

Sentential negation in early child English¹

ROSALIND THORNTON

GRACIELA TESAN

Macquarie University, Sydney

(Received 17 January 2011; revised 22 October 2012)

Starting with the seminal work of Klima & Bellugi (1966) and Bellugi (1967), young English-speaking children have been observed to pass through a stage at which their negative utterances differ from those of adults. Children initially use *not* or *no*, whereas adults use negative auxiliary verbs (*don't*, *can't*, etc.). To explain the observed mismatches between child and adult language, the present study adopts Zeijlstra's (2004, 2007, 2008a, b) Negative Concord Parameter, which divides languages according to whether they interpret negation directly in the semantics with an adverb, or license it in the syntactic component, in which case the negative marker is a head and the language is a negative concord language. Our proposal is that children first hypothesize that negation is expressed with an adverb, in keeping with the more economical parameter value. Because English is exceptional in having both an adverb and a head form of negation, children must also add a negative head (i.e. *n't*) to their grammar. This takes considerable time as the positive input that triggers syntactic negation and negative concord is absent in the input for standard English, and children must find alternative evidence. The Negative Concord Parameter accounts for an intricate longitudinal pattern of development in child English, as non-adult structures are eliminated and a new range of structures are licensed by the grammar.

I. INTRODUCTION

The acquisition of sentential negation by English-speaking children has puzzled researchers for almost half a century. Simply put, the puzzle has been to understand why children's early negative utterances differ so much from those used by adults. One of the main findings is that English-speaking children initially use *not* (and, to a lesser degree, *no*) to express sentential negation (Klima & Bellugi 1966, Bellugi 1967). Adult English speakers, by contrast, typically convey the same messages using negative auxiliary verbs such as *doesn't* and *can't*. Despite a number of investigations of the form and function of different aspects of negation across developmental periods

[1] This work was supported by the Australian Research Council Centre of Excellence for Cognition and its Disorders (CE110001021) <http://www.ccd.edu.au>. We would like to thank Stephen Crain, Teresa Guasti, Terje Lohndal, Hedde Zeijlstra, *Journal of Linguistics* Editor Caroline Heycock and three anonymous *Journal of Linguistics* referees for their helpful comments and suggestions.

(e.g. Bloom 1970, Wode 1977, Choi 1988, Déprez & Pierce 1993, Drozd 1995, Harris & Wexler 1996, Hamann 2000, Gilkerson, Hyams & Curtiss 2004, Cameron-Faulkner, Lieven & Theakston 2007, Dimroth 2010, Schütze 2010), no adequate theoretically-driven account of the mismatches between child and adult grammars has been forthcoming. The present paper presents a novel solution to the old puzzle by invoking the Negative Concord Parameter proposed by Zeijlstra (see Zeijlstra 2004, 2007, 2008a, b, 2010). Before we introduce the parameter, we will review the main acquisition facts at issue, and previous attempts that have been made to explain children's non-adult negative utterances.

More than forty years on, Bellugi's (1967) Ph.D. dissertation still contains the most detailed observations to date about the development of sentential negation by English-speaking children. The Bellugi thesis describes the longitudinal development of negation by the three Harvard children, Adam, Eve and Sarah (Brown 1973). The first three stages of children's development have become standard fare in the child language literature, but the Bellugi thesis introduces further facts about children's use of negation, and discusses a number of issues that have gone unmentioned in the literature. The additional facts include observations about children's command of negative polarity expressions, negative concord structures and sentences with negative tags. Although these data are not routinely reported in the literature, they make important contributions to the theory developed in the present study.

1.1 *Three stages in the acquisition of sentential negation*

Let us briefly review the three familiar stages in children's development of sentential negation. The first stage (stage 1) was labelled 'primitive' by Bellugi (1967). In children's earliest utterances, negation is expressed by the negative markers *not* or *no* which appear either at the end of a word or at the end of a phrase, the 'nucleus' of the sentence in Bellugi's terms. Frequently, the subject NP is omitted in these early utterances. Examples include utterances such as *No sit there*, *Not a teddy bear*, *No fall!*, *Wear mitten no* (Bellugi 1967). These utterances are reported to fulfill a variety of functions in children's communicative repertoire.

On the basis of (a few) examples in which the subject NP is present (e.g. *No the sun shining*), the first stage in the acquisition of negation is often characterized as one at which negation appears external to the sentence (de Villiers & de Villiers 1985, Déprez & Pierce 1993, Drozd 1995). This proposal remains controversial, however. Bloom (1970), for example, argued that children's earliest utterances with 'external' negation are, in fact, instances of anaphoric negation.² The ongoing debate over the data and whether or

[2] Anaphoric negation is the term used to describe negation that is in response to a proposition from a previous speaker, such as in answer to a question. For example, in answer to

not negation is initially external to the sentence is not directly relevant to our purposes. Our evaluation of children's knowledge of negation focuses, instead, on the syntactic category of negation in children's grammars at different stages of development, an issue for which the second stage of development is more relevant.

At the second stage (stage 2) in the acquisition of negation, Bellugi claims that negation is positioned sentence-internally. At this stage, children use *not* or *no* in combination with some kind of predicate, including main verbs (e.g. *He no bite you, I no want envelope*). Utterances with negative auxiliary verbs also begin to appear in children's productions at the second stage (e.g. *I can't catch you, I don't sit on Cromer coffee*). It is important to note, however, that Bellugi claims that children's early use of negative auxiliary verbs is confined to *don't* and *can't*. She states that the rest of the auxiliary system was 'largely absent' at this second stage (Bellugi 1967: 64) in the three children's grammars. Hence, these particular negative auxiliary verbs were analysed as forms of negation, not as auxiliary verb forms.

The rapid emergence of the auxiliary system marked these children's passage into the third stage (stage 3). Once the children had entered the third stage, they used an array of both positive and negative auxiliary verbs. This was demonstrated, for example, by children's use of the auxiliary verb *will* in various syntactic contexts, as well as their command of the irregular forms of *be*, and their ability to ask yes/no questions with *do*-support. Children reached this third stage at varying ages, by Bellugi's calculations: Eve reached this stage at 2;2 (i.e. the age of two years and two months), Adam was 3;2, and Sarah was 3;8.³

1.2 *Previous accounts of the acquisition of sentential negation*

The present paper focuses on the changes that take place in children's grammars as they make the transition from the second to the third stage in the development of negation, and the consequences of these grammatical changes throughout children's grammars. Children's absence of productive use of negative auxiliary verbs in the second stage of development is particularly noteworthy, in view of the overwhelming preference by adults to produce negative auxiliary verbs rather than utterances with *not*. The observed preferences by adults are documented in our investigation by surveying the primary linguistic data provided by the mothers of two young

the question *Do you like coffee?* a speaker might reply *No, I like tea*. The lexical item *no* is the anaphoric negator.

[3] Eve is widely accepted as illustrating precocious, unusually early acquisition of language. Adam and Sarah's ages are more likely to be indicative of typical development.

children (Lily and Naima), using the CHILDES Providence corpus (Demuth, Culbertson & Alter 2006).⁴

Here are a few findings from the survey we conducted. Analysis of the child-directed speech from five transcript files for each parent reveals that Naima's mother used negative auxiliary verbs for sentential negation 78.9% (183/232 tokens) of the time, while they were used 72.2% of the time by Lily's mother (104/144 tokens). These calculations are actually quite conservative, given that the copula *be* was included in these counts, and it co-occurs quite naturally with *not*. The survey findings suggest that the absence of negative auxiliary verbs in children's speech is not easily explained by invoking the frequency of negative expressions in the parental input. Further details appear in Appendix A.⁵

In the child language literature, various ways have been offered to explain discrepancies between child and adult grammars. In the earliest days of generative linguistics, Klima & Bellugi (1966) attempted to explain the transition from child to adult grammar as the consequence of the gradual accrual of rules. Such an explanation is no longer tenable within the current generative framework, which has forsaken rule-based accounts of children's transition to the adult grammar, in favor of parameters. In addition to parameters, some UG-based accounts of children's early non-adult grammars appeal to maturation (see e.g. Borer & Wexler 1987; Wexler 1994, 1998; Schütze & Wexler 1996).

Much of the recent literature on the acquisition of sentential negation has pursued an approach that ties young children's non-adult negative utterances to the fact that they are in the optional infinitive stage of grammatical development (e.g. Harris & Wexler 1996, Guasti & Rizzi 2002, Schütze 2010). In the optional infinitive stage, children frequently omit tense and agreement markers, a fact that can be used to explain why children express negation with *not* in sentences like *It not fit in here* (see Harris & Wexler 1996). In a recent paper, Schütze (2010) explicitly proposes that, at the second of Bellugi's stages in the acquisition of negation, children produce utterances such as *It don't fit in here* instead of *It doesn't fit in here* because they do not yet have mature use of tense and agreement. On his proposal, children prefer

[4] These children's data were recorded between 2002 and 2005, and are therefore representative of current colloquial American speech. Five consecutive files were investigated from each parent, starting when each child was 2;6. The counts excluded anaphoric negation, exclamatives, and imperatives; this excluded 66 tokens out of the total number of 442 initial tokens. Also excluded from the counts were instances of negation that appeared in stories that the mother was reading, since these were not spontaneous uses of negation. Thanks to Nobuaki Akagi for counting the data.

[5] Cameron-Faulkner et al. (2007) argue that children's output is a reflection of the input data. This claim rests on the fact that they include both anaphoric negation and sentential negation (i.e. 'single-word negation' and 'multi-word negation') when examining the forms used in the parental input. This boosts the numbers of *no*, which is the form the child they studied uses initially.

the negative marker *n't* over *not* but, because *n't* requires a host, children are forced to apply *do*-support in order to avoid a violation of Lasnik's Stray Affix constraint (Lasnik 1981). Since children are in the optional infinitive stage of development, however, the idea is that children often fail to realize the agreement morpheme and, consequently, sometimes produce *don't* instead of *doesn't*. In contrast to this argument, we will contend that, at this stage of development, children have not yet identified *n't* as a separate negative marker.⁶ We maintain Bellugi's view that *don't* is a transitional form of negation in young children's grammars at the second stage of the development of negation.

There is little doubt that children's non-adult productions of sentential negation are intertwined with their acquisition of the auxiliary verb system; clearly children cannot use *doesn't*, for example, until they have mastered *do*-support. In this sense, we agree with researchers such as Schütze (2010), who align children's negative utterances with the optional infinitive stage of development. However, we have chosen to pursue the idea that there is a 'strong' continuity between child and adult grammars (Pinker 1984, Crain & Pietroski 2002). As Crain & Pietroski (2002: 177) state the continuity hypothesis, the claim is that 'child language can differ from the local adult language only in ways that adult languages can differ from each other'. In the present study, we follow the continuity hypothesis. In our view, children's grammars fail to align with those of adults primarily due to a parameter that implicates children's knowledge of negation.

1.3 *A parametric account of the acquisition of sentential negation*

According to parameter theory, children are not expected to accrue individual rules governing the local language, as had been supposed using earlier theories of syntax. Instead, the theory known as the Principles and Parameters theory (Chomsky 1981, 1995) supposes that children are biologically fitted, as part of the human genome, with a Universal Grammar that contains both the core principles of language, i.e. principles that are manifested in all human languages, as well as a program for spelling out ways in which human languages can vary. These points of variation are parameters. Once parameters entered the theory of Universal Grammar, many cross-linguistic differences that had been assumed to be learned previously, were reconceived as innately specified properties of human languages. The move to the Principles and Parameters theory enabled researchers in child language to formulate and evaluate far-reaching predictions about the course of language acquisition, including predictions that were not consistent with experience-based accounts.

[6] On our account, children initially take negation to be adverbial, so it cannot be the case that they prefer *n't* over *not* at stage 2.

The introduction of parameters was designed to advance the theory of Universal Grammar along its stated goal of explaining children's rapid mastery of human language. Parameters were seen to reduce the role of experience in children's acquisition of human languages. In the 1980s, parameter setting was seen to initiate radical changes in child language. Instead of piecemeal acquisition of specific constructions, as advocated by usage-based accounts of language development, acquisition within the generative framework was seen to involve the mastery of clusters of linguistic phenomena, all in one fell swoop. The metaphor that was often coupled with descriptions of parameter setting was that of a switch, as in a circuit box. The child language learner was seen to set the switch one way or the other in response to 'triggering' experience. If the switch was set one way, then the child's grammar assumed one format; if the switch was set the other way, the child's grammar assumed a different format.

The minimalist program has seen a move to reduce the 'machinery' for parameters in the innate language faculty. Parametric options are generally viewed as following from lexical learning (Borer 1984, Chomsky 1995). Once a child acquires a lexical item with particular features, its consequences will be implemented in the sentence derivation. We will assume the minimalist version of parameters in this paper; children have to learn the lexical items for negation and their associated features, and this in turn has ramifications throughout the grammar.

