

RESEARCH

Two negations for the price of one

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Standard English is typically described as a double negation language. In double negation languages, each negative marker contributes independent semantic force. Two negations in the same clause usually cancel each other out, resulting in an affirmative sentence. Other dialects of English permit negative concord. In negative concord sentences, the two negative markers yield a single semantic negation. This paper explores how English-speaking children interpret sentences with more than one negative element, in order to assess whether their early grammar allows negative concord. According to Zeijlstra's (2004) typological generalization, if a language has a negative syntactic head, it will be a negative concord language. Since Standard English is often analysed as having a negative head, it represents an apparent exception to Zeijlstra's generalization. This raises the intriguing possibility that initially, children recognize that English has a negative head (i.e., *n't*) and, therefore, assign negative concord interpretations to sentences with two negations, despite the absence of evidence for this interpretation in the adult input. The present study investigated this possibility in a comprehension study with 20 3- to 5-year-old children and a control group of 15 adults. The test sentences were presented in contexts that made them amenable to either a double negation or a negative concord interpretation. As expected, the adult participants assigned the double negation interpretation of the test sentences the majority of the time. In contrast, the child participants assigned the alternative, negative concord interpretation the majority of the time. Children must jettison the negative concord interpretation of sentences with two negative markers, and acquire a double negation interpretation. We propose that the requisite positive evidence is the appearance of negative expressions like *nothing* in object position. Because such expressions exert semantic force without a second negation, this informs children that they are acquiring a double negation language.

Keywords: double negation; negative concord; child language; learnability; negation in English

1 Introduction

In double negation languages, each negation marker exerts semantic force (Zeijlstra 2004; de Swart 2010; Moscati 2006; 2010). In certain linguistic environments, the two negation markers cancel each other out, resulting in an affirmative interpretation. Double negation languages can be contrasted with negative concord languages. In these languages, sentences with two negation markers may express an interpretation that is equivalent to sentences with a single negation.

Standard English is classified as a double negation language. The term 'Standard English' is used here to refer to varieties of English that exclude sentences that express negative concord. In double negation languages such as Standard English, double negation is sometimes associated with metalinguistic negation or pragmatic negation. This terminology refers to the function of double negation in conversational contexts, which is to correct a

previous utterance (Horn 1991; 2001; Puskás 2012; Blanchette 2015).¹ Puskás illustrates the corrective pragmatic function of double negation with the example in (1).

- (1) a. Lenny likes nothing.
 b. Lenny does **not** like nothing.

The assertion in (1a) is contradicted by the double negation response in (1b), which can be paraphrased as “it is not the case that Lenny likes nothing” (Puskás 2012: 615). Typically, double negation is accompanied by a specific prosodic contour (Pilar et al. 2015). In example (1b), boldface font indicates that the negation marker *not* receives stress.

In contrast to Standard English, many contemporary varieties of English exhibit negative concord, including African American English, Appalachian English, both Belfast and Bristol English, and many others (Labov 1972; Wolfram & Christian 1976; Wells 1981; Henry et al. 1997; Martin & Wolfram 1998; Green 2002; 2011). In negative concord dialects of English, double negation interpretations exist alongside negative concord interpretations (Blanchette 2013; 2015). See Green (2011) for a discussion of the coexistence of these interpretations in African American English.

An example of negative concord taken from Labov’s seminal study is given in (2) (Labov 1972: 804). The example is taken from an interview with a 60-year-old speaker from Georgia, referred to as Mrs. Gratton. This speaker used Standard English and single negation with negative polarity items in the first 20 minutes of the interview but a switch in the topic of conversation to ‘baking without measuring’ triggered the use of negative concord.

- (2) IVer: Do you make ‘em [biscuits] from scratch?
 Mrs G: Make ‘em from scratch [chuckle]
 IVer: Wow! Do you measure the things when you put —
 Mrs G: I don’t
 Mrs G: measure nothin’! I never have
 IVer: Never, even when you first. . . ?
 Mrs G: measure’ nothing’. I have never measured—

In certain linguistic contexts, sentences with two negation markers are potentially ambiguous, having both a double negation interpretation and a negative concord interpretation. The potential ambiguity frequently arises when sentential negation is combined with a second negation marker that has been drawn from a particular set of negative expressions, called *n*-words (Laka 1990; Giannakidou 2005).² The set of potential *n*-words in English includes *nobody*, *nothing*, *nowhere*, and so on. A potentially ambiguous sentence with *nothing* is illustrated in (3).

- (3) John didn’t eat nothing before running the marathon.
 a. There is something that John ate before running the marathon. (DN)
 b. There is nothing that John ate before running the marathon. (NC)

¹ Blanchette (2015) proposes a second type of double negation which she terms *long distance DN*. An example is *John didn’t paint the house with no windows*. In long distance DN the two negative markers are separated, for example, by a complex NP or a tensed clausal boundary. In this paper, we will use the term double negation to refer to metalinguistic or pragmatic negation, as illustrated in (1).

² Giannakidou (2005) defines *n*-words, roughly, as words that are used in sentences that also contain sentential negation and, yet, express a proposition that is equivalent to a single negation. In addition, *n*-words can serve as fragment answers to questions.

The double negation interpretation is indicated in (3a). This interpretation is generated if the negation markers (*did*)*n't* and *nothing* each exerts semantic force. In this case, the two negative markers cancel each other out, yielding an affirmative interpretation. A speaker who intends to convey a double negation interpretation of (3) is asserting that John did eat something before running the marathon. The double negation interpretation has three further properties. First, the double negation interpretation of (3) invites the pragmatic inference that John ate only a small amount. Second, the use of double negation indicates that the speaker was not in a position to use a simpler affirmative statement such as *John ate something before running the marathon*, which would have more directly conveyed the intended interpretation (Horn 1991: 85). Rather, the speaker is revising the previous speaker's utterance. Third, the double negation interpretation is typically accompanied by the placement of phonological stress on the auxiliary verb and on the second negation marker (*nothing* in (3)). The critical observation is that the expression *nothing* exerts independent quantificational force on the double negation interpretation.

A speaker who intends the negative concord interpretation of (3) is attempting to convey the message that John didn't eat anything before he ran the marathon, as indicated in (3b). On this interpretation, the word *nothing* is an *n*-word, and does not exert independent negative force. Instead, the *n*-word *nothing* agrees with the first negation marker (cf. Zeijlstra 2004; 2008a; b).

To further illustrate the negative concord interpretation, it is instructive to look at Italian, a negative concord language. In Italian, an *n*-word in object (or dative) position is unable to exert independent negative semantic force. This is illustrated in (4), using the *n*-word *nessuno* 'nobody' (the example is from Zeijlstra 2004: 130). The *n*-word *nessuno* 'nobody' agrees with the negation marker *non* 'not', so *nessuno* expresses a meaning that is semantically equivalent to an existential expression, similar to English *anybody*. If the negation marker *non* is removed, the sentence becomes unacceptable.

(4) *Italian*

Gianni *(non) ha telefonato a nessuno
 Gianni NEG has called to nobody
 'Gianni didn't call anybody'

1.1 Negation in the grammar of English

Adult speakers of Standard English can readily interpret negative concord sentences even if they themselves do not produce negative concord sentences. The ease in comprehension of the negative concord interpretation may be due, in part, to the fact that speakers of Standard English have abundant exposure to negative concord dialects in the media (e.g., *I can't get no satisfaction*). In the present paper, we offer a different explanation for the observation that adult speakers of Standard English can readily interpret negative concord sentences. The alternative possibility has been raised previously by Blanchette (2013) and by Tubau (2008), and entertained briefly by Zeijlstra (2004). These researchers all propose that Standard English is inherently a negative concord language.

A question immediately arises. If Standard English is inherently a negative concord language, why don't speakers of Standard English produce negative concord sentences? One possible answer to this question would point to sociolinguistic factors, such as a social stigma, which some people may associate with negative concord sentences (cf. Nevalainen 2006; Horn 2010). Indeed, Blanchette (2013; 2015) proposes that Standard English is inherently a negative concord language and observes that sociolinguistic factors may contribute to the absence of negative concord sentences by speakers of this dialect.

Nonetheless, Blanchette speculates that English speakers will naturally revert to a negative concord interpretation in the absence of the requisite contextual support and intonation that are typically associated with the double negation interpretation of sentences like (3) (Blanchette 2013: 2). Similarly, Tubau (2008) proposes that all varieties of English are inherently negative concord languages. In contrast to Blanchette, Tubau (2008) invokes language-internal factors, rather than sociolinguistic factors, to explain the absence of negative concord productions in speakers of Standard English.

The present study is an experimental investigation of negative concord in the grammars of children acquiring Standard English. We explore the possibility that young children acquiring Standard English assign a negative concord interpretation to sentences like (3) during their early language development. If young children acquiring Standard English license negative concord interpretations of sentences with two negative markers, then this would lend credence to the conjecture that Standard English is inherently a negative concord language.

1.2 A typological generalization

The proposal that English is a negative concord language does not fit neatly into the typological generalization reported in Zeijlstra (2004). Based on a survey of 25 languages, Zeijlstra (2004) concludes that languages can be partitioned into two classes, depending on the position of negation in the syntax of these languages. That is, the structural position of negation in the syntactic structure of a language determines how it combines with a second negation marker. More specifically, the typological generalization is the following:

- (5) If a language has a negative marker that is a syntactic head, the language exhibits NC (Zeijlstra 2004: 266).³

Zeijlstra's generalization is not bi-conditional, because not all negative concord languages incorporate a negation marker as a syntactic head. Indeed, there are negative concord languages with just an adverb (e.g. Quebecois, Bavarian). Nevertheless, if negation is a syntactic head in a language, then that language licenses sentences with negative concord, according to the generalization proposed by Zeijlstra.

