or the cooking corner before morning tea. One mouse decides to dress up. The cat and the other mouse decide to do some cooking. There are some toy cakes and pizzas to choose from and one cooking bowl. The cat takes the cake and the bowl. The mouse who decided to cook takes the pizza, but has no dish to cook it in. He thinks he might not be able to cook, and he asks the teacher what to do. She looks in her storeroom and finds another dish for him, so he

¹ Their experimental material included control items in which the sentential negation did not c-command the negative quantifier. They achieved this by having the sentential negation embedded within a relative clause while keeping the negative quantifier in the object position. Their two-negation test sentences, therefore, also contained relative clauses.

can do his cooking after all. Meanwhile, the mouse who decided to dress up has finished and there is still time before morning tea. The teacher tells the dressed-up mouse she has time to do some cooking if she would like. *The dressed-up mouse wants to make fruit salad. However, there is no toy fruit available, so she decided not to cook, and to wait until morning tea.*

They found that children accepted the test sentence with 2 negations in the double negation context 25 % of the time, whereas adults did so 80 % of the time. At the same time, children accepted the sentence in the negative concord context 75 % of the time, whereas adults did so 16 % of the time. The results from their study thus indicate that children go through a negative concord stage. This is surprising given that speakers of standard English do not employ negative concord structures in their speech and the children would thus not have had any input indicating that multiple negative expressions can enter into concord.²

As an explanation for this diverging behavior between children and adults, and in particular the children's acceptance of negative concord interpretations, the authors point to a discussion by Zeijlstra (2008), who argues that English is interesting in that it has two types of negation, the adverbial *not* and the head *n't*. Based on a study of 25 languages, Zeijlstra (2004) observed that languages whose negative markers are syntactic heads are also languages which exhibit negative concord, while languages whose negative markers are adverbs are double negation languages. Since English has both types, its varying status between a negative concord and a double negation language is possibly not as surprising.

The goal of our study was to investigate how standard-German-speaking children comprehend sentences with a neg-word in the context of sentential negation. Unlike English, German lacks a negative marker that is a head, so assuming that syntactic status of negation correlates with presence or absence of negative concord, we predict that children should have a double negation grammar, just like adults. Specifically, we hypothesize that standard-German-speaking children, like standard-German-speaking adults, should not accept sentences with *kein* and negation in a negative concord context. This hypothesis finds further support in the work of Zeijlstra who has argued that a grammar in which each neg-word contributes semantic negation should be taken as the default; in other words, a double negation grammar is the default. This conclusion is based on economy-driven considerations: since adverbs do not have to project, while heads do, the former are simpler than the latter and thus the default setting for negation should be as an adverb.

2 Experiment

2.1 Participants

Participants for this study were 26 monolingual German-speaking children (4;2 – 6;5, $M = 5;2$), recruited at three daycare centers in Berlin, Germany, and 10 monolingual adult speakers, recruited also in Berlin.³ Child participants received a sticker for their participation. Adult speakers received 6 Euro for their participation. Child participants were tested individually in a quiet room at the daycare that they normally attend. Adult participants were also tested individually at the Psycholinguistic Lab at ZAS.

² Note that the adult results indicate that adults do not accept doubly negated sentences as good descriptions of negative concord scenarios. This is prima facie not in line with the results reported earlier from Blanchette (2017) but that is most likely due to the different tasks employed: truth value judgement task versus gradient acceptability.

³ As we expected very small variations among adult speakers, we tested only 10 adult speakers.

2.2 Methods, Items and Materials

We used a truth-value judgment task for this experiment. An experimenter told the participant that they would watch a story on a tablet with a puppet. They were told that the puppet would say what happened in the story but that the puppet sometimes makes mistakes. The participant's task was to say whether the puppet described what happened correctly.

We created twelve stories, each consisting of three animated scenes, presented on a tablet computer. In order to facilitate comprehension we presented the participants with stories both visually and aurally. An experimenter sat next to the participant and told the story to both the participant and the puppet (who, the participant was told, was listening in the tablet.) The test sentences were pre-recorded and presented synchronously with the animations on the tablet. After the animation of each scene finished, the puppet appeared on the screen and orally described what happened in the scene.