The present proposal is that children's developmental path in the acquisition of sentential negation can be explained by invoking Zeijlstra's Negative Concord Parameter (Zeijlstra 2004, 2007, 2008a, b). According to this parameter, children acquiring any human language must settle on the syntactic status of negation in the local language. We will outline the technical details of Zeijlstra's Negative Concord Parameter shortly. Suffice it to say for now that the parameter comes down to a choice in the language between a form of negation which is an adverb, and one in which it is a head. The default is to begin with an adverb, since this option does not require language learners to build extra structure into their sentence representation. Children can revise their hypothesis to analyse negation as a head later, at which time they posit a functional projection for negation, a NegP. Applying Zeijlstra's analysis to children acquiring English, we can say that children at Bellugi's first and second stages of acquisition hypothesize that negation is adverbial, which turns out not to align with use of negation in adult English speakers. Once children add a head form of negation to their grammar, they transition to Bellugi's third stage in the acquisition of negation.

The fact that English-speaking children must acquire both a lexical item for negation that is an adverb and one that is a head is not without complications. Although there is nothing to prevent children from acquiring more than one negative marker, there are certain properties associated with

each cross-linguistic parametric option, so we will investigate how this cashes out in the adult English grammatical system.

1.4 *Where we are headed*

The structure of the remainder of the paper is as follows. The theoretical details of the parameter and its relation to negative concord are described in Section 2. There we outline Zeijlstra's (2004, 2008a, b, 2010) account of the typology of negation, presenting some of the cross-linguistic variation in negative markers. We describe the corresponding typological properties that are associated with each parametric option, and offer a sketch of the relevant syntax of sentential negation in English. Section 3 applies Zeijlstra's learnability theory to child language (see Zeijlstra 2007). In that section, we establish various predictions about the consequences for children's grammars of positing adverbial negation at the initial stage. We also derive various consequences of incorporating negation as a head. Section 4 reports our investigation into the predictions of Zeijlstra's theory for child language acquisition, focusing in particular on the forms of children's negative sentences throughout development. We include details about children's use of negative imperatives, their use of double negation versus negative concord, and the related presence or absence of negative polarity items in children's productions. We also explore the prediction that, until children categorize *n't* as a head, they should not be able to produce structures requiring movement of a negative auxiliary verb, such as negative questions (e.g. *What don't you like?*) and negative tags (*You like linguistics don't you?*). The emergence of these structures over time is examined to determine whether or not these sentence structures coincide with adding a negative head to the grammar. Finally, Section 5 contains a summary of the conclusions we have reached as a result of these investigations.

2. ZEIJLSTRA'S THEORY OF NEGATION

Within the minimalist framework there has been a strand of research that has pursued the 'cartographic' approach to sentence representations, in which it is assumed that there is a hierarchy of universally specified functional projections available (e.g. Rizzi 1997, Cinque 1999). Another group of researchers has pursued the idea that languages do not all share the same universal 'list' of functional projections, and that only those functional projections that are motivated by properties of the positive input need be projected (e.g. Iatridou 1990, Thráinsson 1996, Bobaljik & Thráinsson 1998, Neelman & van de Koot 2002).⁷ This alternative 'building block grammars'

[7] There is no reason why the building blocks view could not be compatible with the idea that functional projections are ordered in a universal hierarchy, and if a projection is

view is endorsed by Zeijlstra (2004, 2007, 2008a). Applying the ‘building blocks’ view to negation, it follows that a language will only project a NegP functional projection if it is motivated by the input.

While all languages express negation, Zeijlstra’s proposal is that languages may or may not require a NegP. Only those languages with a lexical item for negation that is a head need a NegP phrase to represent sentential negation (Zeijlstra 2004, 2007, 2008a, b). In some languages, such as Dutch and German, the negative marker is always a negative adverb. Because the negative adverb serves as a negative operator, it can be interpreted in the semantics without any computation in the syntactic component, and so no NegP is necessary. Zeijlstra terms this SEMANTIC NEGATION. In another set of the world’s languages, negative markers do not correspond one-to-one with a negative operator; these are the negative concord languages. Negative concord languages include Czech, French, Italian, and dialects of English among others. These languages may contain additional negative markers (i.e. *n*-words) that do not carry the force of a negative operator.⁸ There is only one negative operator per clause, and the other negative elements in the clause mark the fact that such a negative operator is present in the sentence representation. In negative concord languages, the negative markers must be licensed in the syntactic component, and so a NegP functional projection is motivated. Because negative concord must be licensed in the syntactic component, Zeijlstra terms this SYNTACTIC NEGATION. The two ways negation is realized cross-linguistically can be viewed as a parameter, which Zeijlstra terms the Negative Concord Parameter.

There are two types of negative concord languages, strict and non-strict. In strict negative concord languages like Czech, *n*-words (marked N in example glosses) always appear together with a negative marker, as shown in (1). The same is true in non-strict negative concord languages like Italian, except when the *n*-word is in subject position, in which case a negative marker (*non* in Italian; marked NEG in glosses) is not permitted, as shown in (2a, b).

- (1) (a) Milan **nikomu** **nevolá**. Czech
 Milan N.body NEG.call
 ‘Milan doesn’t call anybody.’
- (2) (a) Gianni ***(non)** ha telefonato a **nessuno**. Italian
 Gianni NEG has called to N.body
 ‘Gianni didn’t call anybody.’

instantiated by positive evidence, it will conform to the ordering in the hierarchy. Whether functional projections are ordered in a universal order or not is not important for the arguments in this paper.

[8] Zeijlstra (2004) terms *n*-words as indefinites that are existentially bound by a negative operator, and that introduce a negative context in only some conditions (see Zeijlstra 2004: 45). The status of *n*-words as negative quantifiers, negative polarity items, or syntactically marked indefinites is controversial, however. This debate is not important for our purposes.

- (b) **Nessuno** (*non) ha telefonato (a **nessuno**).
 N.body NEG has called to N.body
 ‘Nobody called (anybody).’

The difference between the two types of negative concord will not be important for present proposal, but it is worth drawing attention to the distinction in so far as it is relevant to child grammars. It turns out that some English-speaking children take up negative concord and these children use the strict type of negative concord. Next we turn to the typology of negation, where we return to adult English, which does not fit cleanly into the options we have considered; it has a negative adverb like Dutch and German, but is not a negative concord language, despite having a negative head.

2.1 *A typology of negation*

Zeijlstra (2004) lays out a typology of negation based on the following detailed version of Jespersen’s Cycle, which documents the diachronic change in negative forms across languages.⁹ The phases in Jespersen’s Cycle are shown to correlate with other syntactic properties including (i) whether the language exhibits double negation or negative concord, (ii) whether or not ‘true’ negative imperatives are permitted, and (iii) the interpretations that arise when the universal quantifier in subject position precedes negation. Our investigation of child data will not consider (iii), the interpretation of sentences with a universal quantifier and negation (e.g. *Every boy didn’t leave*) and how they correlate with semantic or syntactic negation, since appropriate data from two-year-old children are not available. The important generalization that emerges from the typological study is that languages with a head form of negation are negative concord languages but not vice versa.

- (3) Phase I: Negation is only expressed by a single negative marker that is attached to the finite verb.
 Phase II: The negative marker that is attached to the finite verb becomes phonologically too weak to express negation by itself and a second negative adverb becomes optionally available.
 Phase III: Sentential negation is obligatorily expressed by the negative marker that is attached to the finite verb and the adverbial negative marker.

[9] Jespersen’s Cycle has featured prominently in recent theoretical work on language change, especially in the work of van Gelderen (2004, 2008, 2011), and papers on aspects of the negative cycle by Hoeksema, van der Auwera, Tsurska and Biberauer in van Gelderen (2009a). See also Ingham (2005, 2006, 2007) and van Kemenade (2000) for the history of negation.

- Phase IV: The negative adverb is the obligatory maker for negation and the use of the negative marker that is attached to the finite verb becomes optional.
- Phase V: The negative adverb is the only available negative marker. The negative marker that is attached to the finite verb is no longer available.
- Phase VI: The negative marker is available in two forms: it can appear either as a negative adverb or as a negative marker that is attached on the finite verb, though sometimes simultaneously.

The phases of Jespersen's Cycle that are most relevant to English and our investigation of child language are Phases V and VI. Adult standard English is a Phase VI language: it incorporates the negative adverb *not* as well as the head form of negation *n't* (which is taken to be equivalent to a negative marker attached to a finite verb). We will see that child development mirrors the change from Phase V to Phase VI in Jespersen's Cycle as children move from a grammar in which only a negative adverb is available to one which also incorporates a negative head.

2.2 *Properties of Phase V and VI languages*

Languages in which there is only one form of negation, a negative adverb, are Phase V languages. These languages include German, Dutch, Swedish, and Norwegian, which are V2 (or verb-second) languages, as well as Quebecois, Bavarian, and Yiddish, which are negative concord languages. The discussion here is limited to the V2 Phase V languages that are double negation languages.


In Phase V languages with double negation, the two forms of negation each carry negative force, and therefore cancel each other out. The example below from Dutch illustrates that double negation ends up being a positive statement (from Zeijlstra 2004: 3).

- (4) Jan heeft **niet niemand** gebeld. Dutch
 Jan has NEG N.body called
 'Jan didn't call nobody.' = 'Jan called somebody.'

Phase V languages all allow 'true' negative imperatives, as illustrated with German in (5) (Zeijlstra 2004: 140–141). In languages with true negative imperatives, the imperative form is exactly the same in both affirmative and negative versions in (5). In those languages that do not allow true negative imperatives, the negative imperative cannot be formed by simply adding negation to the affirmative form but must be expressed using a different type of syntactic structure.

- (5) (a) Mache es!
do it
'Do it!'
(b) Mache es **nicht**!
do it NEG
'Don't do it!'
- German

True negative imperatives are formed by verb movement to a Mood projection, as shown in (6) below. In later work (Zeijlstra, personal communication) suggests movement is to C rather than Mood (see also Zeijlstra 2010). Either way, in languages in which negation is an adverb, the verb can freely raise across negation to the appropriate functional projection, since the negative adverb will not block movement (Travis 1984).

- (6) [_{MoodP} [_{NegP} [_{VP} Verb]]]
- 

Phase VI languages have different properties. The set of Phase VI languages comprises only varieties of English, both standard English and non-standard varieties with negative concord. Standard English stands as the exception to Zeijlstra's generalization that any language with a negative head will exhibit negative concord. As van Gelderen (2008) notes, however, there has long been a prescriptive tide against the use of negative concord, and this may have arrested any 'natural' move in this direction for standard English varieties. Nevertheless, there are varieties of both British English and African American dialects in which negative concord is the norm, or at least optional (see Poplack 2000, Green 2002, Iyeyiri 2005).

In standard English, sentential negation is expressed either by the negative marker *n't*, a head that is attached to a finite auxiliary verb, or by the negative adverb *not*. In fact, the literature has debated whether *not* should be analysed as a negative adverb or as a head (see Zanuttini 1991, 2001; Haegeman 1995; Lindstad 2006). One test used by Zeijlstra (2004) to determine its syntactic status is Merchant's *why not* test (Merchant 2001). On Merchant's analysis, the phrase *why not* is formed by phrasal adjunction, and therefore is only licit with negative adverbs. As one might expect, the *why not* construction is fine for Phase V languages like German, Dutch, Swedish, and it is also fine for English, suggesting that *not* is indeed an adverb. We follow Zeijlstra in taking *not* to be an adverb or an XP.

Turning to imperatives, Zeijlstra's generalization is that languages with a head form of negation ban true negative imperatives. If imperatives with *do*-support are considered to illustrate a different syntactic structure, then true to the generalization, modern-day English in all its dialectal varieties bans true negative imperatives, but whether the addition of *do*-support

constitutes a different syntactic structure is debatable; it may be that *do*-support is an independent requirement.¹⁰ In 15th century English, however, before the introduction of *do*-support and the negative marker *n't*, true negative imperatives of the form in (7) clearly did occur (Zeijlstra 2004: 146). At this time, English still exhibited verb movement, so we can assume that the verb moved out of the *v*P across negation.

- (7) Fear **not!** 15th century English
 'Don't fear!'

In later work, Zeijlstra (2008a) raises the possibility that English is actually a Phase V language with only a negative adverb. This is because standard English goes against the generalization that languages with a negative head are negative concord languages. The argument would be that all negative auxiliary verbs like *don't*, *can't*, etc. are unanalysed whole lexical items and therefore *n't* is not analysed as a separate head (Pullum & Wilson 1977). It is difficult to make this argument for the lexical item *doesn't*, however, since this particular negative auxiliary verb realizes the agreement morpheme-internally to the word, splitting the word *don't*.¹¹ It seems unlikely that this form, too, is simply learned as an unanalysed whole. We will therefore continue to assume that English is a Phase VI language with both a negative adverb and a head form of negation, *n't*, as in the earlier proposal.