Zeijlstra's typological generalization was incorporated into a binary parameter. One value of the parameter yields negative concord languages. On this value, negation is associated with formal features [i/uNEG] in the syntactic component, and requires a NegP functional projection (Zeijlstra 2008a).⁴ The other value of the parameter yields double negation languages. On this value, negation is an adverb, adjoined to *vP*. The double negation interpretation is assigned within the semantic component.

We have chosen to describe Zeijlstra's analysis mainly because, with certain corollary assumptions, this parametric analysis can be used to make specific predictions about the course of language acquisition. According to Zeijlstra (2008a), the parameter that distinguishes between negative concord and double negation languages has a default setting. The default value of the parameter is for negation to be an adverb (Zeijlstra 2008a). The reason is that the value associated with double negation is more economical, in the sense that positing negation as an adverb does not require the language learner to build the functional projection, NegP. This functional projection is added on the basis of positive evidence from the language.

³ Zeijlstra (2004) argues that this generalization holds for both so-called strict NC languages (e.g., Russian and Greek) and for non-strict NC languages (e.g., Italian and French).

⁴ In Biberauer & Zeijlstra (2012), negative concord is defined follows: "NC is an Agree relation involving one element bearing a formally interpretable feature [iNEG] and one or more further elements carrying uninterpretable formal features [uNEG]".

In Zeijlstra (2008b), Standard English is analysed as a double negation language, with just one negative marker, the negative adverb, *not*. In the syntactic framework Zeijlstra proposes, negative auxiliary verbs are analyzed as single lexical items (cf. Pullum & Wilson 1977). This analysis is predicated on the observation that the contracted form of negation, *n't*, has a restricted distribution, as pointed out by Zwicky & Pullum (1983); it is limited to negative auxiliary verbs. The analysis proposed in Zeijlstra (2008b) brings Standard English in line with the typological generalization, as expressed using a binary parameter.

In contrast to the analysis proposed in Zeijlstra (2008b), many linguists analyze the contracted form of negation as a syntactic head (e.g., Adger 2003). This would make Standard English an exception to Zeijlstra's typological generalization, which proposes that languages with a head form of negation are negative concord languages (Zeijlstra 2004; 2008a; b). Acknowledging this possibility in his dissertation, Zeijlstra remarked that "Standard English is a DN language that shows NC-like behavior and can be considered as a pseudo-NC language" (Zeijlstra 2004: 145). In the remainder of the paper, we will suppose that *n't* is a head form of negation. We will therefore assume that Standard English requires a NegP and we will investigate the consequences of introducing a head form of negation for the course of child language development.

The parameter approach taken by Zeijlstra (2004; 2008a; b) is not without its critics. One line of research notes that there are finer-grained distinctions among negative concord languages that need to be explained. This has led some researchers to propose a micro-parametric account of the syntax of negative concord languages. According to the micro-parametric account, the syntactic properties of *n*-words determine the internal syntactic differences among negative concord languages (Déprez, 2012; Déprez, et al. 2014).

We readily acknowledge the live debate in the theoretical literature about the syntactic analysis of negation and negative concord, including analyses by Blanchette (2013; 2015), Déprez, (2012), Déprez, et al. (2014), Haegeman & Lohndal (2010), and Tubau (2008), among others. The aim of the research on child language that we report in this paper, however, does not depend on the details of the syntax of negative concord or its semantics. It will suffice for our purposes to settle on one sufficiently detailed linguistic theory as a starting point for investigating children's grammatical hypotheses about negative concord and double negation. We have chosen to frame our experimental hypotheses using Zeijlstra's analysis of negation and negative concord because it was invoked in previous research to formulate testable hypotheses about stages in the acquisition of child English. More specifically, Zeijlstra's typological generalization makes a specific prediction about children's initial analysis of negation, and the subsequent stages children go through in converging on the adult grammar of negation (cf. Thornton & Tesan 2007; 2013).

According to Zeijlstra's (2004) typological generalization, if a language has a negative marker that is a syntactic head, then the end-product is a negative concord language. Therefore, if the contracted negative marker *n't* is analysed as a head in English, then Standard English is predicted to be a negative concord language, contrary to conventional assumptions. This led us to consider the intriguing possibility that, when children acquiring Standard English take *n't* to be a negative head, they will assume that English is a negative concord language. This possibility is explored in our experimental study with preschool children. Before introducing the experiment, we will review the findings of previous studies of the acquisition of negation in Standard English. We begin with a review of the seminal work in the acquisition of negation by Ursula Bellugi in the 1960s, and then reformulate the stages of acquisition first documented by Bellugi, to put them in a modern theoretical perspective. Finally, we will see how well children's stages in the acquisition of negation comport with Zeijlstra's negative concord parameter (Zeijlstra 2004).

2 Literature review

The first detailed study of the acquisition of negation by children acquiring Standard English was presented in Bellugi (1967). The Bellugi study examined the transcripts of the spontaneous speech of three children, who have come to be known as the Harvard children (Brown 1973). On the basis of the transcripts of these children's spontaneous speech, Bellugi (1967) distinguished three stages of negation. At the first stage, negation was said to be primitive. Negation was instantiated by the use of *not* (and, to a lesser extent, *no*) at the beginning or the end of what Bellugi termed the nucleus of the utterance, which could be a word, a phrase, or possibly even a sentence. At the second stage of acquisition, negation appeared sentence-internally. As in stage one, children continued to use the negation marker *not* (and *no*) at stage two. Bellugi also reported that, during stage two, the Harvard children produced two negative auxiliary verbs, *don't* and *can't*. Because these children all lacked productive use of the corresponding affirmative auxiliaries *do* and *can* (and other auxiliary verbs) at stage two, Bellugi argued that the negative auxiliaries *don't* and *can't* were analyzed by children as fixed forms (but see Schütze 2010 for an alternative view). Finally, at stage three, children gained productive use of both affirmative and negative auxiliary verbs. According to Bellugi, children at stage three had achieved productive use of sentential negation.

Adopting Zeijlstra's (2004; 2008a) analysis of negation in Standard English, Thornton & Tesan (2013) recast the developmental patterns observed by Bellugi using current linguistic theory. Thornton & Tesan (2013) interpreted children's early negative utterances at Bellugi's stage one and stage two as a consequence of children adopting the default setting of Zeijlstra's negative concord parameter. That is, children were initially analyzing negation markers as adverbs, which is the default value of the parameter. At these early stages, children acquiring Standard English were expected to lack the head form of negation, the contracted form *n't*. Not until Bellugi's stage 3 were children expected to have figured out that Standard English has a negative head. Both of these predictions were confirmed in the Thornton and Tesan investigations. The present study investigates children's interpretations of potentially ambiguous sentences, with more than a single negation marker, once they have acquired the productive use of the contracted negative marker *n't* in negative auxiliary verbs.

If we accept the conclusion that both adverbial negation and a head form of negation co-exist in Standard English, then this suggests Standard English might actually be better characterized as a hybrid language, despite its usual classification as a double negation language. At any rate, from the standpoint of language learning, one of the tasks confronting children is to incorporate the head form of negation into their grammars. If we adopt a (binary) parametric approach, then children will switch the parameter to the value that generates negative concord and eliminate potential double negation once they incorporate a negative head into their grammars. It is worth considering an alternative acquisition scenario, however. On this scenario, children do not simply abandon the parameter value on which negation is an adverb and thereafter analyze negation as a syntactic head. Rather, children maintain adverbial negation, but respond to the presence of *n't* in the input by adding the NegP projection, which in turn facilitates negative concord (cf. Thornton & Tesan 2013). Children's grammars would then have the potential to generate both negative concord and double negation interpretations. We return to the learnability of these two different acquisition scenarios following the experiments, in the concluding section of the paper. However, our experiment with preschool children assumes the first scenario, that children initially access a negative concord grammar.

For children acquiring negative concord dialects of English the triggering evidence informing children that the local language has formal features for negation and the

functional projection NegP is simply sentences with negative concord in the positive input (Zeijlstra 2004). The fact that there are two negative markers informs children that that they need to build a NegP functional projection, to license the negative operator that ‘agrees’ with the *n*-words in negative concord sentences (Zeijlstra 2004; 2008a; b). Acquiring Standard English is not as clear-cut. Since negative concord sentences are not present in the primary linguistic data, children require an alternative source of positive evidence in order to postulate a NegP projection to host the contracted form of negation, *n’t*. One possible source of evidence is negative auxiliary verbs. In principle, any negative auxiliary verb could be taken by children as evidence that *n’t* is a head form of negation. As we saw, however, the negative auxiliary verbs *don’t* and *can’t* may be analyzed as fixed forms by young English-speaking children. Children require clear evidence that the contracted form of negation, *n’t*, is a component part of the negative auxiliary verb. Thornton & Tesan (2007; 2013) proposed that the multi-morphemic negative auxiliary verb *doesn’t* provides the most salient evidence informing children that *n’t* is a head form of negation, given that the 3rd person agreement marker is internal to the word.

Despite the fact that the negative auxiliary verb *doesn’t* is likely to be abundant in the input to English-speaking children, the empirical findings from the Thornton and Tesan (2007; 2013) studies revealed that children often take considerable time before they produce *doesn’t*. Supposing that the productive use of *doesn’t* is indicative of the head form of negation in children’s grammars, the findings from these studies suggest that the NegP projection is introduced into some children’s grammars when they are as young as 2; 6, and others when they are as old as 3;6. Most importantly, the Thornton and Tesan studies documented a dramatic change in children’s grammars closely following on the heels of the productive use of the negative auxiliary verb *doesn’t*. Soon after children began producing *doesn’t*, they abandoned the use of *not* in negative sentences.⁵ Children’s non-adult negative sentences were rapidly replaced by sentences with the same colloquial negative auxiliary verbs used by adults.