One of the hurdles encountered in creating an experiment involving negation is the issue of how to make the use of negation natural. As our target sentences contained a negative determiner in addition to the sentential negation, the task of creating an appropriate context became even more complicated. Thornton et al. (2016) addressed this by setting up each story in such a way that the end of the story motivated the use of negation in the target sentence with two negations (see the scenarios in (9) and (10)).

In our experiment, the first two scenes each contained a sentential negation, made felicitous by the initial story set-up, while the final scene contained the negative determiner *kein* in addition to the sentential negation, made felicitous by the fact that the negation had already been used in the preceding two scenes. The single negation sentences used in the first two scenes had an additional role: to verify whether children consistently interpreted the negation *nicht* correctly.

Let us illustrate how the experiment proceeded using one of the stories. The story started out with a scene where the set-up was explained, as in (11).

- (11) Once upon a time, there was a rabbit that did not like to eat vegetables. Today for lunch there are carrots, broccoli, and a pepper on the table. Let's see what happened!

After this introduction, the puppet appeared on the monitor, and said the first experimental sentence, as in (12) with one negation, namely the sentential negation. The experimenter moves then to the second scene, expressing something like (13), pointing out to the child that a new scene/day started. The animation was then played, followed by another one-negation sentence, uttered by the puppet. The experimenter made a designated commentary whenever they moved to the new scene.

- (12) *Der Hase hat den Brokkoli nicht gegessen.*

The rabbit has the broccoli not eaten
'The rabbit did not eat the broccoli.'

- (13) *Experimenter: Oh no, there are vegetables on the table again! Let's see what happened!*

After the animation of the third scene, the target sentence with two negations was uttered by the puppet. The puppet was voiced by a native speaker of standard German. We paid particular attention to the prosody of such sentences making sure they sounded as natural as possible. While we could not find previous literature specific to the prosody associated with negative concord in the dialects that have negative concord, such as Austrian, Bavarian and Swabian Germans, we consulted with speakers of standard German and speakers of Bavarian and Austrian German regarding the natural prosodic pattern for sentences with two negations when the intended interpretation is the double negation one. Note that for the speakers that have negative concord, it seems that the negative concord interpretation is more readily available when *nicht* is deaccented. The test sentence that was used for this story is shown in (14), and its

spectrogram indicates that there is a sharp rise while producing *nicht* ‘not’. In other words, even for speakers of a negative concord dialect this intonation pattern would not be consistent with a negative concord interpretation.

- (14) *Der Hase hat kein Gemüse nicht gegessen.*
 the rabbit has no vegetable not eaten
 ‘The rabbit did not eat any vegetable.’

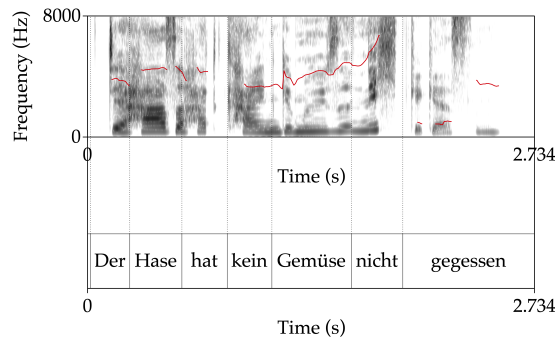


Figure 1. Pitch contour for a sentence with two negations

The two-negation sentences can have one of two interpretations, depending on the speaker’s grammar.

- (15) a. *Double negation interpretation:* ‘The rabbit ate all the vegetables.’
 b. *Negative concord interpretation:* The rabbit ate none of the vegetables.

In order to test which interpretation the participant reaches with the two-negation sentences, these sentences were presented in three different conditions, described in detail below.