2.3 *The syntax of negation*

The theory of negation proposed by Zeijlstra (2004, 2007, 2008a) is couched in the minimalist program (Chomsky 1995, 2000). Within minimalism, semantic features are distinguished from formal features. Semantic features have semantic content and do not trigger syntactic operations while formal features may or may not have semantic content. If they have semantic content, they are interpretable and can be interpreted at LF, but if they are without semantic content, they are uninterpretable and must be deleted during the derivation before reaching LF. The deletion takes place in the syntactic component once a checking relation with a corresponding

[10] In more recent work, Zeijlstra updates the analysis, and proposes that the generalization is that all languages banning true negative imperatives have a marker that is a negative head, but not the other way around. He also suggests that whether or not English has true negative imperatives is a matter of definition (Zeijlstra 2010). If the claim is that a true negative imperative is composed of the usual form of negation with the usual form of imperative, then imperatives such as *Don't walk!* could be considered to be true negative imperatives. The fact that *do*-support is required could be considered to be an independent requirement of English negatives, questions and imperatives.

[11] An anonymous *JL* referee points out that *hasn't* and *isn't* also show some form of third person agreement, and can be used to make the same argument. Both of them have a more idiosyncratic paradigm than the auxiliary verb *do*, however, so the data could be less transparent to children.

interpretable feature is established, through the mechanism of Agree (Chomsky 2000). Working within this framework, Zeijlstra assumes that negative markers can carry either semantic features or uninterpretable formal features.

In Dutch and German and other V2 languages with semantic negation, the negative adverb is adjoined as a νP adjunct, as illustrated in (8a) (but see also Lindstad 2006 for Norwegian). The negative adverb carries a semantic feature [NEG], as shown in (8b), that is directly interpreted at LF.

- (8) (a) [νP niet [νP]] Dutch
 (b) Jan loopt **niet**_[NEG].
 Jan walks not
 ‘Jan doesn’t walk.’

English also has a negative adverb, *not*, so one possibility is that this is adjoined to νP , just as in Dutch. However, since adult English also has a head form of negation that motivates a NegP projection, *not* could also be positioned in the specifier of the NegP projection. Either way, it can be assumed that *not* carries a semantic [NEG] feature.

Negation implicates formal features in English because English has the head form of negation *n’t* in addition to its adverbial form. In a sentence like (9a), negation is licensed in the syntactic component.

- (9) (a) John doesn’t walk to school.
 (b) [TP John does [NegP *Op* \neg _[iNEG] [Neg_0 **n’t**_[uNEG]] [νP walk to school]]]

As shown in (9b), the negative marker *n’t* is positioned in the head of NegP and carries an uninterpretable negation feature [uNEG] that must be deleted before LF. This uninterpretable negation feature is checked off by a covert operator in SpecNegP that carries an interpretable negation feature ([iNEG]).

In negative concord varieties of English, there are two negative markers in the sentence representation, both carrying an uninterpretable negative feature ([uNEG]). These uninterpretable features are checked against the negative operator with the interpretable negation feature by multiple Agree (Ura 1996; Hiraiwa 2001, 2005). Both uninterpretable negative features are thus eliminated before the derivation reaches the interface, yielding one semantic negation, and the interpretation that John did not do anything (but see Haegeman & Lohndal 2010). This is illustrated in (10).

- (10) (a) John didn’t do **nothing**.
 (b) [TP John did [NegP *Op* \neg _[iNEG] [Neg_0 **n’t**_[uNEG]] [νP do **nothing**_[uNEG]]]]

To summarize, cross-linguistic data reveal two types of languages. One set of languages has semantic negation, and sentential negation is expressed with a negative adverb. Another set of languages has a head form of negation.

These languages have a NegP and negation is licensed in the syntactic component of the grammar. The two cross-linguistic options form the options realized by the Negative Concord Parameter (Zeijlstra 2004, 2007, 2008a). The generalization is that a language with a negative head is always a negative concord language, but not vice versa. Finally, standard English is exceptional in that it has both semantic negation as well as syntactic negation, and, despite having a negative head, does not have negative concord.

In the next section, we turn to the predictions that Zeijlstra's theory makes for child English.

3. LEARNABILITY AND PREDICTIONS FOR CHILD ENGLISH

Our proposal is that children acquiring standard English begin with the semantic negation value of the Negative Concord Parameter – that is, negation is exclusively adverbial in the early grammar and only considerably later in the course of acquisition do children add the head form of negation to their grammar.

There are a number of reasons why children might initially begin with a parametric option that does not align with the target grammar. In the earlier Principles and Parameters conception of parameters (Chomsky 1981), in the absence of definitive evidence for one or other binary setting, children could simply pick one parameter value. In some cases, it has been proposed that children may be forced to pick the subset value for learnability reasons and this may not be the target value (see e.g. Berwick & Weinberg 1984, Roeper & Williams 1987, Wexler & Manzini 1987, Crain, Ni & Conway 1994, Fodor & Sakas 2005). A further proposal is that children will initially hypothesize the more economical parameter value. For example, Rizzi argues that a parameter value that requires less articulatory effort at PF will be favored initially, even when it does not match the input from the target language (Rizzi 2005).

Alternative notions of computational efficiency or economy could also give rise to parametric differences.¹² Thráinsson (1996) argues that Chomsky's (1991) general principle of economy of representation guides the child to follow the 'Real Minimalist Principle', that is, to '[a]ssume only those functional categories that you have evidence for'

[12] Van Gelderen has written extensively about how morphological change in language is brought about by principles of economy that are internal to the language learner interacting with external influences. The economy principles of Head Preference ('Be a head') and the Late Merge Principle ('Merge as late as possible') of van Gelderen (2004) are reformulated as a principle of feature economy in van Gelderen (2009b). The Economy of Features principle instructs the learner to 'Minimize the interpretable features in the derivation'. It is not clear how this relates to children's transition from Phase V to Phase VI discussed here, however.

(Thráinsson 1996: 261). Zeijlstra (2007, 2008a) also uses a version of economy to argue for a default option for the Negative Concord Parameter. The idea is that the most economical or simple way to express negation is with a negative adverb, because this does not require the learner to build the structure for a NegP; the adverb can simply be adjoined in the verb phrase. The grammar is hypothesized to be simpler because it does not require formal features. The consequence is that language learners will initially take this option. If there is linguistic evidence available, the learner can posit a NegP functional category in their sentence representation, in which case their grammar takes the alternate value for the Negative Concord Parameter. In Zeijlstra's work, this idea extends beyond negation and is formalized more generally as the Flexible Formal Feature Hypothesis (FFFH).

3.1 *The Flexible Formal Feature Hypothesis*

The Flexible Formal Feature Hypothesis (FFFH) is stated in Zeijlstra (2007) as follows:

- (11) (a) Every feature [F] is first analysed as a semantic feature ([F]).
- (b) Only if there are doubling effects with respect to F in the language input, [F] has to be reanalyzed as a formal feature [i/uF].

The FFFH assumes that rich morphological structure in the positive input is what drives children to posit functional projections in their sentence representations. Returning to negation, the FFFH requires children to first assume that the language has semantic negation ([NEG]) and, only if there are doubling effects for negation in the input, will they reanalyze or add (in the case of English) negation as formal features ([iNEG] and [uNEG]) to their grammar. In the case of negation, the 'doubling effects' are sentences with negative concord since there are two negative markers that add up to one semantic negation. Negative concord sentences thus constitute the input that informs children that (at least) one of the negative markers carries an uninterpretable negation feature that must be checked in the syntactic component. This is what motivates a NegP functional projection. It is important for Zeijlstra's proposal that parameter values are not innately specified. Rather, they arise out of learnability requirements for simplicity.

Let us consider how the FFFH plays out in the grammars of children in different language communities. Children acquiring Phase V languages like Dutch or German, like all other children, initially hypothesize that their language has semantic negation. Since this is the correct option, and there is an appropriate lexical item in the positive input, these children converge speedily on the target grammar. What of children learning French or Italian? In principle, they too hypothesize semantic negation, but exposure to negative concord will soon cause them to reanalyze the local language as

having formal features for negation, leading them to add a NegP projection to the grammar. Assuming that negative concord is abundant in the local language, adoption of formal features for negation could be very rapid, to the extent that the earlier, adverbial stage is never realized or detectable in the child's output (see Wexler's 1998 Very Early Parameter Setting).

Now consider children learning English. Once again, the FFFH should guide children to initially hypothesize semantic negation. The lexical items *not* (and/or *no*) are negative markers in the positive input that children can recruit for this purpose.¹³ Children learning negative concord varieties of English can switch to formal features for negation once they recognize the 'doubling' evidence they need to converge on the adult grammar. Children learning standard English, however, lack exposure to the negative concord data that motivates formal features for negation. In our view, this means that children acquiring standard English refrain from projecting a NegP until alternative sources of linguistic data are forthcoming. This accounts for the protracted development of sentential negation observed in many children. Let us lay out the learning path for children acquiring standard English in more detail.

3.2 Early adverbial negation

The Flexible Formal Feature Hypothesis entreats children to initially posit semantic negation. Children therefore scout the adult input for sentences that contain one semantic negation and identify *not* and/or *no* as potential negative adverbs. The items *not* (and/or *no*) are assigned a semantic feature for negation [NEG], requiring negation to be interpreted in the semantic component. These items will be used in situations when an adult would use a negative auxiliary verb. Thus, children are predicted to produce sentences like *This not fit* or possibly *This no fit* instead of *This doesn't fit*.¹⁴ The derivation would be as shown in (12). The verb and subject merge, the negative adverb takes νP as its complement, negating the proposition, after which the subject moves out to SpecTP (see Zeijlstra 2004: 262).

(12) [_{TP} this_i [_T [_{νP} **not/no**_[NEG] [_{νP} t_i fit]]]]

The fact that English-speaking children initially hypothesize only semantic negation means that their early English is a Phase V language, similar to many of the Germanic languages. This gives rise to some

[13] *Not* is used in the adult input as an adverb so it is most likely to be recruited by children as a potential adverb, but Cameron-Faulkner et al. (2007) report a child who first used *no* and then later moved to *not* to mark sentential negation.

[14] Children who recruit *no* rather than *not* as their form of negative adverb will have to recategorize this as a determiner later. The empirical evidence suggests that children generally tend to pick one or other form.

predictions about further properties of children's grammars at this stage of development.

The first prediction is that, in principle, a negative adverb does not block agreement/movement between the tense/agreement morpheme in T and the main verb. This can be illustrated in Phase V V2 languages like Swedish, in which the negative marker is a negative adverb. In V2 contexts, the verb moves over negation to V2 position, but in non-V2 contexts, such as when there is an initial adverb, inflection shows up on the main verb, as shown in (13a) (Vikner 1995). In English, this means that children could produce utterances like *This not fits*, in which the tense/agreement marker is realized on the main verb (see Bobaljik 1994).¹⁵ This is illustrated in (13b).

- (13) (a) Kanske Lena **inte** köpte en ny bok igår. Swedish
 maybe Lena not bought a new book yesterday
 'Maybe Lena didn't buy a new book yesterday.'
- (b) [_{TP} this_i [_T S [_{vP} **not/no**_[NEG] [_{vP} t_i fit]]]]
-

Furthermore, if Bellugi's claim (see Section 1.1 above) that children's early uses of *don't* and *can't* at stage 2 are forms of negation rather than auxiliary verbs, these transitional forms can also be analysed as negative adverbs adjoined to vP, just like *not*. Quite possibly, children suspect that forms like *don't* and *can't* differ from *not* in their distribution (see Schütze 2010), but given that NegP has not yet been adopted into the grammar, they temporarily utilize these forms as vP adjuncts.¹⁶ Children who take this path potentially could produce utterances like *This don't fits*, in which inflection associates with the main verb over the negative adverb *don't*. As a caveat, it has to be recognized, however, that adults do not permit utterances like *It not fits*, even though *not* is an adverb for adults also, so if such utterances occur in child grammars, we will need to consider how they are eliminated from the adult grammar.

A second prediction that follows from analyzing early English as a Phase V language is that children should take every negative marker as a form of semantic negation. Thus, early child language should permit double

[15] Productions like *This not fit*, with omission of the 3rd person marker, are also predicted at this developmental stage, since it coincides with the root infinitive stage of development.

[16] Bellugi's (1967) reasoning for claiming that *don't* and *can't* are forms of negation was that the children had not yet developed productive use of a range of affirmative auxiliary verbs. On the present account, these forms are used as adverbial forms of negation because children do not have a NegP. There is nothing to prevent the child from using a range of affirmative auxiliary verbs, although these could serve to hasten reanalysis of negative auxiliary verbs.

negation, as in sentences like *John didn't tell nobody*, where the intended meaning is that John told somebody. In practice, this may be difficult to test, as sentences with double negation are likely to be absent from two-year-old children's spontaneous speech for independent reasons. For one thing, double negation is infrequent even in adult languages that allow it (Zeijlstra 2004). Conversely, English-speaking children should not use negative concord at this stage of development. There is nothing to prevent children from producing negative polarity items (henceforth NPIs) such as *any* in the adverbial stage, however, since the negative adverb can license the NPI.