This brings us back to the topic of the paper – whether Standard English is inherently a negative concord language. According to Thornton & Tesan (2013), who assume Zeijlstra’s negative concord parameter, once children produce the contracted form of negation, *n’t*, and have added the NegP functional projection, their grammars have the potential to generate negative concord sentences. Previous research provides only anecdotal evidence that English-speaking children generate negative concord sentences, possibly even in the absence of such sentences in the primary linguistic data. Some of the anecdotal evidence can be found in Bellugi (1967), who observed that two of the Harvard children, Adam and Sarah, produced negative concord sentences.

The notes that accompany the Adam corpus state that Adam’s parents spoke Standard English. Sarah came from a working class family and Bellugi observed that Sarah produced some nonstandard lexical items. However, Bellugi does not state whether or not Sarah’s parents were speakers of a negative concord language. This possibility was assessed by Miller (2012) who documented the existence of negative concord sentences in the transcripts of the speech by Sarah’s parents, although Sarah produced far more sentences with negative concord than her parents did. We will therefore consider Sarah to be acquiring a negative concord dialect of English, and Adam to be acquiring a double negation dialect. Examples of negative concord structures produced by Sarah are given in (6), and examples from Adam appear in (7).

⁵ More accurately, children abandoned the use of *not* in sentences where adults prefer to use *doesn’t*. We do not know whether children continue to use *not* in other sentences, such as ones with the copula, where it is natural (e.g. *John’s not a student*). Possibly, children temporarily refrain from using *not* altogether, until they confirm that the local language permits both the head and the adverb forms negation.

- (6) a. She is not having no picnic. (3;11) file 40
 b. I just don't want nothing in there. (4;0) file 42
 c. I don't want to share none of my books. (4;6) file 49
 d. I'm not scared of nothing. (4;7) file 51
- (7) a. I didn't do nothing. (3;5) file 63
 b. I didn't call him nothing. (3;8) file 72
 c. Because nobody didn't broke it. (4;5) file 107
 d. I don't think I can do this no more. (4;8) file 121

As noted earlier, sentences with negative concord are equivalent in meaning to sentences that contain existential expressions in the same position as *n*-words. For example, on the negative concord interpretation, the sentence *I didn't see nobody* is truth-conditionally equivalent to the sentence *I didn't see anybody*. To investigate the parallels between Sarah's use of negative expressions and her use of existential expressions, Miller (2012) searched Sarah's transcripts for sentences with the negation markers: *no*, *no one*, *nobody*, *nothing* and *none*, as well as for sentences with the corresponding existential expressions, *any*, *anyone*, and *anything*. The main finding was that Sarah used negative concord sentences with negation markers 65.43% of the time, whereas she produced negative sentences with existential expressions 34.57% of the time. Sarah clearly distinguished negative concord from negative sentences with existential expressions, and she preferred to use negative concord sentences, at the rate of about 2:1. Interestingly, Sarah's parents exhibited the opposite pattern. They produced negative sentences with existential expressions, such as *any*, more frequently than negative concord sentences. Miller speculates that Sarah's parents favored existential expressions over negative concord structures because they knew they were being recorded. If so, the transcripts of Sarah's parents may underestimate the input of negative concord sentences that Sarah was exposed to. The same does not apply to Adam, however, since Adam's parents reportedly spoke Standard English.

Some further support for the conclusion that negative concord could be a default sentence structure comes from the findings of two studies of 5-year old children acquiring African American English in a study by Green (2011) and in another study by Coles-White (2004). The findings of these investigations indicate that, by age 5, children command productive use of sentences with negative concord, and access negative concord interpretations of sentences with two negation markers. There is no discussion of the age of first emergence, however. Sentences with negative concord have also been documented in children acquiring Belfast English (Henry et al. 1997) and Bristol English (Wells 1981). A study by Henry et al. (1997) reports that children acquiring Belfast English produce sentences with negative concord at 3;3 years of age, while sentences with negative concord do not appear in the speech of children acquiring Bristol English until 4;6 years. The findings to date, therefore, do not permit us to paint a clear picture of the emergence of negative concord structures in child language, so the jury is out as to the status of negative concord sentences in the grammars of children acquiring Standard English.

Turning to double negation sentences, Bellugi (1967) reports that she did not find a single sentence of this kind in the transcripts of the three children she studied. Likewise, children in the Coles-White (2004) study showed a marked preference for the negative concord interpretation of potentially ambiguous sentences. It is of interest that there was no significant difference in the children who spoke Standard American English and

African American English. The fact that the children preferred the negative concord interpretation was taken by Coles-White to suggest that children find it difficult to compute double negation interpretations due to their inherent complexity. For this reason, Coles-White speculates that “redundant information is easier to process than additional negative information” (Coles-White 2004: 218).

The possibility that children find double negation interpretations more difficult than negative concord interpretations was also raised in a study by Jou (1988). The Jou study tested children acquiring Mandarin Chinese, a double negation language. The main finding was that children younger than 7-years-old had difficulty computing an interpretation for sentences with two negation markers. However, a later study by Zhou et al. (2014) found that, with appropriate contextual support, even 5-year-old Mandarin speaking children were able to access the double negation interpretation of sentences with two negation markers. Nevertheless, it is important to be cognizant of the difficulties that children may experience in attempting to compute the meanings of sentences with more than one negation, at least in the absence of contextual support. This factor will be incorporated into the control items in our experiment.

Based on the findings from the previous literature on the acquisition of negation, we cannot reach a definitive conclusion about the relationship between negative concord sentences in the parental input and in the spontaneous speech of children acquiring Standard English. We addressed this issue in the experiment described in the next section.

3 Experiment

Previous research in theoretical linguistics by Zeijlstra (2004), Tubau (2008) and Blanchette (2013; 2015) all raises the possibility that Standard English is underlyingly a negative concord language. Building on previous research by Zeijlstra, our experimental hypothesis was that, once children acquiring English have added the contracted negative marker *n't* into their grammars, they are capable of assigning negative concord interpretations to sentences with two negations inside the same clause.

The experimental hypothesis anticipates that when children are presented with sentences that are ambiguous between a negative concord interpretation and a double negation interpretation, preschool children may assign negative concord interpretations of ambiguous sentences, whereas adults will assign double negation interpretations. The null hypothesis is that English is a double negation language for both children and adults. If so, then both children and adults are expected to assign the same double negation interpretations to the potentially ambiguous test sentences presented in the experiment. One might expect moreover, on the null hypothesis, that children would assign double negation interpretations even more often than adults do, since adults will have had more exposure to negative concord interpretations, in the media, for example.

Potentially ambiguous test sentences were used to probe the interpretations assigned by both children and adults. The test sentences contained two negative markers, sentential negation followed by *nothing*. An example is (8).

- (8) The girl who skipped didn't buy nothing.
- a. The girl who skipped bought something. (DN)
 - b. The girl who skipped bought nothing. (NC)

As indicated in (8a) and (8b), the test sentences were potentially ambiguous between a double negation (DN) interpretation and a negative concord (NC) interpretation, and the experimental contexts provided the requisite support for both of these interpretations. If children acquiring Standard English initially adopt a grammar that generates negative

concord interpretations, children should be expected to assign the interpretation in (8b). However, if children acquiring Standard English initially posit grammars that do not permit negative concord just like Standard English speaking adults, both children and adults should assign double negation interpretations as in (8a).

The study included a control condition, which incorporated sentences with two negation markers such as (9). These sentences evoked neither a double negation interpretation nor a negative concord interpretation. The control sentences were designed to see whether or not the child participants experience difficulties in processing sentences that contain two negations. That is, the control sentences contained two negative markers, but did not license a (pragmatic) double negation interpretation.⁶

(9) The girl who didn't skip bought nothing.

The control sentences were designed to resemble the test sentences as closely as possible. The main difference is the surface syntactic position of the two negative markers. In the test sentences, both negative markers appear in the main clause (i.e., . . . *didn't buy nothing*). However, in the control sentences, one negative marker appears in the main clause, and the other appears inside the relative clause (i.e., . . . *who didn't V bought nothing*). By positioning the negative markers in different clauses, the *n*-word *nothing* exerts independent quantificational force. Thus, in our control sentences, even though there are two negative markers, the main clause contained just one negation, and a pragmatic double negation reading is excluded. We were led to predict, therefore, that children whose grammars assign a negative concord interpretation to the test sentences, such as (8), should, nevertheless, assign the same interpretation as adult speakers of Standard English do to control sentences like (9).

The control sentences were introduced to exclude two possible confounding factors. Based on either of these factors, children might produce responses that appear to be derived by a negative concord grammar when, as a matter of fact, children's grammars only licensed double negation interpretations. One source of children's apparent, but not real, negative concord responses could stem from difficulties they experience in interpreting sentences that contain two negative markers, due to processing limitations such as verbal working memory (cf. Déprez, et al. 2015). The control sentences were included to guard against this possible source of children's non-adult responses to the test sentences.