Condition 1: Double negation The scene starts with the rabbit standing next to the table with three vegetables on the table. After the animation showing the vegetables disappearing around the rabbit’s mouth, the final picture shows the rabbit standing next to a table without any vegetables left. This is meant to convey that the rabbit ate all of the vegetables. This ending should be judged true under a double negation interpretation of the sentence (since everything was eaten) and false under an negative concord interpretation.

Condition 2: Negative concord The scene starts with the rabbit standing next to the table with three vegetables. After the animation all the vegetables are still on the table. This ending should be judged true under an negative concord interpretation of the sentence (since nothing was eaten) and false under a DC interpretation.

Condition 3: Control-False The rabbit stands next to the table with three vegetables, and the animation shows that only two out of the three vegetables were eaten. The scene does not match either of the possible interpretations that the participant may arrive at. This condition was created to make certain that children can respond with *no* to a two-negation sentence.

There were 12 stories in total, and thus there were 24 items with one negation and 12 items with two negations per participant. 12 of the 24 one-negation items were tested in a context where the expected response was *the puppet was wrong* (e.g., for the sentence *The rabbit did not eat the broccoli*, the scene showed that the rabbit, in fact, ate the broccoli), and the other 12 items were tested in a context where the expected response was *the puppet was correct* (e.g., the rabbit ate the broccoli). Among the 12 two-negation items, each condition discussed above had four items.

2.3 Prediction

Given our hypothesis that children and adults should behave similarly in light of the proposal put forward by Zeijlstra (2004, 2008), we predict that both children and adults will accept the target, two-negation sentences in the double negation condition and reject them in the negative concord condition.

2.4 Results

2.4.1 Adult Results

We begin with the adult results first. Recall that we tested 10 adult participants. We obtained 40 data points each for the three conditions in which two-negation sentences were used. Overall, adult speakers accepted the use of two-negation sentences in the double negation condition 92.5% of the time, whereas they did so in the negative concord condition only 15.0% of the time. Looking into individual data, there were 8 adult participants who rejected the use of two-negation items in the negative concord condition in all 4 trials, while accepting their use in the double negation condition in all 4 trials. One participant rejected their use in the negative concord condition in all 4 trials, while accepting their use in the double negation condition in 3 trials. One participant, however, accepted the use of two-negation sentences in the negative concord condition in 3 trials, while rejecting them in the double negation condition in all trials, showing the pattern expected from a speaker of a negative concord dialect.

This data show that this experimental method can extract the expected responses from adults. Furthermore, the data support our expectation that there is very little variation among adult speakers.

2.4.2 Child Results

Next we turn to the data for the 26 child participants. Recall that there were 24 one-negation items, half of which were designed to be judged true (control-yes) and half false (control-no). As mentioned above, these items had two purposes: (i) to check whether children have difficulties understanding the negation *nicht* in a sentence, and (ii) to create an environment where the two-negation sentence would be felicitous in the third scene.

There were 312 items each (12 items for 26 children) for the control-yes and the control-no contexts (624 items in total). Child participants responded correctly 93% of the time over all. Looking at the control-yes and the control-no conditions separately, children accepted the control-yes items 94.9% of the time, and correctly rejected the control-no items 91.4% of the time. Both response patterns are significantly above chance (binomial test: $p < .01$).

Looking at individual responses, however, we observe that there were four children who did not respond above chance level (the chance level, calculated using Binomial Test for 12 items as the total with probability set as 0.5, is fewer than 10 out of 12 items.) This could be because the participant did not understand the meaning of the negation *nicht*, or did not understand the task. We excluded two additional children because they did not reject any control item with two-negation sentences, namely those situations where the protagonist acted on only one or two of the objects.⁴

⁴ The control-false items were always presented in a scenario where only some of the vegetables had been eaten. We hypothesized that neither the double negation nor the negative concord interpretation would be consistent with such a scenario. There is, however, a way to generate an interpretation for two-negation sentences like (14) that would make them true in such a scenario. Previewing the analysis in Section 4, we assume that in double negation languages, negative determiners like *kein* should be analyzed as negated existential quantifiers. Thus, a surface scope interpretation of (15) amounts to the universal reading by virtue of the logical equivalence in (ia), whereas the inverse scope interpretation amounts to an existential reading, as in (ib).