A third prediction is that children will produce true negative imperatives. Affirmative imperatives such as *Walk!* will be produced by all children at all stages, but in the early development of negation, at the stage before *do*-support is acquired, the true negative imperative correlate *Not run!* is also predicted to occur, at least in some children's output. Given that there is no verb movement in English, and children know this early (see Wexler 1994, 1998), the representation for a true negative imperative would be as in (14). An uninterpretable mood feature on the verb checks off its feature with an interpretable feature on the MoodP.¹⁷

(14) [_{MoodP}[iMOOD] [_{vP} **not** [_{vP} run_[uMOOD]]]]

It is worth considering what triggers the transition from the early adverbial negation stage of negation to the adult grammar. As we noted, for children learning standard English, there is no doubling evidence in the input to trigger addition of a NegP projection into the functional hierarchy, so some source of linguistic evidence must become available. Following Haegeman (1995), Zeijlstra (2004) observes that questions with raised negative auxiliaries are a potential catalyst to instigate change. Questions with raised negative auxiliaries must be formed by head movement of the negative auxiliary from I to C, which confirms the status of *don't*, *can't*, etc. as heads, and not as vP adjuncts. If children recognize these data in the positive input, they will potentially trigger reanalysis of the features on these lexical items.¹⁸ Negative tags are another potential source of evidence, since these are analysed as reduced questions (e.g. Sailor 2009) and likely to be frequent in the input.¹⁹

There may be more accessible sources of evidence to trigger adding the 'negation as a head' value for the Negative Concord Parameter.

[17] Thanks to Terje Lohndal for suggesting this analysis.

[18] According to Bellugi (1967), negative yes/no questions form less than 7% of the input sample of negation studied from the mothers of Adam, Eve, and Sarah. Negative *wh*-questions are less than 11% of the sample (this includes suggestions, etc.). These figures are from the negation sample, however, not the entire input sample to the child, so we do not have an accurate calculation of their frequency.

[19] Thanks to an anonymous *JL* referee for pointing out that negative tags may provide appropriate positive evidence.

Negative auxiliary verbs, which are formed by adjunction of one head to another, should prove an abundant source of evidence. However, decomposing the morphology of negative auxiliary verbs may be problematic for children, since empirical evidence suggests that, at least for a while, *don't* seems to be treated as a negative adverb, rather than a negative auxiliary verb, at least by some children. The negative auxiliary *doesn't* may be more informative than most other auxiliary verb forms because the agreement morpheme is internal to the word. This provides overt evidence that the word is formed compositionally from several parts, including *n't*. We contend that *doesn't*, in particular, may be an important source of evidence for children to trigger change to the adult grammar.

Once children use negative auxiliary verbs productively (and *doesn't*, in particular) we can infer that negation is no longer just semantic negation in children's grammars. We can assume that they have added formal features for negation and incorporated a NegP phrase into their sentence representations.

3.3 *Negation as a head*

Once children have added *n't* as a lexical item into their lexicon, they require a NegP projection to license it in the syntactic component of the grammar. The head form of negation, *n't*, generates an uninterpretable [uNEG] feature in the head position of NegP. In order for the uninterpretable feature on *n't* to be checked off, the child needs to posit a covert negative operator with an interpretable [iNEG] feature in the SpecNeg position. The negation and auxiliary verb can then merge (Bobaljik 1994). The now adult-like representation for the sentence *This doesn't fit* is shown in (15).

(15) [_{TP} this_i [_T does [_{NegP} Op \neg [_iNEG] [_{Neg0} **n't**_[uNEG]] [_{VP} t_i fit]]]]

Once children adopt the second value of the Negative Concord Parameter, they have moved through one phase of Jespersen's Cycle, from a Phase V to a Phase VI grammar.

The consequence of adding another lexical entry for negation is that children should now be able to produce adult-like sentential negation, sentences like *It doesn't fit*. The question is whether they retain the form *It not fits* (if it was used in their earlier Phase V grammar) alongside *It doesn't fit*. The same question could be asked of negative imperatives. If children produce *Not run!* at the adverbial stage, do they simply add *Don't run!* once the head form of negation is in the lexicon, or do they eliminate the earlier form? Clearly the forms *It not fits* and *Not run!* are not grammatical in adult English, even though a negative adverb continues to be part of the adult grammar, so they must be eliminated from the grammar at some point. The question for acquisition, though, is when these forms are purged, and on what grounds.

One possibility is that a learnability principle, such as the Uniqueness Principle, kicks in to exclude the possibility that is not supported by the input (Wexler & Culicover 1980, Pinker 1984). The Uniqueness Principle does not tolerate two syntactic forms being used for the same meaning, so it could force the non-adult optional form from children's grammar. Another possibility is that the acquisition of *do*-support has the effect of eliminating the non-adult form. This seems likely, although the mechanism that causes inflection to be blocked from appearing on the main verb is not clear. All we know is that sentences with the adverb *not* require *do*-support in the adult grammar (i.e. *It does not fit*).

The third prediction that follows from Zeijlstra's parameter is that once *n't* is added to the lexicon and a NegP functional projection is added to the grammar, negative concord is licensed, suggesting that children could, in principle, produce it. Of course, negative concord is not witnessed in the environmental input of children learning standard English, so this prediction may just be an 'in principle' prediction that fails to eventuate due to lack of linguistic evidence. At the same time, NPIs such as *any* are present in the input for children acquiring standard English, so nothing precludes children from producing them, either at the adverbial stage, or once they have adopted a head form of negation, since NPIs are licensed by either type of negative marker in adult English.

It is interesting to speculate about the timing of children's progression to adult-like sentential negation across dialects of English. Children acquiring negative concord dialects are exposed to the doubling of negative markers in the input, so, all things being equal, these children should adopt the 'negation as a head' value of the Negative Concord Parameter early. The caveat is that children acquiring any variety of English still have to acquire *do*-support before they can use the head form of negation to its full extent, so early use of negative concord could be hampered by this fact.

The fourth prediction is that a number of structures should become available to children as part of their syntactic repertoire once they have incorporated the head form of negation. The presence of negative questions with a raised negative auxiliary verb offers uncontroversial evidence that children have adopted *n't* as a negative head. In adult English, negative questions can be formed with a negative auxiliary verb or with *not*, but the unmarked way is to use a negative auxiliary verb. As noted, children can only produce this structure once they can move the negative auxiliary verb to the left periphery via head movement, as illustrated in (16).

- (16) (a) What don't you like?
 (b) [_{CP} what_j [_C don't_i [_{TP} you [_T t_i [_{VP} like t_j]]]]]

Tag questions are another construction that should not be present at the earlier stage, when negation is restricted to an adverb. Tags can be of two

Early stage: Negation as an adverb	Later stage: Addition of negation as a head
1. Use of <i>no/not</i> used with inflected main verbs (e.g. <i>This not fits</i>)	Negative auxiliary verbs become productive
2. True negative imperatives permitted (e.g. <i>Not walk!</i>)	No true negative imperatives
3. Double negation permitted Negative concord not licensed NPIs permitted if licensed by <i>not</i>	Double negation permitted Negative concord licensed in principle NPIs permitted
4. Constructions requiring I-to-C movement of negative auxiliary verb not possible	Constructions requiring I-to-C movement of negative auxiliary verb become available
(i) No negative questions with raised negative auxiliary verb	(i) Adult-like negative questions (e.g. <i>What don't you like?</i>)
(ii) No tag questions with negative auxiliaries	(ii) Tag questions become available (e.g. <i>You like linguistics, don't you?</i>)

Table 1
Summary of predictions.

types; invariant, as in (17a), or a form of the auxiliary verb that is dependent on the main clause, as in (17b). The dependent type has long been considered to be some kind of reduced question. An analysis by Sailor (2009) proposes that dependent tags are derived by I-to-C movement with subsequent ellipsis of the VP. The movement of the negative auxiliary verb to C should mean that children are not able to produce negative tag questions until negation has been analysed as a head. The structure is illustrated in (17c).

- (17) (a) You like linguistics, eh/huh/right?
 (b) You like linguistics, don't you?
 (c) You like linguistics [_{CP} [_C don't_i [_{TP} you t_i [_{VP} like linguistics]]]]?

The predictions that follow from Zeijlstra's theory are summarized in Table 1.

4. CHILD DATA

This section investigates our predictions for child language (outlined in Sections 3.2 and 3.3 above) based on Zeijlstra's (2004, 2007, 2008a) theory. We have identified a cluster of linguistic properties that may be identifiable in

children's output when they have a Phase V grammar, and a different constellation of properties that should be present in the Phase VI grammar. In order to test the proposal, however, a criterion needs to be identified for deciding the age or stage at which children add the 'negation as a head' option to their grammars. For the Harvard children, the turning point can be the age at which Bellugi (1967) claims the children enter stage 3 in the acquisition of negation, since this is when they are reported to use negative auxiliary verbs productively. A more conservative measure proposed in Thornton & Tesan (2007) is to take productive use of the auxiliary verb *doesn't* as indication that children have added *n't* as a head; we will use this criterion for our investigation of the first prediction.

In order to test the predictions we will draw on a variety of sources of child data from the literature, including data from children's spontaneous productions as well as experimental data. The spontaneous production data include diary data from one child, Laura (Thornton, unpublished data), as well as data culled from the transcripts of the Harvard children (Brown 1973) and the Belfast corpus (Henry 1995, Wilson & Henry 1998) in the CHILDES database (MacWhinney 2000). Because children acquiring English produce comparatively few negative sentences in their spontaneous speech at stages 1 and 2, we also present longitudinal data from four children that were gathered using elicited production methodology. This methodology allowed us to probe two-year-old children's use of negation and inflection in 3rd person singular contexts (see Thornton & Tesan 2007).²⁰ This richer data set allows us to test the first prediction that follows from Zeijlstra's proposal. To further put our proposal to the test, we also discuss an experiment eliciting negative questions conducted by Guasti, Thornton & Wexler (1996).

4.1 Prediction 1

At the adverbial negation stage, children should, in principle, be able to produce negative sentences in which the main verb is inflected, such as *This not fits* or *This don't fits*.

The interaction of inflection and negation was studied longitudinally in four two-year-old children (Tesan 2005, Thornton & Tesan 2007). The children visited our language acquisition laboratory every two weeks for about a year. Details of the children's participation are listed in Appendix B.

[20] Negative sentences were elicited by getting children to contradict various statements made by a puppet, such as a claim that a large toy could fit through the door of a farmhouse, or fit in a toy train. Another elicitation technique was to have the child do a 'science experiment' to check whether or not various items float, stick, squeak, break, etc. Children had to contrast items that did float or whatever the action was (*This one floats!*) with ones that did not (*This one not floats! This one not float! This one doesn't float!*). The element of contrast encouraged children to produce negative sentences.

The elicited production study targeted sentences with third person singular subjects, since these sentences provide the most information about children's knowledge of negation as it interacts with inflection.

As is usual for children in the optional infinitive stage of development, the four children all frequently omitted the morphology in their utterances with 3rd person subjects (see Rizzi 1994; Wexler 1994, 1998). Our focus, however, is those productions in which inflection was present in children's negative sentences. The important finding is that among those utterances with overt inflection were ones that conformed to Prediction 1. That is, three of the four children produced some number of utterances in which inflection was positioned on the main verb, such as *He not fits in there*. Utterances of this kind have been previously mentioned only in passing, and have usually been interpreted as performance errors due to their infrequent appearance.²¹ The fourth child from the group produced fewer negative sentences, but nevertheless did produce one utterance of the form *This don't fits in here*.

The children's data also revealed another type of utterance that has not been well documented in the literature. The children produced some utterances with what we term 'misplaced' morphology, ones like *He -s fit in there* or negative ones like *He -s not fit in there*.²² The utterances with 'misplaced morphology' are not informative for the present inquiry and are therefore excluded from the data we present, but for completeness, they are included in the summary of the data in Appendix C.²³

The four children's data that are represented in the graphs in this paper include only sentences with 3rd person singular subjects, since these data reveal the position of the tense/agreement morpheme, if present.

[21] In Bloom's (1970) list of sentences produced by Kathryn at age 2;2, there are a number of examples in which inflection appears on the main verb. These include *This not fits!*, *This one don't fits* (×2), and *This [?] no goes*, from Bloom's Tables 6.4 and 7.8. This shows that such examples also occur in some children's spontaneous productions. Schütze (2010) also reports also reports that there are 11 utterances in Abe's transcripts in the CHILDES database of the form *This don't works*, in which *don't* appears with an inflected main verb.

[22] Utterances with 'misplaced morphology' occurred with a variety of subjects, including pronouns, DPs, and the child's own name. This fact suggests that the morphology could not have been a plural marker. Another fact that supports our analysis is that the 'misplaced morphology' only appeared with 3rd person subjects, where overt morphology is required.

[23] In Thornton & Tesan (2007), the 'misplaced inflection' was taken to reflect a phonologically weak auxiliary verb that has raised out of the vP, much like the other auxiliary verbs, *be* and *have*. Auxiliary verbs *be* and *have* are often taken to be 'semantically transparent' with the result that they can move over negation, even when it is a head (see Pollock 1989). Therefore, if the weak auxiliary verb is assumed to behave like *be* and *have*, we cannot tell if it has raised over a head or an adverbial form of negation in utterances like *He -s not fit in there*. This means that these particular data cannot inform us of the status of negation in children's grammars.