The control sentences enabled us to control for another possible confounding factor. This is the possibility that children mistakenly analyze the word *nothing* as an existential expression, with a meaning equivalent to *something* or *anything*. Children's adult-like interpretations of words like *nothing* in control sentences like (9) would nullify this possibility. Correct responses to the control sentences would demonstrate that children, like adults, know that words like *nothing* exert independent semantic force, unless they agree with a second negation in the same clause. If children acquiring Standard English correctly interpret the word *nothing* in sentences like (9) but, nevertheless, take it to be an agreeing negative element in sentences like (8), then this would add to the weight of the evidence that children acquiring English initially posit a grammar that licenses negative concord interpretations.

In summary, children's correct responses to the control sentences indicate, first, that they are able to process sentences with two negations and, second, that they do not analyze words like *nothing* as existential expressions (*something, anything*). If we assume that

⁶ According to Blanchette's (2015) terminology, the control sentences are instances of long distance double negation.

children initially have a negative concord grammar, then the fact that words like *nothing* exert independent semantic force in the control sentences provides children with evidence (what are called detectable errors in the learnability literature) that they must jettison their initial negative concord grammar in favor of a double negation grammar. Further evidence is provided by filler items that were included in the experiment. There were 3 simple sentence fillers like (10) included in the test battery for the participants; the other 3 fillers contained *something*.

(10) The boy bought nothing.

In the filler sentence in (10), the word *nothing* has independent negative quantificational force. According to the experimental hypothesis, the child participants were predicted to assign a negative concord interpretation to the test sentences. We also anticipated that children would assign an adult-like interpretation to filler sentences such as (10) because there is no obvious way for children to ‘misinterpret’ them. Therefore we predict that children will successfully compute an adult-like interpretation for the filler items, but may generate a non-adult (negative concord) interpretation of the test sentences. If this pattern is obtained, then this would support the conclusion that children’s grammars permit a negative concord interpretation of the test sentences, but are not unduly influenced by the burden of processing sentences with two negation markers.

Because the control sentences and the filler sentences use words like *nothing* that have independent negative semantic force, these materials potentially bias the child participants towards assigning a double negation interpretation of the test sentences, if this interpretation was possible in their grammars. Putting it the other way around, the control sentences and fillers disfavored the experimental hypothesis, thereby reducing the likelihood of a Type 1 error.⁷

We wish to note one further feature of our experimental design that was included to avoid Type 1 errors. We presented the test sentences to both children and adults with neutral prosody. Previous research has found that children are not sensitive to prosodic cues as an indication of the speaker’s intended meaning, whereas adults are highly sensitive to such cues (e.g., Halbert et al. 1995; Gualmini et al. 2003). Therefore, the presence of prosodic cues would be unlikely to influence children’s interpretation of the test sentences, but would have had a strong influence on the interpretations assigned by adults. Had we chosen to use the prosody typically associated with the double negation interpretation in the test sentences, then adults (but not children) would have been biased to assign the double negation interpretation (cf. Pilar et al. 2015). To avoid a Type 1 error, we used neutral prosody. In fact, it has been suggested by Blanchette (2013) that, in the absence of stress on the second negative marker, adults favor a negative concord interpretation. If this is correct, then the experiment biased adults, but not children, towards a negative concord interpretation. The experimental hypothesis was, Blanchette’s suggestion notwithstanding, that adults would assign double negation interpretation to the test sentences, whereas children would assign a negative concord interpretation.⁸

3.1 Participants

Twenty-four English-speaking children participated in the experiment. The children ranged in age from 3;6–5;8 with a mean age of 4;7. The children were recruited from three child care centers situated either on the university campus or close by, and all of the

⁷ A Type 1 error is committed when an experiment is designed so that the experimental hypothesis is favored.

⁸ As a reviewer points out, we do not yet have information from experimental investigations about the degree to which intonation does or does not influence double negation interpretations in either adults or children, so this remains a question to be answered in future research.

children were monolingual speakers of Australian English. Australian English conforms to other global versions of Standard English in disallowing negative concord (Newbrook 2001). We had no reason to believe that any of the child participants were exposed to negative concord in the home. The adult controls who participated in the study were 15 undergraduate students at the same university. The adult participants all completed a language background questionnaire, and only those adult participants who were monolingual speakers of Australian English from birth were included in the study. All of the adult control participants were taking a first-year linguistics course, and received course credit for their participation.⁹

3.2 Procedures

The task used to probe children's interpretations of sentences with two negative markers was the dynamic version of the truth value judgment task (Crain & Thornton 1998). The truth value judgment methodology involves two experimenters. One experimenter acts out stories with toy characters and props, and the other plays the role of a puppet who watches the stories alongside the child. In the version of the task used in this experiment, the experimenter acting out the stories posed a series of three questions to the puppet, and the puppet provided answers to these questions. After the puppet produced each answer, the child was asked if the puppet had given the right answer or not. The child's 'Yes' or 'No' responses were taken as indications of how the child understood the experimental context. If the child informed the puppet that he was wrong, then the child was asked to explain to the puppet "what really happened" in the story. The child's judgment of the sentence as true ("Yes") or false ("No") and the child's justification of their rejections of the target sentences were used to infer if the child had accessed the negative concord interpretation or the double negation interpretation.

The experimenter who played the role of the storyteller did not describe the stories from their own perspective. Rather, the storyteller acted out the story and made the characters do the talking as the events unfolded in real time. This meant that the storyteller experimenter memorized the dialogue ahead of time, and did not read it verbatim. This step was important to engage the child participants. The experimenter playing the role of the puppet delivered the test sentences individually for each child with a neutral intonation contour. Again, to keep the child engaged, we chose to deliver the test sentences live, rather than to pre-record them, and play them back on a recording device. In this way, we could ensure that the puppet responded to the experimenter's questions immediately. Any delay would have made it difficult for the child to maintain the test sentences in working memory, in order to judge their truth or falsity.

Before commencing a test session, each child subject was introduced to our puppet and given two practice items. On one practice item our puppet made an obviously true statement about a story, and on the other he made an obviously false statement about the same story. This was so that the child subjects would know that the puppet could say something wrong and to familiarize them with the task. Provided that the children performed correctly on the practice items, the child proceeded to the main task. The children were tested individually and their spoken answers were audio recorded for later analysis.

The adult participants were tested on the same experimental stories in small groups rather than individually and they recorded their judgments of the puppet's statements as true or false on a written score sheet. As with the child participants, the adult participants were asked to judge the truth of scenarios acted out with toys and props. At the start of

⁹ The study was approved by the Human Research Ethics Committee at Macquarie University (Reference No. 5201200478), and all participants (or their parents) gave consent to participate.

the session, following common practice, we explained to the adult participants that the experiment was designed as an experiment for children, and that we wanted them to see the same stories that we presented to children, so that we could compare children's responses to those of adults. We did this because we wanted both children and adults to be presented with the identical materials under the same conditions. A potential confound is that adults' responses could have been influenced by any social stigma that adult participants might have associated with negative concord sentences.¹⁰

3.3 Materials

The experimental task consisted of 6 stories, each built around a theme such as animal preschool, the princesses' party and so on. Each story was followed by 3 items for the child to judge; a target sentence like (8), a control sentence like (9) and a filler item like (10). The stories devised for the test sentences were divided into 2 conditions. In one condition, the test sentence at the end of the story was true on a double negation interpretation, but false on a negative concord interpretation. This condition is called Condition 1. In the other condition, the test sentence was true on a negative concord reading, but false on a double negation interpretation. This is called Condition 2. There were 3 test trials in each condition.

The control sentences were designed to ensure that children were able to process sentences with 2 instances of negation. There were 3 true controls and 3 false control sentences. The filler items were simple affirmative or negative sentences that provided an equal number of "Yes" and "No" responses. The experimental items are given in Appendix A.

First, we will illustrate the experimental materials using an example story from each condition. Below, we give the plotline. The detailed scripts for the stories are provided in Appendix B.

3.3.1 Condition 1: Double Negation True, Negative Concord False

Two 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 to the flower shop she meets a friend at a café 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 café (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.

The situation at the end of this story is illustrated in Figure 1 below.

After this story the puppet was asked an explicit yes/no-question, to which he replied using one of our test sentences, as in (11). This satisfied the presupposition for double negation, that is, that there was someone who may have bought nothing and that this is being challenged.

- (11) Experimenter: In that story, did the girl who skipped buy nothing?
 Puppet: The girl who skipped didn't buy nothing.

¹⁰ As an anonymous reviewer pointed out, this experimental procedure does not build in an assessment of whether adults' responses are influenced by a prescriptive ban against negative concord in Standard English. Further studies using more sensitive dependent variables (e.g. reaction times, eye-movements) could help to add more evidence about the time-course of processing our experimental sentences and their status in the adult grammar.



Figure 1: The final scenario for the story *The girl who skipped didn't buy nothing*.

In Condition 1 stories, the puppet's statement was true on a double negation reading; it was true that the girl who skipped had bought something. In addition, the sentence was false on a negative concord reading; it was false that the girl who skipped bought nothing. Since the double negation reading was the "Yes" answer, it was assumed that children would access this reading if it was available, in accord with the Principle of Charity. The Principle of Charity is a pragmatic principle according to which hearers assume that speakers' statements are true, unless there is evidence to the contrary (Davidson 1984).

3.3.2 Condition 2: Double Negation False, Negative Concord True

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 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 decides not to cook, and to wait until morning tea.

The situation at the end of this story is illustrated in Figure 2 below.

After this story our puppet was again asked an explicit yes/no-question, to which he replied using one of the test sentences, as in (12).



Figure 2: The final scenario for the story *The mouse who dressed up didn't cook nothing*.

- (12) Experimenter: In that story, did the mouse who dressed up cook nothing?
 Puppet: The mouse who dressed up didn't cook nothing.