(i) a. SS: *kein* > *nicht* [$\neg\exists$] > \neg ($\neg\exists\neg \equiv \forall$)

Below, we discuss the results from the remaining 20 children. The overall distribution of individual children is shown in Figure 2, right panel, along with the distribution of adult participants. Figure 2, left panel, plots participants according to how many of the four items of each type they have accepted. 19 children accepted the use of the two-negation sentences in the negative concord condition in 4 out of the 4 trials. These are the children that are at the top of the plot. Among these 19 children, seven of them rejected the two-negation sentences in the double negation condition in all 4 trials (participants at the top left corner of the plot), and 10 rejected them in 3 trials. The other two children who accepted two-negation sentences in the negative concord condition rejected them in the double negation context twice (1 child) or three times (1 child). There was one child who accepted two-negation sentences in the double negation context in 3 trials, while rejecting their use in the negative concord condition in 3 trials.

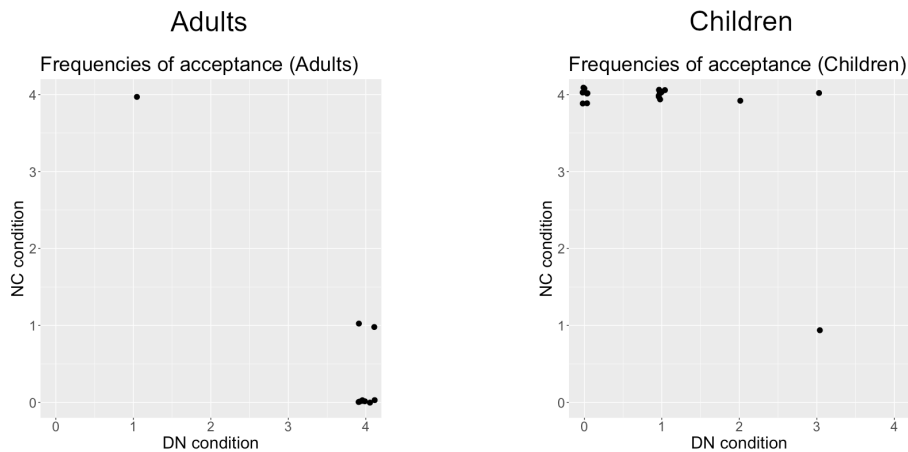


Figure 2. Distribution of participants responses to two negation sentences

When we consider the number of times a participant accepted or rejected the use of two-negation sentences in each condition, the difference in ratios between adult participants (negative concord condition, 6 trials vs. double negation condition, 37 trials) and child participants (negative concord condition, 77 trials vs. double negation condition, 18 trials) is statistically significant (Fisher’s Exact test: $p < .01$). Note that there is one adult who we could classify as belonging to the negative concord group, while the other nine participants rejected all four trials of the two-negation sentences in the negative concord context. The ratios between the two groups with respect to the number of participants belonging to each group (child: 1 double negation vs. 17 negative concord and adults: 9 double negation vs. 1 negative concord) is also significant (Fisher’s exact test: $p < .01$).

We ran linear mixed models with items and participants as random effects, and examined (i) whether there is an effect of the groups (child vs. adults) and (ii) whether there is an interaction between the groups and the type of experimental items (double negation or negative concord). We used the lme4 package for R. We found an effect of groups ($t = -4.049, p < 0.01$), an interaction of groups and responses to double negation items ($t = -5.950, p < 0.01$), as well as an interaction of groups and responses to negative concord items ($t = -8.867, p < 0.01$).

b. IS: *nicht* > *kein* $\neg > [\neg\exists]$

$(\neg\neg\exists \equiv \exists)$

If these children had a double negation grammar, then we would expect them to reject such items in the negative concord condition. They actually accepted almost all such items in both condition 1 and condition 2, suggesting that they were not behaving consistent with either grammar.