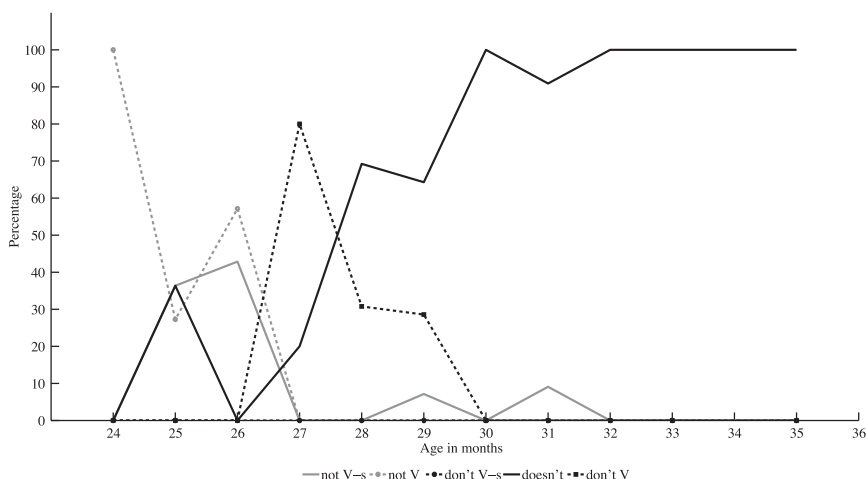


Figure 1
Kristen's negative sentences with 3rd person subjects by age in months.

The first graph for each child shows the variety of utterances that express sentential negation in combination with a lexical verb, excluding the copula.²⁴ Following this, we present a second graph for each child that collapses the data according to whether their negative sentences incorporate the lexical item *not* or *n't*. These graphs all show a sharp transition between use of *not* being exchanged for *n't*. The data show that when children add the head value of the Negative Concord Parameter, they cease to use the adverb, at least for their productions of lexical verbs with third person subjects.

Turning to the first of the four children, this child, Kristen, produced a variety of negative structures, among them sentences with negation and an inflected main verb. The utterances of the form *This not fits* were soon replaced by *don't* and then *doesn't*, as shown in Figure 1.

The next child, Georgia, was a conservative learner and produced few negative sentences. This child did not produce *not* with inflected main verbs, but she produced one instance of *don't* used with an inflected main verb among her utterances. Therefore, although the support is limited for Prediction 1, her data are compatible with the prediction. Georgia's data are shown in Figure 2.

[24] The sentences with misplaced or doubled morphology (e.g. *It s not fit*, *It s don't fit*, *It s don'ts fit*) are not included in the graphs, since we took these to be not informative about the status of negation as head or adverb. The few cases of what could potentially be external negation are also not recorded in the graphs.

SENTENTIAL NEGATION IN EARLY CHILD ENGLISH

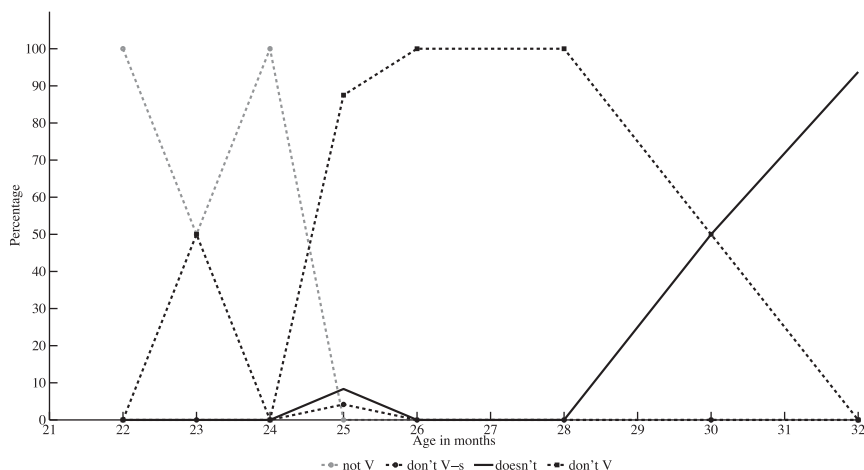


Figure 2
Georgia's negative sentences with 3rd person subjects by age in months.

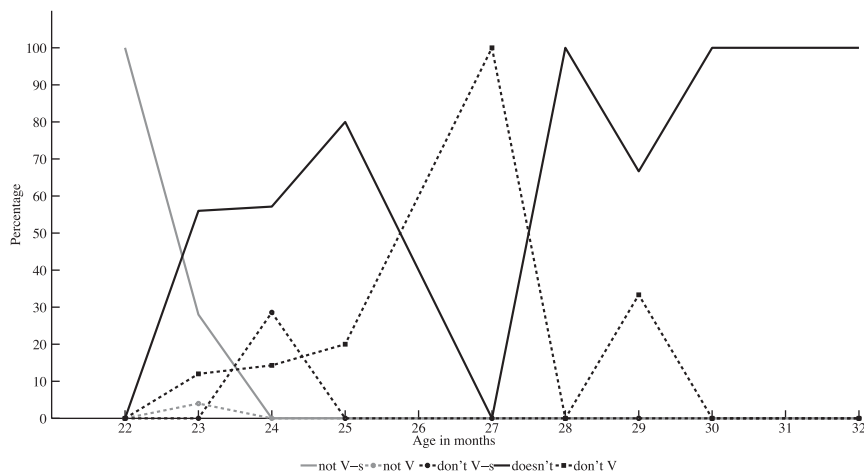


Figure 3
Caitlyn's negative sentences with 3rd person subjects by age in months.

The data for Caitlyn are shown in Figure 3. Caitlyn was the fastest to develop linguistically, rapidly becoming adult-like at just over two-and-a-half years of age, a good year earlier than Curtis, the child whose data follow, and considerably earlier than the majority of the children whose data are recorded in the CHILDES database. Caitlyn began using sentential

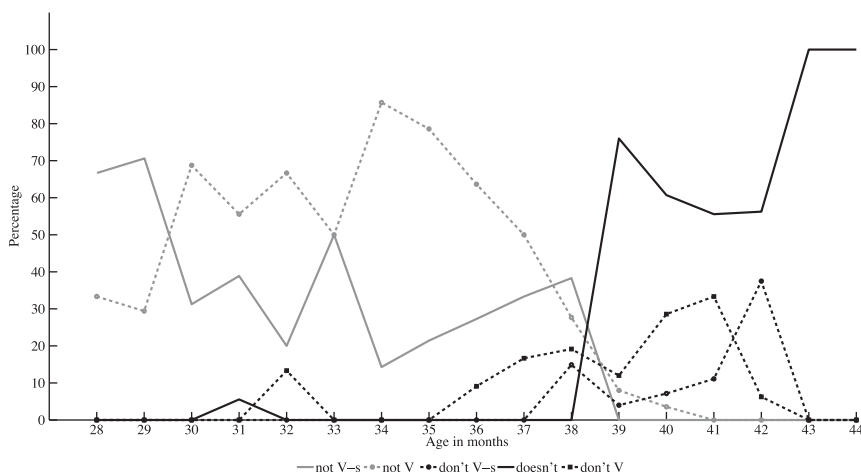


Figure 4
Curtis's negative sentences with 3rd person subjects by age in months.

negation by using *not* plus an inflected main verb, so her data support the proposal that children begin with a negative adverb.

The final child, Curtis, exhibited the most chaotic path of development. There were many cases of utterances with *not* and an inflected main verb in his early productions. He vacillated between alternative structures for negative sentences for many months. When he finally acquired the form *doesn't* at age 3;2, adult-like negative sentences dominated the other forms of negation, which gradually disappeared, but not before he was about three-and-a-half years old. Curtis's development of negation is shown in Figure 4.

Although each child showed a different profile when their negative sentences were charted, the following graphs from each of the children show that once the data are organized by negative marker, *not* or *n't*, each child's pattern of development looks remarkably similar, with *not* being prominent at first, and gradually being replaced by the much more frequent *n't* marker. The data for the four children are shown in Figures 5–8.

As the graphs illustrate, once children adopted *n't* as a head and were using the negative auxiliary *doesn't* productively, utterances like *This not fits in here* disappeared from children's productions.²⁵ There is considerable variation in the age that this takes place, but once it occurs, it is quite rapid. At this point, children have incorporated syntactic negation into their

[25] Recall that these data do not include sentences with the copula, in which *not* as a form of negation is very natural.

SENTENTIAL NEGATION IN EARLY CHILD ENGLISH

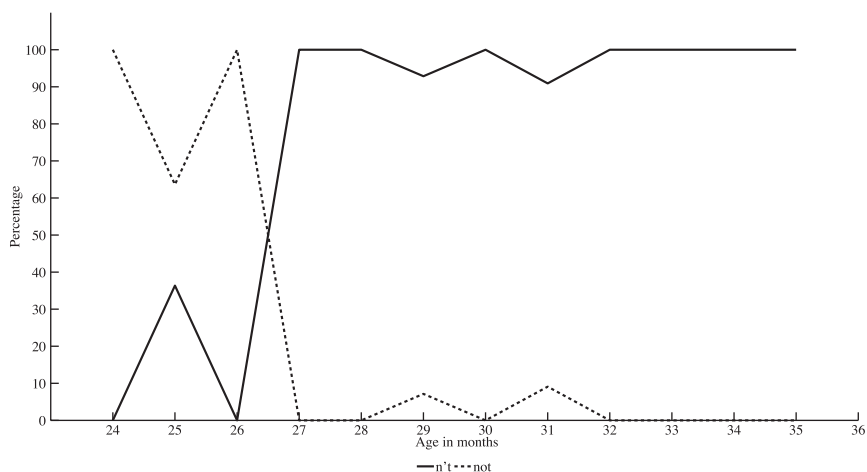


Figure 5
Negative markers *n't* versus *not* in Kirsten's grammar.

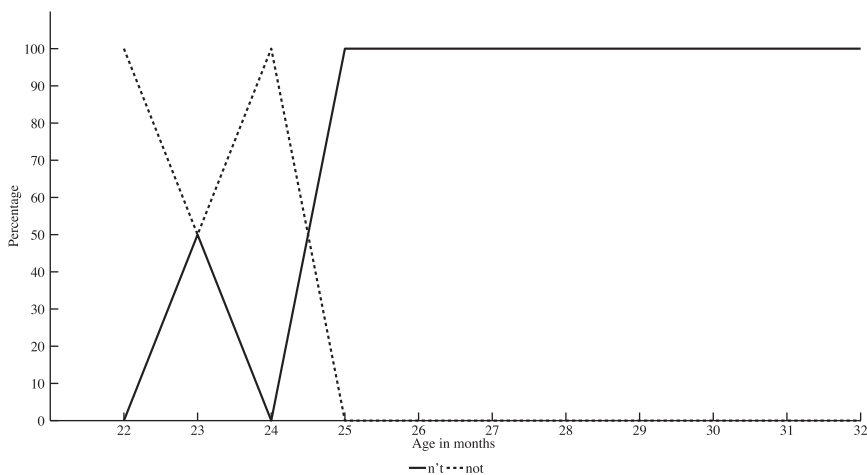


Figure 6
Negative markers *n't* versus *not* in Georgia's grammar.

grammar, and added a NegP. The empirical data suggest that acquisition of *do*-support causes utterances with an inflected main verb to be eliminated, but exactly why this is so is not clear. We simply note here that the ungrammaticality of utterances with negation and an inflected main verb in adult English is also not well understood, especially given that such

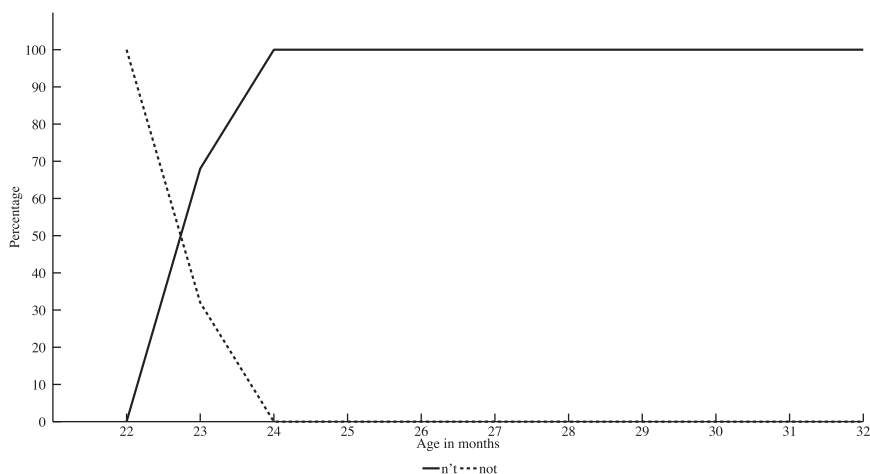


Figure 7
Negative markers *n't* versus *not* in Caitlyn's grammar.