In Condition 2 stories, the puppet's statement was true on a negative concord reading (it was true that the mouse who dressed up cooked nothing) and false on a double negation reading (it was false that the mouse who dressed up cooked something). For Condition 2 items, it was assumed that if negative concord reading was part of children's grammars, they would say "Yes" to such items, again, due to the Principle of Charity. On the other hand, if negative concord is a learned peripheral structure for children acquiring standard English, then children would not access this interpretation. Instead they would access the double negation reading, which, as noted, was a false description of the events that transpired in the story.

Notice that each of the 6 test sentences was preceded by an explicit Yes/No-question. This was to ensure that both potential interpretations would be contextually appropriate and available to children. The rationale behind using an explicit question is based on the Question-Answer Requirement (QAR) (Gualmini et al. 2005; 2008; Gualmini 2007). The QAR model was proposed as a means of explaining why children may access only one particular reading of a scopally ambiguous sentence. It was suggested that children only access readings that constitute good answers to some salient question-under-discussion in the relevant context. If one of the potential readings of a test sentence does *not* appropriately answer the question made salient by the context, then it was suggested it would simply not be available to children. To ensure that both potential readings are available, both readings should constitute good answers to a clearly defined question under discussion. In the case of a yes/no-question, Gualmini and colleagues define a good answer as an assertion that entails either the "Yes" or "No" answer to the question.

As a precaution, we extended the question-answer requirement for scopally ambiguous sentences to include the kinds of ambiguous sentences that were presented to participants in our experiment. Notice that both of the interpretations of the test sentences in the present experiment constitute good answers to the explicit Yes/No-questions used in (11) and (12). For example, if the test sentence (11) is taken to represent a correction of the previous utterance, it would be interpreted to mean that the girl who skipped bought something. This interpretation requires an affirmative answer to the question *Did the girl who skipped buy nothing?* On the other hand, if (11) is taken to mean that the girl who skipped bought nothing, then this would generate a negative response to the question. The reverse pattern of responses is expected for test sentence (12). If (12) is understood to mean that the mouse who dressed up cooked something, then this requires a negative answer to the question *Did the mouse who dressed up cook nothing?* On the other hand, if (12) is understood to mean that the mouse who dressed up cooked nothing, then this would result in an affirmative answer. By using an explicit question-under-discussion, we could be sure that both readings of our test sentences were potentially available.

We also ensured that the context preceding our stories made it clear why each test sentence would be true or false on each available reading. This is an essential part of the truth value judgment task (TVJT) methodology and is called the condition of plausible dissent (Crain & Thornton 1998). The condition of plausible dissent was originally proposed to apply to test sentences that were false in a given context. It was suggested that children could erroneously accept these false test sentences, despite knowing the relevant grammatical principle under investigation, if the context did not provide a clear reason for denying the sentence. To guard against this, TVJT stories should outline a possible outcome, different from the actual outcome, on which a false test sentence would have been true. A natural extension of this design feature would be to also make clear the reason for accepting a true test sentence by outlining a possible outcome, different from the actual outcome, on which the sentence would have been false.

To make it clear to the child participants why the experimental sentences were true or false, we made sure that our stories always included a possible outcome that differed from the actual outcome on both possible interpretations of the test sentences. For example, in the skipping story in Condition 1, it was possible that the girl who skipped would buy nothing. This possibility arose because, at the beginning of the story, this girl decided to stay at home to practice skipping tricks instead of going to buy flowers. On this possible outcome, therefore, the double negation interpretation of the test sentence would have been false, while the negative concord interpretation would have been true. However, by the conclusion of the story, it had turned out that the girl who skipped did buy something. This verified the double negation interpretation of the test sentence, and falsified the negative concord interpretation. Similarly, in the animal preschool story in Condition 2, it was possible that the mouse who dressed up would also cook something. This possibility arose because the mouse finished dressing up before morning teatime. On this possible outcome, the double negation interpretation of our test sentence would have been true, while the negative concord interpretation would have been false. However, it turned out that the mouse who dressed up only wanted to make fruit salad, and there was no toy fruit available, so the mouse decided not to cook in the end. This actual outcome verified the negative interpretation of the test sentence, but falsified the double negation interpretation.

3.3.3 Control Sentences and Filler Sentences

The control sentences were designed to ensure that the test sentences were not too complex for the child participants to process, in virtue of having two instances of negation. If the test sentences exceeded children's computational resources, then it was likely that the control sentences would also. In this case, children might just ignore one of the negations.

In Condition 1, for example, children whose computational resources had been exceeded would be expected to interpret the test sentence *The girl who skipped didn't buy nothing* to mean either that the girl who skipped bought nothing, or that the girl who skipped didn't buy something/anything. On both of these interpretations, the sentence would be judged to be false. Because the test sentences were false in Condition 1, on the negative concord interpretation, we would not be able to infer that children's grammars were the source of their negative concord responses. Similarly, if children were unable to process both of the negative markers in Condition 2, they would judge the test sentences to be true. Again, children's responses could not be attributed to a negative concord grammar.

These considerations underscore the importance of the control sentences in determining the source of children's responses to the test sentences. As with the test sentences, the control sentences were preceded by a question, as illustrated in (13).

- (13) Experimenter: Did the mouse who didn't dress up cook nothing?
 Puppet: The mouse who didn't dress up cooked nothing.

The children could only answer these control items correctly if they processed both negations. For example, in the animal preschool story, it was false that the mouse who didn't dress up cooked nothing. As a matter of fact, he cooked some pizza. However, if children ignored one of the negations in this control sentence, then they might interpret it to mean that the mouse who dressed up cooked nothing. Alternatively, children could interpret the control sentence to mean that the mouse who didn't dress up cooked something. On either of these interpretations, the control sentence would be judged to be true.¹¹ Thus, the finding that children could answer the control sentences correctly would rule out the possibility that children simply ignored one of the negative markers in the test sentences, due to their limitations in computational resources.¹²

Finally, each test story also incorporated a filler item. This was done to provide an equal number of Yes and No responses, and to ensure that children were presented with some easy judgments, in addition to the learnability consideration we discussed earlier, in Section 2. The fillers were either positive statements (3 fillers), or statements with a single negation (3 fillers). Example (14) illustrates a filler item with a single negation, from the skipping story in Condition 1.

- (14) Experimenter: Did the boy buy something?
 Puppet: The boy bought nothing.

Because the boy in the skipping story did buy some flowers, this filler question was clearly false.

¹¹ Other control structures are possible, for example *It is not true that the mouse who dressed up cooked nothing*. In such sentences, the two negations reside in separate clauses and cancel each other out, yielding an affirmative meaning that can be paraphrased as *It is true that the mouse who dressed up cooked something*. We decided against using such control sentences in order to keep the same basic structure in both the test sentences and the control sentences; both contain one main clause in which the subject phrase is modified by a relative clause. These controls allowed us to ascertain that children do not simply ignore one of the negative markers, in sentences with more than one. In fact, the ability to access a double negation meaning was not related to age. We refer the reader to the results section for further details.

¹² We also made sure that our stories always outlined a possible outcome that differed from the actual outcome for these control sentences. For example, in our Condition 1 skipping story, it was possible that the girl who didn't skip would buy something because she went straight out to the shops at the beginning of the story. This would have made the control sentence *The girl who didn't skip bought nothing* false. However, by the end of the story, it turned out that she bought nothing because the flower shop had run out of flowers. This made the sentence clearly true. Similarly, in our Condition 2 animal preschool story, it was possible that the mouse who didn't dress up would cook nothing because he was missing a dish to put his pizza in. This would have made the control sentence *The mouse who didn't dress up cooked nothing* true. However, because the teacher found him a spare dish in the storeroom, he did end up cooking something after all. This made the sentence clearly false.

4 Results

Four of the 24 child participants were excluded from the analysis. Three of these children failed to perform successfully on at least 3 of the 6 control sentences and one child failed to answer the questions. Given the complexity of the test sentences and the control sentences, it is not surprising that a few children failed to successfully comprehend the control sentences. The 20 remaining children completed the experiment and their data were included in the analysis. These children ranged in age from 3;7 to 5;8, with a mean age of 4;9. The 15 monolingual adults all passed at least 3 of the control items, and all of them were included in the analysis.

The main findings are summarized in Figure 3. This figure indicates the percent of children’s adult-like responses to the test sentences, where double negation interpretations are considered adult-like responses. In this figure, the proportion of adult-like responses includes both Yes and No responses. The adult participants produced double negation responses to the test sentences 82% of the time, whereas children produced double negation responses only 25% of the time. (As we will see shortly, 2 adults did not access double negation responses.) Figure 3 indicates that both children and adults showed a similar pattern of responses to the control sentences, with both groups performing well above chance. Children responded correctly to the control sentences 84% of the time, and adults responded correctly 94% of the time. In view of the child participants’ high proportion of adult-like responses to the control sentences, it is reasonable to infer that children do not have difficulties in computing interpretations for sentences that contain two instances of negation.