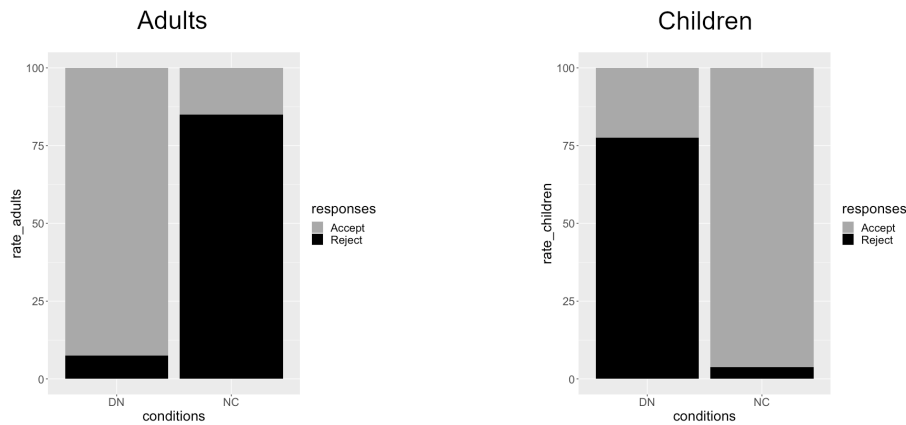


Figure 3. Rates of acceptance for each condition

3 Discussion

Our experimental data show that standard-German-speaking children allow concord between sentential negation and the negative quantifier *kein*, unlike adults. This goes against our hypothesis which was that children, like adults, would reject the use of *kein . . . nicht* in the negative concord context. This hypothesis was motivated by the discussion in Zeijlstra (2004, 2008) where it was proposed that availability of negative concord is dependent on the presence of a negative marker that can project its own phrase. Since the German negation *nicht* is an adverb rather than a head, there is no reason we should expect children to go through a negative concord stage if we follow Zeijlstra and assume that the double negation setting is the default by virtue of the adverbial setting being the default.

Our investigation thus shows that negative concord is present even in the presence of an adverbial head. If we want to maintain that headedness necessarily correlates with this setting, we could speculate that standard-German-speaking children mistake *nicht* for a head. However, it is not clear how one would go about testing this hypothesis, nor is it clear how children could then go on to reanalyze *nicht* as an adverb.

We would like to discuss a relevant note regarding the participants. We inquired the age and sex of the child on the consent form that the parents/guardians of participating children signed, but did not ask for information regarding the dialects that the parents/guardians speak to the child participant at home. There is a chance that some of the children who participated in this study have parents who are speakers of one of the southern dialects of German, or for that matter, that some of the daycare providers themselves are speakers of these dialects. We cannot thus exclude the possibility that our results are accidental, namely that the child participants have a negative concord grammar because they have parents who speak one of the dialects with negative concord. Similarly, even though adult speakers were recruited in Berlin, Germany, this does not guarantee that the participants were speakers of the standard variety of German, rather than of Austrian German or southern German dialects, such as Bavarian and Swabian, all of which are reported to have negative concord (Bayer, 1990). Recall that we used the prosody that have been identified as less likely to induce a negative concord interpretation even for speakers of the Austrian, Bavarian, and Swabian German. Assuming that both child and adult participants are sensitive to prosodic information (Yatsushiro et al. 2019), we assume that the target interpretation for the two negation sentences in our experiment should be that of double negation, independent of their native dialect. We leave the topics of prosody and dialectal variation for future research, however.

3.1 Corpus Data

We found further evidence from the CHILDES corpus (Macwhinney, 2000) that children's grammar exhibits characteristics of negative concord. German speaking children of around 2 years old produce utterances with both *kein* and *nicht*. The explanation of what happens next for (16) (Leo hoping that the bell(s) would ring) points to an negative concord interpretation.