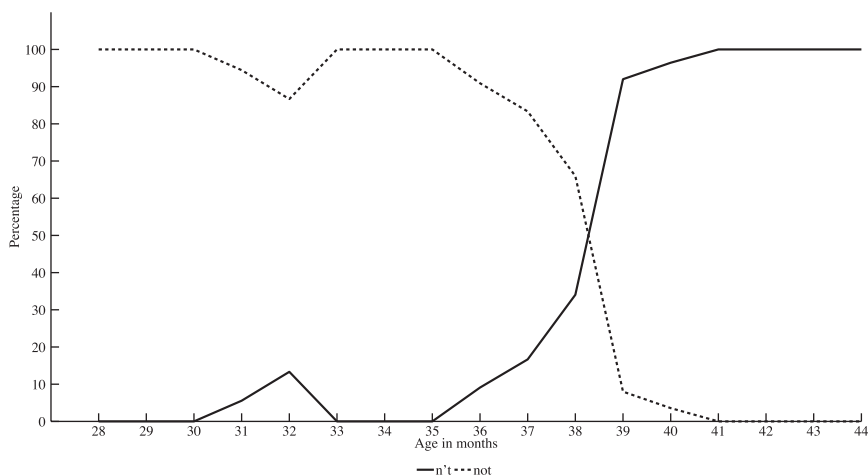


Figure 8
Negative markers *n't* versus *not* in Curtis's grammar.

utterances are perfectly grammatical with the negative adverb *never*, as in *It never fits*.

Another potential reason why children might hesitate to use *not* once *doesn't* enters the grammar is because they are uncertain about its status as a negative adverb or a head. The positive evidence showing *do*-support in lieu

of sentences with inflected main verbs such as *He not fits* may lead them to question their former analysis of *not* as a negative adverb. Consequently they may refrain from its use while they reevaluate its status. Although Zeijlstra (2004, 2008a) assumes that *not* is an adverb in the adult grammar, and this is the assumption we follow in this paper, its status as adverb or head has been debated by theoretical linguists (e.g. Chomsky 1995; Lindstad 2006; van Gelderen 2008, 2011), so its status in child grammar is also worthy of consideration.

Although these issues cannot be resolved, the child data are nevertheless compatible with Prediction 1. The children's data show a rapid change from semantic negation as linguistic evidence causes children to adopt the syntactic negation value of the Negative Concord Parameter. Once children start to use *doesn't* productively, utterances like *This not fits* disappear rapidly from the grammar.

4.2 Prediction 2

Children in the adverbial negation stage should produce true negative imperatives. Recall Zeijlstra's (2004) proposal that Phase V languages, in which negation is a negative adverb, have true negative imperatives, whereas Phase VI languages do not. While there is some uncertainty as to whether negative imperatives with *do*-support such as *Don't run!* are true negative imperatives or not, it is clear that imperatives of the form *Not run!* fit the criterion – such examples show negation simply preceding the affirmative imperative form with no syntactic alternative required for the negative imperative. Evidence that children produce such forms would lend further support for the proposal that children's early grammars are limited to a negative adverb.

Prediction 2 is investigated in diary data from one child, Laura (Thornton, unpublished corpus). Diary data are the source of data here because there are a sizeable number of imperatives, including negative ones, produced at an early age in this corpus. The diary data are comprised of about 4500 utterances, collected from age 1;6 to 2;6.²⁶ The first step is to illustrate that this child was in the early semantic negation stage under discussion. Her negative utterances with inflected main verbs at around age 2 shown in (18) confirm she was using *not* as a negative adverb (age format is shown in years; months.days).

[26] Diary data consists of jottings in a notebook, usually by a parent, of a child's spontaneous production. The advantage is that 'fleeting' stages and utterance types that are relatively infrequent can be captured, but they are often criticized for not being representative of a child's normal development. The diary data presented here are intended only to show that certain constructions can co-occur in a particular timeframe. Furthermore, the child is probably more likely to use imperatives at home with parents than in play sessions in which an investigator is present.

- (18) (a) Daddy, this is not works. (2;0.4)
 (b) This pencil not works. (2;0.4)
 (c) This is not goes here. (2;0.6)
 (d) This not goes here. (2;0.23)
 (e) This not fits. (2;0.25)
 (f) But he don't fits. (2;3.8)

About a month earlier, Laura produced negative imperatives, with the form *Not + V*, as illustrated in (19). The examples in (19d, h) are particularly clear examples of negative imperatives since they are followed directly by a non-negative imperative. Imperatives of this form were frequent at around age two, but then came to an abrupt halt, presumably replaced by *Don't + V* imperatives (in which *don't* could still be a transitional adverb, but we cannot tell from its surface form).

- (19) (a) Not come in, Boomer! (1;11.0) [Boomer is the dog]
 (b) Not go here! (1;11.0)
 (c) Not sing in the car! (1;11.12)
 (d) Not do that! Walk! (1;11.12)
 (e) Not sing that song! (1;11.13)
 (f) Not play your flower pot! (1;11.27)
 (g) Not walk! Dance! (2;0.15)

These data support Prediction 2. True negative imperatives appear in the early grammar when the Negative Concord Parameter defaults to semantic negation. The true negative imperatives are short-lived, however, disappearing well before negation in its head form is added to the grammar. Bellugi (1967), for example, gives examples of *Don't V* imperatives in the Brown (1973) children's grammars at stage 2, so these forms with *do*-support are documented before children have acquired negation as a head. As we have noted, there is no way to tell whether children use *don't* in these imperatives as a transitional negative adverb, or whether it is being analysed as a negative auxiliary verb with the negative head *n't*. Our theory favors the former option, since children are not expected to analyse *n't* as a head until considerably later in the course of acquisition.

4.3 Prediction 3

In the semantic negation stage, children should permit double negation, and negative concord should not be licensed. Negative polarity items such as *any* occur in children's input data and children are expected to use them, as long as they are licensed by a negative adverb (i.e. *not*). Once children have syntactic negation, children's grammars should, in principle, license negative concord. In practice, children may not take up this option but either way,

use of NPIs is expected to continue. Children learning negative concord dialects should adopt negative concord early, unless acquiring *do*-support is a complicating factor.

The first part of Prediction 3 states that at the early semantic negation stage, double negation should be permitted in the grammar. In such Phase V grammars, each instance of negation is semantic negation. Given the cognitive complexity of sentences with double negation, it is unlikely examples will show up in toddlers' speech, and indeed, no such examples have been discussed or observed in the literature. Bellugi (1967) explicitly notes that children do not use double negation in their spontaneous production and that it is a late development in English. Experiments will be required to test when children are able to interpret double negation.

Second, at the semantic negation stage, NPIs should be possible, if licensed by a negative adverb. To assess this, Laura's diary data, and Adam and Sarah's transcript data (Brown 1973) were searched for NPI *any* (as well as *anymore* and *anything*). In Laura's diary data, the finding is that NPIs emerge early, simultaneously with inflected main verbs and true negative imperatives (as discussed for Prediction 1). As expected, in all of the examples below other than the imperative utterance in (20b), the NPI is licensed by *no* or *not*.²⁷

- (20) (a) Boomer's not hungry anymore. (2;0.3)
 (b) Don't touch anything! (2;0.7)
 (c) I not a dog anymore. (2;0.15)
 (d) I'm not scared anymore. (2;0.18)
 (e) There's no anymore. (2;0.24) [= no cookies left]
 (f) Girl's not sad anymore. (2;0.25)

According to Bellugi (1967), Adam and Sarah entered stage 3 and started to use a range of positive and negative auxiliaries productively at quite different ages: Adam was 3;2, and Sarah was 3;8. If we take the children's productive use of negative auxiliary verbs to mean that they have adopted syntactic negation, then we could expect that the children might use NPI *any/anymore/anything* before this age. Adam has a couple of examples at age 3, but Sarah does not use these items as NPIs in the early period. This is somewhat surprising, given Laura's early uses. Adam's examples are given in (21).

- (21) (a) I can't wear that anymore. (3;0.2) file 24
 (b) He won't have anything to... (3;4.01) file 28

[27] Later, Laura often uses *some* under negation, when *any* is appropriate, and this continues until she is 2;6. This has been documented previously in older children (O'Leary 1994). The form *doesn't*, which we have hypothesized signals transition to negation as a head, becomes stable at around 2;7. Laura used two fleeting examples of negative concord, but negative concord does not become productive in her grammar.

Age	NPIs	Negative concord
		(first use)
3;5–3;8	5	8 (3;8)
3;9–4;0	0	28
4;1–4;4	4	26
4;5–4;8	2	37
4;9–4;10	1	21
5;3	7	2

Table 2
Adam's use of negative polarity items and
negative concord by age.

It follows from Zeijlstra's theory of negation that once children have added syntactic negation, sentences with negative concord can be licensed, at least 'in principle'. The intriguing fact is that Bellugi (1967) reported that both Adam and Sarah used negative concord, despite the fact that their parents were not speakers of negative concord dialects.²⁸ Crucially, the sentences with negative concord only occurred late in acquisition, after the children had made the transition to stage 3. Some examples from the children are given from Adam in (22) and Sarah in (23).

- (22) (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
- (23) (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

A closer look at Adam and Sarah's data shows that the children both used NPIs and negative concord after syntactic negation has been adopted, but their profiles differed. Recall, Bellugi (1967) identified Adam as moving to stage 3 at 3;2. A search of the children's transcripts (Brown 1973) revealed that Adam began by using NPIs, but once he started to use negative concord, the NPIs temporarily dropped out of his grammar, appearing again at 4;4. Adam's data, arranged in three-monthly periods, are illustrated in Table 2.

Sarah, on the other hand, used both NPIs and negative concord alongside each other from age 3;5 through to 5;0, so these two structures appeared

[28] Adam is reported to be African American, but the notes on the CHILDES database explicitly say that he was acquiring standard American English. Sarah is described as being from a working class family, and is said to use some non-standard lexical items.

Age	NPIs	Negative concord
		(first use)
3;5–3;8	10	9 (3;5)
3;9–4;0	8	2
4;1–4;4	8	11
4;5–4;8	6	16
4;9–5;0	2	7
5;1	1	0

Table 3
Sarah's use of negative polarity items and
negative concord by age.

to be optional in her grammar. As shown in Table 3, Sarah's first use of negative concord is at 3;5 (file 63), so this is three months before it is predicted, according to Bellugi's (1967) criterion for moving into stage 3. In this context, it is worth noting that Clark & Clark (1977) estimate Sarah's transition to stage 3 to be at 3;5, rather than 3;8. If true, this would bring her data in line with the prediction. Notice that Sarah appears to have a strict negative concord dialect, like Czech (recall (1) above), as (23c) above shows that she allows an *n*-word in subject position in negative concord sentences. Sarah's data are shown in Table 3.

Although Adam and Sarah take up the negative concord option made available once the grammar has instantiated a NegP functional projection, presumably other children choose not to. The child whose diary data we examined, Laura, for example, did not use negative concord productively. The key point is that Universal Grammar does not prohibit children acquiring any dialect of English from using it once they have added a NegP. This raises the question of how children acquiring standard English get rid of the unwanted negative concord utterances. Since the grammar licenses negative concord, it is quite likely that it does not dissipate until it is stamped out by prescriptive grammar in the school years.

All things being equal, the expectation is that children learning negative concord varieties of English should use negative concord earlier than Adam and Sarah, since they are exposed to the relevant doubling input with two negative markers. There are no sources of African American English available on the CHILDES database that can be used to investigate this prediction. Although there is a limited literature on negative concord in African American English (e.g. Green 2011), it does not address the age of emergence. There are data from children acquiring Belfast English (Henry 1995, Wilson & Henry 1998) and Bristol English (Wells 1981) in the CHILDES database, both of which are varieties of English in which negative concord is optional. Here, the Belfast corpus is used to investigate age of emergence.

Child and age	NPIs	Negative concord	
		(first use)	
Barbara 2;4-4;1	5	7	(3;7)
Mich 2;4-4;2	17	2	(3;11)
Court 3;4-4;0	7	2	(4;0)
Rach 2;5-2;9	5	0	
Conor 3;8-4;6	25	2	
Stuart 3;5-4;4	7	0	
John 3;6-4;4	1	2	
David 2;0-4;0	0	0	

Table 4
Negative polarity items and negative concord in the
Belfast corpus.

According to Henry et al. (1997), negative concord first appears very late in Belfast English children, with the first instance not appearing until 4;6. This late use is compared with children acquiring Bristol English, who reportedly have command of negative concord by 3;3. Henry et al. (1997) propose that this difference cannot be attributed to frequency of input or to sociolinguistic variables, and suggest that it has its source in distributional facts about negative concord in the two languages. Our own searches of the Belfast English transcripts on CHILDES show earlier use of negative concord than reported by Henry et al. (1997), with one child's first use of negative concord at 3;7, bringing it closer to the reports of children acquiring Bristol English.²⁹ The Belfast corpus transcripts reveal that the children do not use negative concord very frequently, with uses of NPIs outnumbering instances of negative concord. These data from the Belfast children are summarized in Table 4.