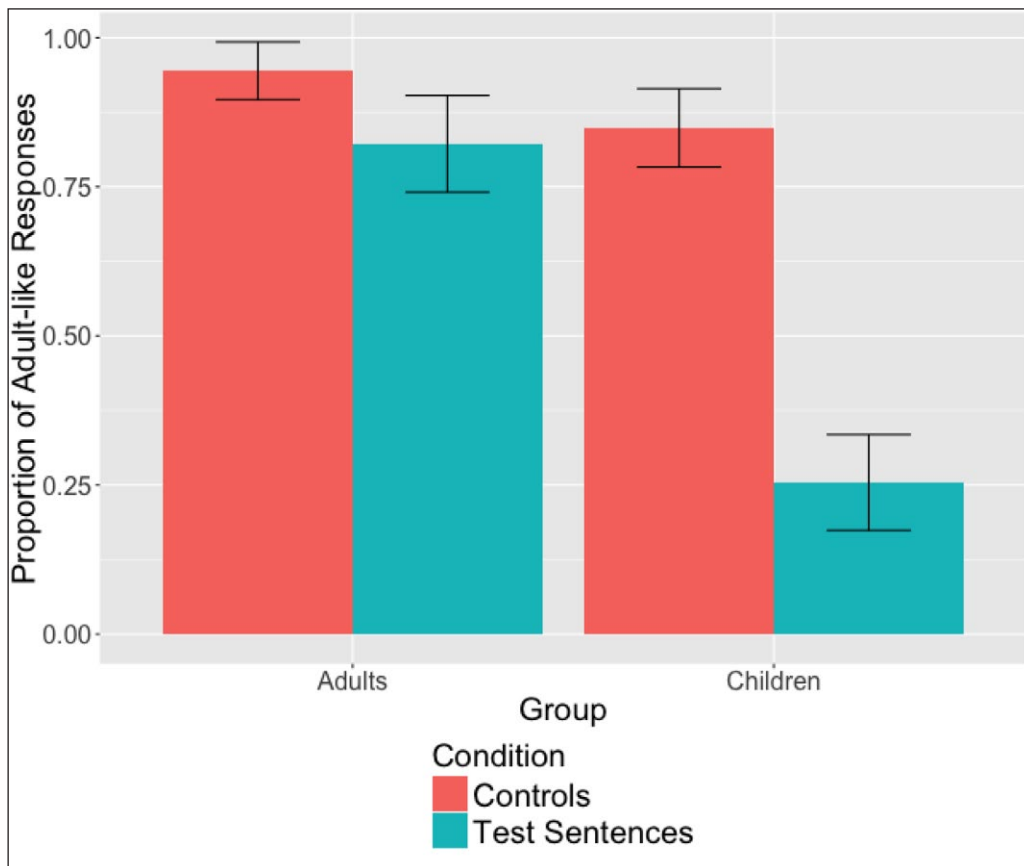


Figure 3: Proportion of Adult-like Responses by Group and by Condition (Control Sentences versus Test Sentences).

	Estimate	Std. Error	z value	Pr (> z)	
(Intercept)	4.2193	0.7806	5.405	6.48e-08	***
Child. vs Adults	-1.6541	0.9233	-1.791	0.07322	.
Cond_DN vs Controls	-1.7841	0.6848	-2.605	0.00918	**
Child/DN vs Adults/DN	-2.3379	0.8061	-2.900	0.00373	**

Table 1: Analysis using generalized mixed effects models.

Significance codes: '***'p < 0.001, '**'p < 0.01, '.'p < 0.1.

Correct ~ Group * Condition + (1 | Item) + (1 | Subject).

For statistical analysis, we used generalized linear-mixed-effects-models (Baayen 2008) implemented in R using the lmer function. There were two fixed factors and two random factors. One fixed factor was Condition, which contrasted the Test Sentences versus the Control Sentences. The other fixed factor was Group. The two random factors were Participants and Items.

The results of the analysis are summarized in Table 1. As the table indicates, there was a main effect of Condition, and a significant interaction between Condition and Group. This interaction confirmed that, as compared to the adults, the child participants produced a lower proportion of responses that were consistent with a double negation grammar in the Test conditions. The analysis also revealed a marginally significant effect of Group.

We will now separate the participants' responses in order to distinguish between the alternative truth-values that were associated with double negation interpretations in Condition 1 and in Condition 2. In Condition 1, the test sentences were true descriptions of the events that took place in the stories on the double negation interpretation, but were false descriptions of these events on the negative concord interpretation. Both groups responded to 3 Condition 1 test sentences. The group of 15 adult speakers of Standard English accepted the test sentences in Condition 1 80% of the time (36/45). By contrast, the 20 child participants accepted the test sentences only 26% of the time (16/60), rejecting them 72% of the time (43/60).¹³ The high rate of rejection of the test sentences by the child participants in Condition 1 suggests that they accessed the negative concord interpretation of the test sentences, whereas adults accessed the double negation interpretation in the same situation.

In (15), we illustrate a typical interaction with a child who judged the test sentences to be false in Condition 1. In (16), we provide a representative sample of the justifications children gave for rejecting the test sentences in Condition 1, using the skipping story that was associated with the test sentence *The girl who skipped didn't buy nothing*.

- (15) Experimenter: Did the girl who skipped buy nothing?
Puppet: The girl who skipped didn't buy nothing.
Child: Yes, he – she did. (P., 4;11)
Puppet: Oh so was I right or wrong?
Child: Wrong.
- (16) a. No. She did buy something. (A., 5;2)
b. The girl who skipped, she wanted to take to her mum so she got some flowers. (H., 4;10)
c. Her bought some flowers for her mum's birthday. (Z., 4;9)
d. She bought these flowers, Owl. (A., 4;9)
e. She bought some flowers. (F., 4;9)

¹³ One child was responsible for the remaining 2% of responses. This child only produced a judgment on one trial.

In Condition 2, the negative concord interpretation made the test sentences true, and the double negation interpretation made the test sentences false. The control group of 15 adult speakers of Standard English accepted the test sentences in Condition 2 16% of the time (7/45). This pattern of responses is consistent with a double negation interpretation of the test sentences. The child participants accepted the test sentences 75% (45/60) of the time, rejecting them 23% of the time in this condition (14/60).¹⁴ The pattern of responses by the child participants suggests that they accessed a negative concord interpretation, in contrast to adults in this experimental context.

In (17), we provide a representative sample of children's reasons for rejecting the test sentences in Condition 2, using the 'dress up' story that was associated with the test sentence *The mouse who dressed up didn't cook nothing*.

- (17) a. You're wrong Owl [puppet]. . . She didn't cook anything. (L., 5;1)
 b. He got dressed up Owl. Oh, he just got dressed up. (R., 4;10)
 c. Coz he didn't cook anything. (S., 4;8)

The different patterns of responses by the child and adult groups are summarized in Figure 4. As the figure clearly indicates, Condition 1 sentences that made the double negation interpretation true were judged to be true by adults but children mostly judged the test sentences to be false. Likewise, when the double negation interpretation made the test sentence false for adults, children judged them to be true. The adult control group produced exactly the reverse pattern. This pattern of responses by the child participants is consistent with the experimental hypothesis that children acquiring Standard English go through a stage in which they posit a grammar that licenses a negative concord interpretation of the test sentences.

The individual subject data for the test sentences and the control sentences is shown in Figure 5. Responses to the control sentences for adults and children are shown on the left panel of Figure 5. The right panel classifies the individual participants according to their preference for one interpretation of the test sentences over the other, with the data from Condition 1 and Condition 2 combined. The double negation interpretation is the baseline adult response, so a participant who preferred the double negation interpretation is positioned towards the top of the right panel in Figure 5, and a participant who preferred the alternative negative concord interpretation is positioned towards the bottom.

We partitioned child and adult participants into groups according to their preference for one interpretation over the other. A participant was judged to have a preference for one of the two kinds of interpretations if their responses were consistent with that interpretation on at least 5 out of the 6 test trials. Using this criterion, 15 children exhibited a preference for the negative concord interpretation, 3 preferred the double negation interpretation, and 2 children had no preference. In contrast to the child group, the same criterion resulted in 13 adults being classified as having a preference for the double negation interpretation, and 2 exhibited a preference for the negative concord interpretation.

Finally, we report the pattern of responses by children and adults to the filler items. We proposed that filler items with the negative quantifier *nothing* provide critical evidence to children that Standard English is a double negation language, keeping in mind our assumption for the purposes of the experiment that children's grammars generate only negative concord interpretations at this point in their development. Nevertheless, we expected children to produce adult-like responses to these items. As we anticipated,

¹⁴ Again, the remaining 2% of responses were due to the one child who made only one judgment.