(16) *keine Glocken nicht da!*
 keine bells not there
 'no bell there!' CHILDES: Leo 2;2, 2 days (20202.cha)

(17) (...) *e weiß nicht kein.*
 ... know not kein
 'don't know any.' CHILDES: Andreas 2;1 (andreas1.cha)

It appears then that German children around 2;1-2;2 go through a stage where they produce two negations in a manner consistent with a negative concord grammar. While the children tested in the experiment were older than 2, this corroborates our observation that children's interpretation of *kein ... nicht* is that of negative concord, rather than double negation.

There were also standard-German-speaking children who produced sentences with bare *kein* to express a negated existential. Below we report data taken from Macwhinney (2000) as well as data collected by one of the authors in a production experiment (Bill et al., 2019).⁵

(18) *Mama keine Mütze.*
 Mama keine hat
 'Mama no hat.' CHILDES: Leo 2;2, 6 days (20206.cha)

(19) *Viele Katzen haben keine Hüte.*
 many cats have keine hats
 'Many cats have no hats.' Bill et al. (2019): Participant 6 4;6

This set of data shows that children can produce *kein* alone to convey one-negation meanings. In fact, the data show that they produce *kein* in object position, in both elided and non-elided contexts, which is unlike what is observed in any negative concord language. Recall that NC languages do not allow post-verbal neg-words to occur without an accompanying negation. This production data resembles more closely what a German-speaking adult would produce, thus lining up more so with a double negation grammar than with a negative concord one.

Moving forward, there are two main issues that need to be addressed: (i) the apparent difference between child and adult grammars, and (ii) the seemingly inconsistent interpretation and production data. Before moving on to our analysis, however, we will quickly consider and ultimately dismiss a processing approach to understanding these data.

3.2 Against a Processing Approach

Let's assume that standard-German-speaking children, like adults, have a double negation grammar. Let's furthermore assume that children cannot interpret sentences containing two neg-words because of their complexity. A processing strategy theory might go as follows: children simplify (20) into a sentence containing a single negative expression, e.g. (20a) or (20b). Both of these simplifications would be compatible with the context in which the children are accepting the use of two negations.

(20) Der Hase hat kein Gemüse nicht gegessen.

⁵ The child participant from Bill et al. (2019) is older than the children from the CHILDES corpus, but around the same age as the child participants of our experiment.

- a. Der Hase hat Gemüse nicht gegessen.
'The rabbit didn't eat vegetables.'
- b. Der Hase hat kein Gemüse gegessen.
'The rabbit ate no vegetables.'

This approach accounts for why *kein* (i) can appear in object position without a c-commanding negation, and (ii) can appear in both elided and non-elided environments, for German children.

This approach, however, cannot account for the production data involving *kein . . . nicht* to convey one-negation meanings unless we assume something else is at play. Note that if children were like adults, they should not use such sentences to convey a one-negation interpretation, which is what they seem to do.⁶

Another point against a processing account comes from the results reported in Thornton et al. (2016) where sentences with two negatives were tested specifically so as to control for this factor, namely children's ability to process two negative markers. It is crucial to note that the concord relation holds when one item (for example, negation) c-commands another item (for example, neg-words). The difference between the test items and the control items in Thornton et al. (2016) was a structural one: in the former, the negation c-commands the neg-word, whereas in the latter, because the negation is in the relative clause, the negation does not c-command the neg-word, as shown in (21); these markers would not enter into concord even in negative concord languages because they do not stand in a c-command relation. Given an appropriate context, the children could only answer these control items correctly if they processed both negations.

- (21) *Context: The mouse who didn't dress up cooked some pizza.*
 Experimenter: Did the mouse who didn't dress up cook nothing?
 Puppet: The mouse who didn't dress up cooked nothing.

Their results showed that children responded correctly to the control sentences 84% of the time. This high number allows us to conclude that children do not have difficulties in computing interpretations for sentences that contain two instances of negation, rendering a processing approach as outlined above faulty.