The data from the Belfast children suggest that exposure to negative concord in the input does not speed acquisition of syntactic negation. Both the Brown children and the children in the Belfast corpus start to use negative concord at three-and-a-half years of age or later. It would be useful to see production data from an English variety in which negative concord is the norm, and not optional, as it is in Belfast English, to see whether this has any effect on the emergence of negative concord and the use of NPIs.

There is another interacting variable that may delay use of negative concord no matter what the dialect, or the frequency of its use. It is possible that

[29] The transcripts show that Barbara used two instances of negative concord in file 12 at 3;7. These were *No I'm not really eat chocolate no more* and *I do but don't eat them no more*. Most likely data transcription was not complete at the time of the Henry et al. (1997) publication.

Age	Negative Aux raised to C	Negation in IP
3;0–3;4	0	4
3;5–3;8	5	16
3;9–4;0	2	0
4;1–4;4	2	0
4;5–4;8	10	0
4;9–4;10	12	0
5;2	4	2

Table 5
Adam's negative question forms by age.

even if children were to adopt a NegP phrase early due an abundance of negative concord input, in practice, its use could be severely curtailed until *do*-support has been acquired, typically a fairly late acquisition for English-speaking children. This issue remains for future research.

4.4 Prediction 4

At the semantic negation stage, children cannot produce constructions that require head movement of the negative auxiliary verb. As a consequence, children will not be able to form adult-like negative questions with an auxiliary verb raised to C such as *What don't you like?* or (dependent) negative tags such as *You like linguistics, don't you?*. These structures should become available once the child has added a head form of negation to their grammar.

To test Prediction 4, Adam and Sarah's transcripts (Brown 1973) were searched to see when these structures emerge. We have seen that Adam entered stage 3 at age 3;2, so his negative questions with raised *n't* and tags should emerge after this point. The data for his negative questions are summarized in Table 5. The column labeled 'Negative Aux raised to C' shows Adam's adult-like questions, and the column showing 'Negation in IP' shows any alternative form of negative question in which the negation remained in the IP.

The transcript data show Adam's first negative questions at 3;4, after he entered Bellugi's stage 3. These first four questions are all *why*-questions, which, for some children, are optionally formed with an unraised Aux for a considerable period of time, even when other *wh*-words always appear with a raised Aux (see Thornton 2008). By age 3;5, Adam was producing some yes/no questions with a raised Aux, as well as some with negation remaining in the IP. The main point is that, as predicted, adult-like questions with the negative auxiliary verb raised to C only appear after he has adopted a head form of negation.

Age	Negative Aux	
	raised to C	Negation in IP
3;4	0	0
3;5–3;8	0	4
3;9–4;0	1	0
4;1–4;4	6	1
4;5–4;8	8	1
4;9–5;0	5	3

Table 6
Sarah's negative question forms by age.

Turning to Sarah, there are no negative questions with a raised Aux before 3;8, the age Bellugi states that she entered stage 3. The first negative question with the Aux raised to C is at 4;0. Overall, Sarah asks few negative questions, however. Sarah's data are shown in Table 6.

As Sarah's data illustrate, children acquiring English tend to ask few negative questions in their spontaneous speech (see Harris & Wexler 1996). When the situation calls for a negative question, however, children can oblige. An elicited production experiment by Guasti et al. (1996) elicited positive and negative questions from 10 four- and five-year-old children. In their positive questions, children raised the Aux to C 96% of the time in yes/no questions and in 88% of their *wh*-questions. The children's negative questions took a wide range of forms, however, as illustrated in (24). A raised negative auxiliary verb was used in only 1% of yes/no questions and in 23% of *wh*-questions (see Stromswold 1990).

- (24) (a) What don't you like? Adult form
 (b) What do you don't like? Aux-doubling structure
 (c) What don't you don't like? Neg/Aux-doubling structure
 (d) What you don't like? Noninverted structure
 (e) What do you not like? Not-structure

The most common alternative to the adult negative question structure for both *wh*-questions and yes/no questions was the Aux-doubling structure, shown in (24b) above. A few such Aux-doubling structures were also noted by Stromswold (1990) in Adam's questions. Occasionally the negative Aux doubled was doubled, as in (24c). The other structures used by the children in Guasti et al.'s (1996) experiment included questions with an unraised auxiliary verb (in contrast to their positive questions) and use of *not* rather than *n't*. The figures taken from Guasti et al. (1996) are shown in Table 7.

The children's non-adult question structures all have in common the fact that negation remains in the IP domain, and is not raised by head movement

Structure	Aux-doubling	Neg/Aux-doubling	Non-inversion	'Not'	'Adult'
Yes/no question (= 72)	57 (79%)	1 (1%)	5 (7%)	8 (11%)	1 (1%)
<i>Wh</i> -object or adjunct question (= 342)	109 (32%)	30 (9%)	92 (27%)	33 (10%)	78 (23%)

Table 7

Number and percentage of different negative question structures used by question type for children (N = 10).

to C. In all of these alternative structures that children produce, negation could be analysed as an adverb. In Aux-doubling structures such as *What do you don't like?* and in non-inversion questions such as *What you don't like?*, *don't* could be a transitional negative adverb, as discussed earlier. Children's questions with *not* are, of course, grammatical in the adult grammar, but they are not adults' preferred form, so they can be interpreted as a strategy to avoid raising a negative Aux to C. In sum, all of children's non-adult question structures with negation in the IP are expected before children add the new value of the Negative Concord Parameter.

There is one fact that does not line up with our predictions. Our investigation suggests that English-speaking children add a head negative marker to their grammar, somewhere between age three and age four, so by age four, children should produce adult-like negative questions. The children in the Guasti et al. (1996) experiment were aged four and five, so it is surprising that they are producing this assortment of non-adult structures considerably after syntactic negation should have been incorporated into their grammars. The children are apparently quite conservative, reluctant to implement the consequences of syntactic negation until they are certain.

Tag questions, too, are late in acquisition, as noted originally by Bellugi (1967) and predicted by our theory. Recent linguistic theory analyses negative tags as negative questions 'reduced' to the tag by VP ellipsis, so the prediction is that the timing should be very similar to negative questions, all things being equal. This is confirmed in Adam and Sarah's data in Tables 8 and 9.

Other than two suspect examples well before age three, Adam's first negative dependent tag in the transcripts is at 3;5, exactly the same age that he starts to use negative questions with a raised negative Aux. Before he started to use dependent tags, according to Bellugi (1967), he often formed tags with 'huh?' Some examples at 4;0 are given in (25).

- (25) (a) It's turned on red [?] # huh? (4;0) file 42
 (b) That's like you doing thread # huh? (4;0) file 42
 (c) I have to get black color # huh? (4;0) file 42

Age	Negative Aux in C in questions	Negative tags
3;0–3;4	0	0
3;5–3;8	5	1
3;9–4;0	2	0
4;1–4;4	2	13
4;5–4;8	10	63
4;9–4;10	12	13
5;2	4	5

Table 8
Number of negative questions and negative tags by age
for Adam.

Age	Negative Aux in C in questions	Negative tags
3;4	0	0
3;5–3;8	0	0
3;9–4;0	1	0
4;1–4;4	6	12
4;5–4;8	8	3
4;9–5;0	5	10

Table 9
Number of negative questions and negative tags by age
for Sarah.

As Table 8 shows, neither negative questions nor negative tags appear often before about 4;5 so productivity of these two structures lags considerably after adoption of the head form of negation into the grammar.

Sarah also produced tags at about the same time as she produced negative questions, again confirming our prediction that these structures follow incorporating the syntactic negation value of the Negative Concord Parameter. Sarah adopts the head form of negation at around 3;8, and the data in the table suggest the two structures become productive between 4;1 and 4;4.

We can conclude that Prediction 4 is supported by Adam and Sarah's data. Syntactic structures that require movement of the negative auxiliary to C are not produced before the grammar has incorporated a head form of negation.

5. CONCLUSION

Textbooks on child language recapitulate the developmental stages that children pass through as they acquire sentential negation, mainly based

on the detailed observations of the three Harvard children (Brown 1973) recorded in Klima & Bellugi (1966) and Bellugi (1967). But exactly why children pass through these stages is not well understood. Children appear to ignore the frequent negative auxiliary verbs in the input and, instead, proceed through a protracted stage of development during which they use *not* (and to a lesser extent *no*). Recent literature has attempted to tie children's non-adult forms of sentential negation to the optional infinitive stage of language development, a stage at which tense and agreement are compromised in children's grammars. Although we agree that children's use of tense and/or agreement is not adult-like at this age, we have proposed that there is an additional factor at play. Our proposal is that knowledge of negation is non-adult-like in the early grammar because children's first hypothesis limits them to a negative marker that is an adverb, in keeping with the default value of the Negative Concord Parameter (Zeijlstra 2004, 2007, 2008a).

Adopting Zeijlstra's Flexible Formal Features Hypothesis (FFFH), we suppose that children initially posit semantic features for negation. Children begin with semantic negation because it does not entail structure building in the form of positing a unique functional projection for negation. Children add syntactic negation to their grammar in response to positive input revealing that there is a negative head in the target language. At this point, they posit a NegP functional projection and can check formal features for negation in the syntax.

According to Zeijlstra's proposal, the triggering input that compels children to add syntactic negation is negative concord. Structures with negative concord have two negative markers, signaling to children that both negative markers must be checked off in the syntactic component of the grammar (Zeijlstra 2004). The problem with this learnability scenario is that it does not accommodate children acquiring standard English who do not encounter negative concord structures, but nevertheless still need to add a negative marker that is a head (i.e. *n't*) to their grammar. Negative concord, then, cannot be necessary for adopting syntactic negation (though it should be sufficient to engage this parameter value for other languages). We propose that children learning standard English must find another source of evidence to motivate the NegP projection. Negative auxiliary verbs such as *don't*, *can't*, *isn't* are an abundant source of evidence, but children appear to have some difficulty identifying the negative morpheme. We attribute this to a difficulty in decomposing negative auxiliaries into *Aux + n't*. This difficulty in decomposition, in turn, explains why English-speaking children remain limited to semantic negation for an extended time period.

Taking Zeijlstra's theory of negation as the backdrop, we predicted a number of properties that children's grammars may exhibit at the earlier stage, when they are confined to semantic negation, and then at the later stage when they have taken the available evidence on board and added syntactic negation, adopting the head value of the Negative Concord Parameter.

At the early stages, when negation is an adverb, children potentially allow utterances like *It not fits* with an inflected main verb, they tolerate true negative imperatives, and they (at least potentially) permit double negation. On the flipside, children at this stage must exclude negative concord, and should be unable to ask adult-like questions with the negative auxiliary verb raised to C, or use negative tags. On the other hand, once children have established the fact that English has a head form of negation, utterances like *It not fits* rapidly cease, non-adult negative imperatives such as *Not walk!* disappear, negative concord is (at least in principle) licensed, and constructions requiring movement of the negative auxiliary verb to C become available to children. These predictions have been investigated in a range of empirical data, which has given solid support for our proposed account of the development of sentential negation by English-speaking children.

More generally, usage-based explanations of children's development of negation have more difficulty explaining the mismatch between child and adult grammars. For example, Cameron-Faulkner et al. (2007) lay the blame on the child's attentional mechanisms, claiming that the child in their study used the most salient form of negation in the input (i.e. *no*) as the form to express sentential negation, although this form is typically the form of negation associated with anaphoric negation. This is used in a 'creative' way, in combination with verbal predicates, and only later do children become sensitive to the frequency and distribution of negative forms. This kind of explanation for children's non-adult productions seems to go against the spirit of usage-based theories, in that children are apparently not learning the form/function mapping of negative sentences in tandem (see Tomasello 2000, 2003; Lieven & Tomasello 2008). Another challenge for the usage-based approach is to explain why the earlier and later stages of negation are associated with other properties. On the usage-based approach, each property or construction has to be learned separately on the basis of the input. To take one example, it is a challenge for the usage-based account to explain why Adam and Sarah use negative concord late in the course of acquisition, despite the fact that it is missing in the parental input, and why negative questions and tags also emerge late, despite the fact that they are probably more frequent in children's input data.

Our UG-based theory anticipates a mismatch between English-speaking children and adults, based on the fact that children hypothesize semantic negation until they sort out the evidence for syntactic negation. Although children may take some time to analyse the local input, the interim grammar they adopt is UG-compatible, in line with the continuity hypothesis (e.g. Crain & Pietroski 2002). Once children adopt syntactic negation, they can converge on the adult grammar. However, syntactic negation permits negative concord, and at least some children acquiring standard English take up this possibility (Bellugi 1967). These children eventually have to override this option. At present, little is known about the developmental path of children

acquiring negative concord dialects, and how this compares with children acquiring non-negative concord dialects. These issues, and many others, represent a rich empirical area for future research in the acquisition of negation in child language.