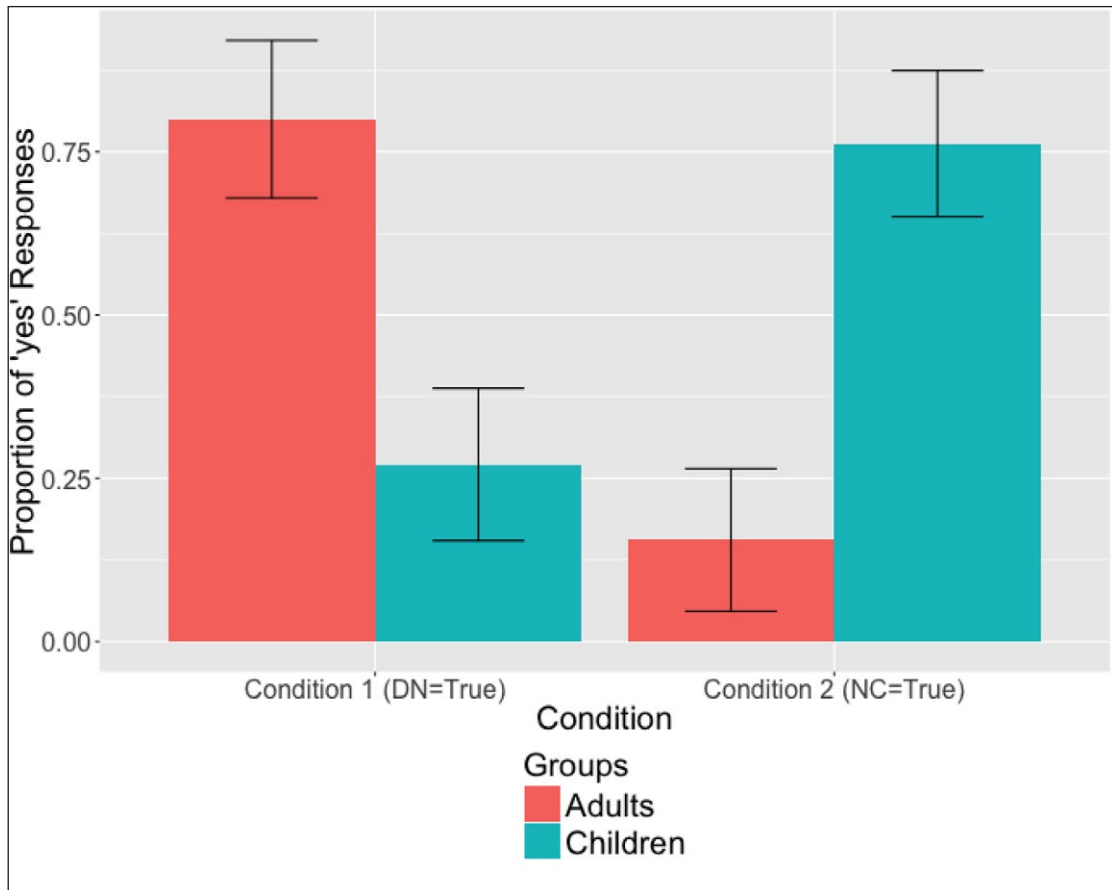


Figure 4: Proportion of 'yes' Responses by Group for the two types of test sentences: Condition 1 (DN = True/ NC = False) and Condition 2 (NC = True/ DN = False).

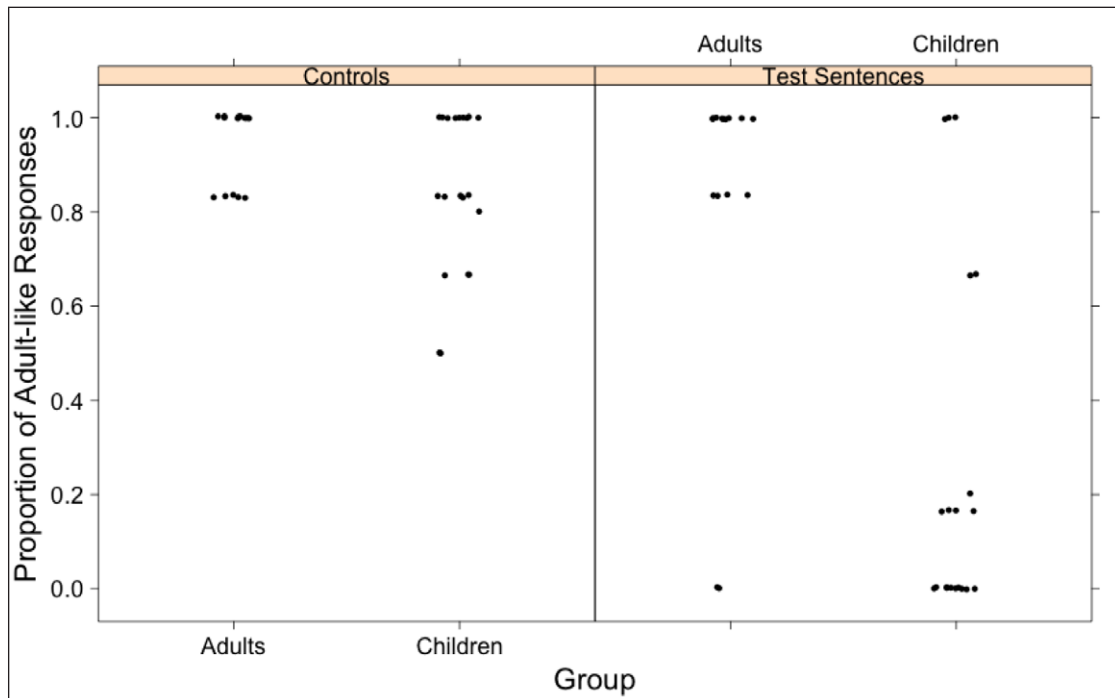


Figure 5: Responses to the Control sentences and the Test sentences by Group.

children rejected the false fillers 97% (57/59) of the time. Adults rejected them 96% (43/45) of the time. Both child and adult participants also responded accurately to the true fillers with the lexical item *something*; children responded correctly 98% (59/60) of the time, and adults 96% (43/45) of the time.

5 Discussion

Several theoretical linguists have raised the possibility that Standard English is underlyingly a negative concord language (Zeijlstra 2004; Tubau 2008; Blanchette 2013; 2015), although theories differ in their views of why negative concord is not represented in adults' productions. In earlier work, Thornton & Tesan (2013) had suggested that children acquiring Standard English have the linguistic resources for computing negative concord interpretations, at the stage at which they have acquired the head form of negation. This proposal was the basis of our experimental study of children acquiring Standard English. Condition 1 presented the participants with stories that made the test sentences true on the negative concord interpretation, but false on the double negation interpretation. In Condition 2, the double negation interpretation made the test sentences true, and the negative concord interpretation made them false.

Adult speakers *accepted* the test sentences when the double negation interpretation, but not the negative concord interpretation, generated a true description of the events that had taken place in the stories (Condition 1). More importantly, adults *rejected* the test sentences when the negative concord interpretation, but not the double negation interpretation, made the sentences true (Condition 2). Perhaps this pattern of responses by adults is not surprising, since Standard English is a double negation language, and does not allow negative concord interpretations. However, double negation interpretations are typically associated with phonological stress on the second negative marker, and this cue was not provided in the experiment. As we noted earlier, Blanchette (2013) suggested that adults could be expected to default to negative concord interpretations in the absence of this phonological cue. However, this did not prove to be the case in the present experiment. Despite the assignment of neutral prosody to the test sentences, 13 of the 15 adult participants consistently accessed double negation interpretations.¹⁵

Children exhibited the opposite pattern of responses to the test sentences. Children *accepted* the test sentences when the negative concord interpretation, but not the double negation interpretation, generated true descriptions of the events that had taken place in the stories (Condition 1). More importantly, children *rejected* the test sentences when the double negation interpretation generated true descriptions (Condition 2). Despite having to reject the test sentences on half of the target trials, children nevertheless opted for negative concord interpretations in both conditions.

From a processing complexity perspective, it is generally assumed that it is easier to access an interpretation of an ambiguous sentence that makes the sentence true rather than one that makes it false. This is the foundational assumption of what is called the Principle of Charity (Davidson 1984). The Principle of Charity explains why people exhibit a "Yes" bias in many psychological tasks. When confronted with an ambiguous sentence, for example, hearers make an effort to come up with an interpretation that makes the sentence comport with reality, whenever possible. Children's rejections of the puppet's statements in Condition 2 constitute apparent violations of the Principle of Charity. It has been argued that violations of the Principle of Charity are evidence that, as a matter of

¹⁵ A reviewer notes that adult participants' preference for the double negation interpretation may have been elevated by the fact that adults who are tested in academic settings are conscious of the social stigma associated with negative concord interpretations.

fact, the participants did not find the sentences ambiguous, but were only able to generate an interpretation that made the puppet's statement false (Crain & Thornton 1998). If so, the fact that most children consistently rejected the test sentences in Condition 2 suggests one of two possibilities. One possibility is that children's grammars were unable to generate double negation interpretations; only negative concord interpretations were available. The second alternative is the children's grammar generates both negative concord and double negation interpretations, but an extra-linguistic factor is operative that overrides the Principle of Charity. We will consider these alternatives in more detail in the next section.

6 Learnability

The present experimental study was designed to investigate the possibility that children acquiring Standard English initially hypothesize a grammar that generates negative concord interpretations for sentences that are assigned double negation interpretations by adult speakers. Based on previous research, we were led to suppose that children acquiring English begin with the adverbial form of negation. Once children analyze *n't* is a separate morpheme, they hypothesize that English has a head form of negation, and add the NegP projection to their grammars. At that point, in principle, children's grammars potentially generate negative concord sentences. The finding from the present study was that children acquiring Standard English readily accessed negative concord interpretations. This finding supports the proposal we began with – that Standard English is, in some sense, inherently a negative concord language. As attested by children's responses in the experiment we conducted, young English-speaking children appear to go through a stage of language development at which their grammars generate negative concord interpretations, even in the absence of evidence that these interpretations are permitted in the local language. Children's responses stood in striking contrast to those of adults, who exhibited the opposite pattern of responses to the same experimental materials.

A question that remains is how children acquiring Standard English expunge negative concord interpretations from their grammar. Assuming that children do not have access to direct negative evidence (e.g., corrective feedback), the transition to a purely double negation grammar must either be driven by positive evidence or by some indirect form of negative evidence. We will discuss two acquisition scenarios that attempt to account for children's transition to the adult grammar of Standard English. The two scenarios differ in the way in which children set the negative concord parameter.

Before we lay out these scenarios, it is worth noting that there is no issue of learnability for children who are acquiring negative concord dialects of English. These children will be exposed to positive evidence for both double negation and negative concord interpretations (cf. Zeijlstra 2007). Consider one of the test sentences from the present experiment, *The girl who skipped didn't buy nothing*, heard in a context in which the girl bought nothing. Children acquiring negative concord dialects of English could use this sentence as evidence that the local language generates a negative concord structure. In the structure, the *n*-word *nothing* is assigned the same meaning as the corresponding negative polarity item *anything*, i.e., *The girl who skipped didn't buy anything*. These children would also be exposed to positive evidence that the same sentence expresses a double negation interpretation in contexts that are felicitous for this interpretation.