3.3 *Kein* = (C)overt Negation + Existential Quantifier

Penka (2007) and Zeijlstra (2004, 2008) propose an analysis which takes the negative determiner *kein* to be decomposed into a negation and an existential quantifier, which they argue for based on the existence of split indefinite readings (Bech, 1957; Jacobs, 1980; Lerner & Sternefeld, 1984; Kratzer, 1995). A different way of expressing their proposal would be to say that the neg-word *kein* is a kind of negative polarity item (NPI) which needs to be in the scope of a covert negative operator in order to be licensed. In child grammar, however, we want to argue that this negation can be either covert, like in the adult language, or overt. If it is overt, *kein* ends up behaving like a negative polarity determiner in that it needs to occur in the scope of an overt negation.

Let us consider how the comprehension and production data could be accounted for under this view. When children hear a sentence with *kein* in the presence of sentential negation, they consider *kein* to be licensed; presumably for economy reasons they don't deem it necessary to

⁶ An audience member at Linguistic Evidence suggested that what might be happening is some sort of over-generalization. Specifically, the idea would be that the child wants to convey a negative interpretation and they do so by "marking" negation in as many ways as they can. This, they argue (K. Davidson pers. comm. as well) is pervasive among children. For example, they may mark tense information twice, as in *What does he likes?* (Ambridge et al. 2015; Rowland 2007 among others.)

In fact, it is not clear to us how to analyse such behavior without appealing to a notion of negative concord, which would be in conflict with the assumption that children start out with a double negation grammar.

further postulate a covert operator. In production, the licensing of the NPI *kein* can be done either by a covert operator or by an overt operator. If the licensing is via the overt negation route, the children will be said to behave more like speakers of a negative concord language, whereas if the licensing is via a covert negation, the children will pattern with speakers of a double negation language. To sum up, while for adults the use of overt negation is obligatory, children allow both overt and covert negation to act as NPI licensors, hence their variable behavior in the production data.

There is one aspect that we still need to address, namely, why do adults only allow a covert licensor? While we do not have an answer to this question, there are other areas where it has been observed that children produce more material than adults; put differently, that children have not yet learned when to be silent. One such area is the production of relative clauses. Relative clauses are both difficult to produce and to comprehend for children (Friedmann & Novogrodsky 2004; Arosio et al. 2012). In addition, it is well-known that there is a difference in ease of comprehension between relative clauses with the gap in the subject position of the relative clause and those with the gap in the object position (Friedmann & Novogrodsky 2004; Arosio et al. 2012). When producing the relative clauses with the gap in the object position, Yatsushiro & Sauerland (2018) observe that German speaking children often produce both the head of the relative clause and its copy in the base-position through an elicited production experiment. Similar phenomena has been observed for Italian clitic left dislocation (Belletti, 2006). These data show, then, that children sometimes overtly express what is not overtly visible in adult grammar. Put differently, children seem not to delete items that adults must delete.

The present analysis leads us to the following conclusion: the switch from child grammar into adult grammar amounts to a switch from an optionally overt licensor to an obligatorily covert licensor. The following question remains: why must the licensor be covert in the adult grammar (of double negation languages)? One possibility is to say that it is driven by an economy consideration: be covert whenever possible. We leave this issue to future investigation but speculate that it might be caused by a need for efficiency in adult language production.

4 Conclusion

In this paper, we tested the hypothesis that standard-German children's interpretation of sentences with two negative expressions resembles that of adult speakers, namely, as doubly negated sentences. This hypothesis is based on the previous observation by Thornton et al. (2016) that English speaking children show concord relations between two negations. They attribute this result to the fact that English has both a negative head (*n't*) and a negative adverbial (*not*). Following Zeijlstra (2008), they assume that availability of a negative head is crucial for negative concord to exist. Since German *nicht* is an adverbial and there is no other sentential negation, we predicted that standard-German-speaking children should not show concord between multiple negative expressions.

Our experiment shows that this hypothesis is not supported, however, making it less likely that the availability of a negative head in the language determines children's interpretation of sentences with multiple negative expressions. Despite the fact that the adult language can be described as a double negation language, child participants in our study comprehended two-negation sentences as conveying one negation, unlike adults. The source of negative concord-like behavior in children can thus not be due to the structural position of negation (the proposed account for English). Our proposal is that negative concord is the default setting and that is why both English and German speaking children go through the negative concord stage.

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Appendix

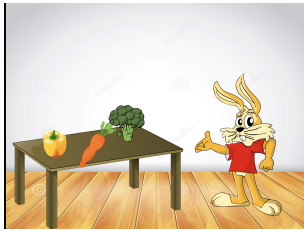
Double Negation Story

Set-up

- (22) Es war einmal ein Hase, der es nicht mochte, Gemüse zu essen.
'There once was a rabbit that did not like to eat vegetables.'

Scene 1

- (23) Heute gab es Möhren, Brokkoli und Paprika zum Mittagessen. Mal sehen, was passiert!
'Today, there's carrots, broccoli, and pepper for lunch. Let's see what happens!'



animation



Puppet utters:

- (24) Ich weiß, was passiert ist! Der Hase hat die Paprika nicht gegessen.
'I know what happened! The rabbit did not eat the pepper.'

Scene 2:

- (25) Am nächsten Tag war immer noch Gemüse übrig. Mal sehen, was jetzt passiert.
'On the next day, there were still vegetables left. Let's see what happens now.'



animation



Puppet utters:

- (26) Ich weiß, was passiert ist! Der Hase hat die Möhre nicht gegessen.
'I know what happened! The rabbit did not eat the carrot.'

Scene 3:

- (27) Ohje, es ist immer noch Gemüse übrig! Mal sehen, was jetzt passiert!
'Oh, no, there is still vegetables left! Let's see what happens now!'



animation



Puppet utters:

- (28) Ich weiß es! Der Hase hat kein Gemüse nicht gegessen!
'I know it! The rabbit has not eaten no vegetables!'

Negative Concord Story

Set-up

- (29) Es war einmal eine Giraffe, die es nicht mochte, das Besteck zu spülen.
'There once was a giraffe that didn't like to wash silverware.'

Scene 1

- (30) Heute waren ein Messer, eine Gabel, und ein Löffel sehr dreckig. Mal sehen, was passiert.
'Today, there were a knife, a fork, and a spoon (that are) very dirty. Let's see what happens.'



animation

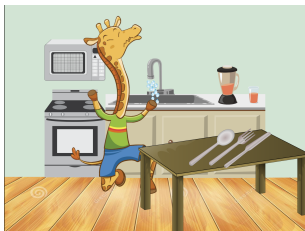


Puppet utters:

- (31) Ich weiß es! Die Giraffe hat die Gabel nicht gespült.
'I know it! The giraffe didn't wash the fork!'

Scene 2:

- (32) Am nächsten Tag war schon wieder viel Geschirr zu spülen. Mal sehen, was jetzt passiert.
'On the next day, there were again many dishes to wash. Let's see what happens now.'



animation

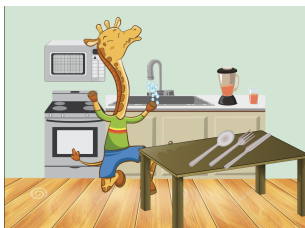


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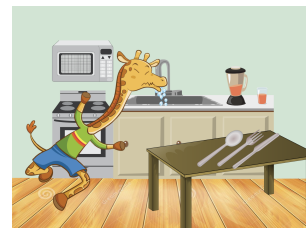
- (33) Ich weiß es! Die Giraffe hat das Messer nicht gespült
'I know it! The giraffe didn't wash the knife!'

Scene 3:

- (34) Oh nein! Schon wieder ist das Geschirr dreckig. Mal sehen was jetzt passiert.
'Oh no! The dishes are already dirty again! Let's see what happens now.'



animation



Puppet utters:

- (35) Ich weiß es! Die Giraffe hat kein Geschirr nicht gespült.
'I know it! The giraffe didn't wash the dishes.'