6.1 Converging on the adult grammar

We have couched our experimental findings from the present study using the same theoretical backdrop as we used in previous research, i.e., we have adopted Zeijlstra's negative concord parameter (Zeijlstra 2004). Following Thornton and Tesan (2013),

we have supposed that English-speaking children initially adopt the default parameter value of the negative concord parameter, according to which negation is an adverb. We also followed Thornton and Tesan (2013) in supposing that children have acquired the head form of negation, *n't*, and the functional projection to host it, NegP, once they begin producing sentences with the negative auxiliary verb *doesn't*. Since children generally have acquired the head form of negation by around 3 years of age, we assumed that the child participants in the experiment we conducted might hypothesize that English permits negative concord.

At this point, at least two possible acquisition scenarios can be advanced within the parameter-setting framework to explain children's transition to the adult grammar. As suggested in Section 2, one scenario sees children as switching from the default (double negation) setting of the negative concord parameter to the value that generates negative concord sentences. At that point, children would be able to assign negative concord interpretations to sentences such as the ones we presented in the experiment but would not have access to double negation interpretations. Therefore, the experimental hypothesis was that children and adults would assign different syntactic analyses to the test sentences.

From a syntactic perspective, we assume that the morpheme *n't* carries an uninterpretable negative feature, u_{NEG} , which must be checked against a null operator (Zeijlstra 2004; 2008). Assuming that children have a negative concord grammar as in languages like Italian, we were led to suppose that they would treat *nothing* as an *n*-word. Therefore, children were expected to adhere to constraints that govern *n*-words in negative concord languages. On the account advanced by Zeijlstra, an *n*-word in object position must be associated with a c-commanding IP-internal negative marker (Zeijlstra 2008: 29). The child's syntactic representation is illustrated in (18), where the two uninterpretable negative features, the one associated with the *n*-word *nothing*_[uNEG] and the one carried by *n't*_[uNEG], enter into a Multiple Agree relation with the c-commanding Negative Operator_[iNEG]. For adults, the negative expression *nothing* carries its own interpretable features and, therefore, the corresponding structure for adults, illustrated in (19), generates a double-negation reading.

(18) The girl [who skipped]_{OP[iNEG]} didn't_[uNEG] buy nothing_[uNEG] (children)

(19) The girl [who skipped]_{OP[iNEG]} didn't_[uNEG] buy nothing_{OP[iNEG]} (adults)

In both the control and filler items in the experiment, the negative word *nothing*_[uNEG] in the object position would be unlicensed in children's grammars. Therefore, children would be compelled to analyze it to be a negative quantifier, just as adults do.

To converge on the double negation grammar of adult speakers of Standard English, children would need to reset the negative concord parameter back to the default value.¹⁶ There is abundant evidence informing children that Standard English does not permit negative concord. The evidence consists of sentences with *n*-words like *nothing* in object position. As we have seen, negative concord languages (e.g., Italian) do not tolerate negative quantifiers in object position, so such sentences would represent a detectable error, revealing that their current negative concord grammar is not the same as that of adult speakers of the local language. This would trigger a resetting of the parameter.

¹⁶ We can assume that children retain NegP when they reset the parameter to the double negation value; children have already witnessed positive evidence for the morpheme *n't*. This will mean they do not necessarily treat *not* as an adverb adjoined to vP , as in double negation languages like Dutch. It is possible that the negative marker *not* could be generated in SpecNegP for English speakers.

As noted, the experiment contained both control items and fillers with the negative quantifier *nothing* in object position (i.e. *The girl who didn't skip bought nothing* and *The boy bought nothing*). Children and adults both responded to these items in the same way, treating *nothing* as a negative quantifier. The child participants did not appear to be at all puzzled by the control and filler items, however, as might be expected if children had a purely negative concord grammar.

The observation that children efficiently dealt with the control and filler items in the experiment invites us to consider a second acquisition scenario. On this scenario, children did not abandon the default value of the negative concord parameter. Instead, children retained the default parameter setting that gave rise to double negation and simply responded to the adult input by adding the head form of negation, *n't* and the functional projection, NegP to their grammar (cf. Thornton & Tesan 2013). At this stage, we assume that children would have been able to generate both negative concord interpretations and double negation interpretations, similar to speakers of negative concord dialects of English, in which both negative concord and double negation are permitted (cf. Blanchette 2013; 2015). Presumably, in principle, children could generate both the representation in (18) and the one in (19).

This scenario is questioned by our experimental data, however, because we found that children overwhelmingly preferred the negative concord interpretation of the test sentences. However, the double negation interpretation may impose additional processing complexity, beyond that required to access the negative concord interpretation of the test sentences.¹⁷ The additional complexity of the double negation could be attributed to the pragmatic pre-conditions on the use of this interpretation. As we noted, the double negation interpretation is felicitous only when the previous speaker's utterance is being contradicted. As a consequence of the additional pragmatic knowledge required to formulate the double negation interpretation, children may have found the negative concord interpretation more accessible, since that interpretation was felicitous in the experimental context (although this would not be true outside the laboratory). Although our control trials were designed to ensure that children were able to compute sentences with two negative markers (cf. (9)), the control sentences were not as pragmatically complex as the test sentences were, on the double negation interpretation. Assigning an interpretation to the unambiguous control sentences did not require children to pay careful attention to the pragmatic context, or to maintain the information that was expressed in the previous utterance. Therefore, in view of the significant literature documenting children's lack of sensitivity to certain pragmatic principles (see, for example, Chien & Wexler 1990; Grodzinsky & Reinhart 1993; Reinhart 2006), it is reasonable to suppose that this may account for children's preference for the negative concord interpretation of the test sentences. To date, there is no literature investigating this aspect of double negation, so this is a topic for future research.

At some point, children acquiring Standard English would still need to eliminate negative concord from their grammars. This would be no mean feat, because children would be generating a superset of the interpretations permitted by adult speakers. In the absence of direct positive evidence to purge their grammars of negative concord interpretations, this acquisition scenario would require the postulation of some form of indirect negative evidence. In order to purge the negative concord interpretation from their grammars, children would have to notice that the adults in their environment *always* assign double negation interpretations and never negative concord interpretations.

¹⁷ Thanks to an anonymous reviewer for pointing out this possibility.

Although the test sentences in the experiment we conducted were amenable to both interpretations, the interpretation encountered in the adult input would presumably be the double negation one, in its appropriate corrective conversational context. This feature of the double negation interpretations of the test sentences could potentially inform children that adult grammars do not license negative concord interpretations. That is, adults only produce sentences like the ones we presented in the experiment in specific conversational contexts. Once children become as pragmatically sophisticated as adults are, they too would reserve the use of such sentences to these contexts. Nevertheless, the option of generating a negative concord interpretation would remain, though it would languish from lack of use. To truly expunge this interpretation from children's grammars would require some kind of substitute for negative evidence. One possible substitute for negative evidence is a uniqueness assumption, which entreats language learners to produce only one meaning for each sentence structure, unless there is abundant evidence in the input that more than one meaning can be assigned (Pinker 1984).

To our knowledge, the experimental study we have presented is the first investigation of the availability of negative concord in children acquiring Standard English. We have proposed two potential learnability scenarios based on Zeijlstra's parametric approach (Zeijlstra 2004; 2008). Future studies may find other theoretical approaches, including micro-parametric approaches to negative concord, fruitful for analyzing children's developmental path.

Two main conclusions can be reached based on the findings of the experiment. First, the fact that children acquiring Standard English assigned negative concord interpretations rather than double negation interpretations provides empirical support for the hypothesis that negative concord is at least initially part of the core grammar of Standard English. Second, the fact that children and adults assigned different interpretations to the same sentences poses a challenge to the experience-based approach to language development (cf. Goldberg 2003).

The challenge to the usage-based approach is simply to explain how children generate an interpretation that is not available in the adult input. There are, of course, many ways an advocate of an experience-based account might respond to this challenge, and we will not have anticipated all of the possible rejoinders. However, we designed the experiment to blunt the force of two alternative explanations of the observed differences in the interpretations assigned by children and adults. First we took steps to control for the possibility that children suffer from a greater limitation in processing resources than adults do, for example in verbal working memory. To ensure that children had the computational resources to compute the meanings of sentences with two negative markers, the experiment included control sentences with two instances of negation, but where the two negations did not cancel each other out. In most respects, the control sentences were structurally similar to the test sentences. The main difference was that, in the control sentences, one of the negative markers appeared inside the relative clause that modified the subject noun phrase. The test sentences also included a relative clause, but in these sentences, both negative markers resided in the matrix clause. If children had failed to compute one of the negative markers and conflated the two negative markers into a single negation, then this would have led to a different pattern of response by children, as compared to adults (see, e.g., Jou 1988; Coles-White 2004). The fact that children and adults exhibited the same pattern of responses to the control sentences, but different patterns in response to the test sentences, provides circumstantial evidence against a processing-limitation account of children's responses to the target sentences. The findings point instead to a grammatical explanation, or a pragmatic explanation of the observed difference between children and adults.

Additional files

The additional files for this article can be found as follows:

- **Additional File 1: Appendix A.** <http://dx.doi.org/10.5334/gjgl.4.s1>
- **Additional File 2: Appendix B.** <http://dx.doi.org/10.5334/gjgl.4.s2>

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Competing interests

The authors have no competing interests to declare.

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
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