APPENDIX A

Some auxiliary verbs and modals are collapsed. The adverb *never* is also included in the counts.

Auxiliary verb or modal	Naima's mother (Files 61–65)	Lily's mother (Files 46–50)
<i>No</i>	3.9% (9)	3.5% (5)
<i>not</i> (used with <i>be</i>)	9.6% (22)	11.8% (17)
<i>not</i> (with any other verb)	5.1% (12)	11.8% (17)
<i>Never</i>	2.6% (6)	0.7% (1)
<i>don't</i>	37.9% (88)	42.4% (61)
<i>didn't</i>	7.7% (18)	4.7% (11)
<i>doesn't</i>	9.1% (21)	5.6% (8)
<i>isn't/aren't/wasn't/weren't</i>	12.1% (28)	4.9% (7)
<i>can't</i>	5.6% (13)	7.6% (11)
<i>couldn't</i>	0.9% (2)	2.1% (3)
<i>haven't/hadn't</i>	1.7% (4)	0.7% (1)
<i>shan't/shouldn't</i>	0.9% (2)	0% (0)
<i>won't</i>	0.9% (2)	1.3% (2)
<i>wouldn't</i>	2.2% (5)	0% (0)
Total tokens	232	144

Token and proportional frequencies of negative auxiliary verbs in Naima's and Lily's mothers' speech from the Providence corpus on CHILDES.

APPENDIX B

Participants' ages and duration of participation in the study

	Age at beginning of study	Age at end of study	Number of sessions
Caitlyn	1;9.4	2;8.29	18
Kristen	2;0.12	3;0.8	18
Georgia	1;10.23	2;8.20	19
Curtis	2;1.9	3;8.03	31

APPENDIX C

Summary of negative sentences with 3rd person subjects and a lexical main verb (excluding *BE*) for four children (Thornton–Tesan corpus)

	NOT V-s	Don't V-s	Doesn't	Not V	Don't V	-s V	Total
Caitlyn	10 (20%)	2 (4%)	31 (61%)	1 (2%)	7 (14%)		51
Curtis	58 (19%)	19 (6%)	93 (31%)	87 (29%)	34 (11%)	8 (3%)	299
Georgia	0	1 (2%)	18 (31%)	3 (5%)	27 (47%)	9 (16%)	58
Kristen	9 (10%)	0	45 (51%)	10 (11%)	12 (13%)	13 (15%)	89
Total (N=4)	77 (15%)	22 (4%)	187 (38%)	101 (20%)	80 (16%)	30 (6%)	497

REFERENCES

- Bellugi, Ursula. 1967. *The acquisition of the system of negation in children's speech*. Ph.D. dissertation, Harvard University.
- Berwick, Robert & Amy Weinberg. 1984. *The grammatical basis of linguistic performance*. Cambridge, MA: MIT Press.
- Bloom, Lois. 1970. *Language development: Form and function in emerging grammars*. Cambridge, MA: MIT Press.
- Bobaljik, Jonathan D. 1994. What does adjacency do? *MIT Working Papers in Linguistics* 22, 1–32.
- Bobaljik, Jonathan D. & Höskuldur Thráinsson. 1998. Two heads aren't always better than one. *Syntax* 1, 37–71.
- Borer, Hagit. 1984. *Parametric syntax*. Dordrecht: Foris.
- Borer, Hagit & Kenneth Wexler. 1987. The maturation of syntax. In Roeper & Williams (eds.), 123–172.
- Brown, Roger. 1973. *A first language: The early stages*. Cambridge, MA: Harvard University Press.
- Cameron-Faulkner, Theo, Elena Lieven & Anna Theakston. 2007. What part of *no* do children not understand? A usage-based account of multiword negation. *Journal of Child Language* 33, 251–282.
- Choi, Soonja. 1988. The semantic development of negation: A cross-linguistic longitudinal study. *Journal of Child Language* 15, 517–531.
- Chomsky, Noam. 1981. *Lectures on government and binding*. Dordrecht: Foris.
- Chomsky, Noam. 1991. Some notes on economy of derivation and representation. In Robert Freiden (ed.), *Principles and parameters in comparative grammar*. Cambridge, MA: MIT Press.
- Chomsky, Noam. 1995. *The Minimalist Program*. Cambridge, MA: MIT Press.
- Chomsky, Noam. 2000. Minimalist inquiries: The framework. In Roger Martin, David Michaels & Juan Uriagereka (eds.), *Step by step: Essays on minimalist syntax in honor of Howard Lasnik*, 89–155. Cambridge, MA: MIT Press.
- Cinque, Guglielmo. 1999. *Adverbs and functional heads*. Oxford: Oxford University Press.
- Clark, Herbert H. & Eve Clark. 1977. *Psychology and language: An introduction to psycholinguistics*. New York: Harcourt Brace Jovanovich.
- Crain, Stephen, Wei-Jia Ni & Laura Conway. 1994. Learning, parsing, and modularity. In Charles Clifton, Lyn Frazier & Keith Rayner (eds.), *Perspectives on sentence processing*, 443–467. Hillsdale, NJ: Lawrence Erlbaum.
- Crain, Stephen & Paul Pietroski. 2002. Why language acquisition is a snap. *The Linguistic Review* 19, 185–224.
- Demuth, Katherine, Jennifer Culbertson & Jennifer Alter. 2006. Word-minimality, epenthesis, and coda licensing in the acquisition of English. *Language and Speech* 49, 137–174.

- Déprez, Viviane & Amy Pierce. 1993. Negation and functional projections in early grammar. *Linguistic Inquiry* 24, 25–647.
- De Villiers, Jill & Peter de Villiers. 1985. The acquisition of English. In Dan I. Slobin (ed.), *The crosslinguistic study of language acquisition*, vol. 1: *The data*, 27–140. Hillsdale, NJ: Lawrence Erlbaum.
- Dimroth, Christine. 2010. The acquisition of negation. In Wolfgang Klein & Stephen Levinson (eds.), *The expression of cognitive categories*, vol. 4: Laurence R. Horn (ed.), *The expression of negation*, 39–72. Berlin & New York: Walter de Gruyter.
- Droz, Kenneth. 1995. Child English pre-sentential negation as metalinguistic exclamatory sentence negation. *Journal of Child Language* 22, 583–610.
- Fodor, Janet D. & William G. Sakas. 2005. The Subset Principle in syntax: Costs of compliance. *Journal of Linguistics* 41, 513–569.
- Gelderen, Elly van. 2004. *Grammaticalization as economy*. Amsterdam: John Benjamins.
- Gelderen, Elly van. 2008. Negative cycles. *Linguistic Typology* 12, 195–243.
- Gelderen, Elly van (ed.). 2009a. *Cyclical change*. Amsterdam: John Benjamins.
- Gelderen, Elly van. 2009b. Feature economy in the linguistic cycle. In Paola Crisma & Giuseppe Longobardi (eds.), *Historical syntax and linguistic theory*, 93–109. New York: Oxford University Press.
- Gelderen, Elly van. 2011. *The linguistic cycle: Language change and the language faculty*. New York: Oxford University Press.
- Gilkerson, Jill, Nina Hyams & Susan Curtiss. 2004. On the scope of negation: More evidence for early parameter setting. *Generative Approaches to Language Acquisition (GALA)* 10, 175–185.
- Green, Lisa. 2002. *African American English: A linguistic introduction*. Cambridge: Cambridge University Press.
- Green, Lisa. 2011. *Language and the African American child*. New York: Cambridge University Press.
- Guasti, Maria Teresa & Luigi Rizzi. 2002. Agreement and tense as distinct syntactic positions: Evidence from acquisition. In Guglielmo Cinque (ed.), *The structure of DP and IP: The cartography of syntactic structures*, vol. 1, 167–194. New York: Oxford University Press.
- Guasti Maria Teresa, Rosalind Thornton & Kenneth Wexler. 1996. Children's negative questions: The case of English. *Boston University Conference on Child Language Development (BUCLD)* 19, 228–239.
- Haegeman, Liliane. 1995. *The syntax of negation*. Cambridge: Cambridge University Press.
- Haegeman, Liliane & Terje Lohdahl. 2010. Negative concord and (multiple) agree: A case study of West Flemish. *Linguistic Inquiry* 41, 181–211.
- Hamann, Cornelia. 2000. Negation, infinitives and heads. In Susan Powers & Cornelia Hamann (eds.), *The acquisition of scrambling and cliticization*, 423–477. Dordrecht: Kluwer.
- Harris, Anthony & Kenneth Wexler. 1996. The optional-infinitive stage in child language: Evidence from negation. In Harald Clahsen (ed.), *Generative perspectives on language acquisition*, 1–42. Amsterdam: John Benjamins.
- Henry, Alison. 1995. *Belfast English and Standard English: Dialect variation and parameter setting*. New York: Oxford University Press.
- Henry, Alison, Rose McLaren, John Wilson & Cathy Finlay. 1997. The acquisition of negative concord in non-standard English. *Boston University Conference on Child Language Development (BUCLD)* 21, 269–280.
- Hiraiwa, Ken. 2001. Multiple agree and the defective intervention constraint in Japanese. *1st HUMIT Student Conference in Language Research (HUMIT 2000; MIT Working Papers in Linguistics 40)*, 67–80.
- Hiraiwa, Ken. 2005. *Dimensions of symmetry in syntax: Agreement and clausal architecture*. Ph.D. dissertation, MIT.
- Iatridou, Sabine. 1990. About Agr(P). *Linguistic Inquiry* 21, 551–577.
- Ingham, Richard. 2005. The loss of NegV→C in Middle English. *Linguistische Berichte* 202, 171–206.
- Ingham, Richard. 2006. On two negative concord dialects in early English. *Language Variation and Change* 18, 241–266.
- Ingham, Richard. 2007. NegP and negated constituent movement in the history of English. *Transactions of the Philological Society* 105, 365–397.
- Iyeiri, Yoko. 2005. *Aspects of English negation*. Amsterdam: John Benjamins.

- Kemenade, Ans van. 2000. Jespersen's Cycle revisited: Formal properties of grammaticalization. In Susan Pintzuk, George Tsoulas & Anthony Warner (eds.), *Diachronic syntax: Models and mechanisms*, 51–75. Oxford: Oxford University Press.
- Klima, Edward S. & Ursula Bellugi. 1966. Syntactic regularities in the speech of children. In John Lyons & Roger Wales (eds.), *Psycholinguistic papers*, 183–208. Edinburgh: Edinburgh University Press.
- Lasnik, Howard. 1981. Restricting the theory of transformations. In Norbert Hornstein & David Lightfoot (eds.), *Explanation in linguistics*, 152–173. London: Longman.
- Lieven, Elena & Michael Tomasello. 2008. Children's first language acquisition from a usage-based perspective. In Peter Robinson & Nick C. Ellis (eds.), *Handbook of cognitive linguistics and second language acquisition*, 168–196. New York: Routledge.
- Lindstad, Arne. 2006. *Analyses of negation: Structure and interpretation*. Ph.D. dissertation, University of Oslo.
- MacWhinney, Brian. 2000. *The CHILDES project: Tools for analyzing talk*. Mahwah, NJ: Lawrence Erlbaum.
- Merchant, Jason. 2001. Why no(t). Ms., University of Chicago.
- Neelman, Ad & Hans van de Koot. 2002. The configurational matrix. *Linguistic Inquiry* 33, 529–574.
- O'Leary, Carrie. 1994. Children's awareness of polarity sensitivity. Master's thesis, University of Connecticut.
- Pinker, Steven. 1984. *Language learnability and language development*. Cambridge, MA: Harvard University Press.
- Pollock, Jean-Yves. 1989. Verb movement, universal grammar, and the structure of IP. *Linguistic Inquiry* 20, 365–424.
- Poplack, Shana. 2000. *The English history of African American English*. Malden, MA: Blackwell.
- Pullum, Geoffrey K. & Deidre Wilson. 1977. Autonomous syntax and the analysis of auxiliaries. *Language* 53, 741–788.
- Rizzi, Luigi. 1994. Some notes on linguistic theory and language development: The case of root infinitives. *Language Acquisition* 3, 371–393.
- Rizzi, Luigi. 1997. The fine structure of the left periphery. In Liliane Haegeman (ed.), *Elements of grammar: A handbook of generative syntax*, 281–337. Dordrecht: Kluwer.
- Rizzi, Luigi. 2005. On the grammatical basis of language development: A case study. In Guglielmo Cinque & Richard Kayne (eds.), *The Oxford handbook of comparative syntax*, 70–109. New York: Oxford University Press.
- Roeper, Thomas & Edwin Williams (eds.). 1987. *Parameter setting*. Dordrecht: Reidel.
- Sailor, Craig. 2009. Tagged for deletion: A typological approach to VP ellipsis in tag questions. Master's thesis, UCLA.
- Schütze, Carson. 2010. The status of non-agreeing *don't* and theories of root infinitives. *Language Acquisition* 17, 235–271.
- Schütze, Carson & Kenneth Wexler. 1996. Subject case licensing and English root infinitives. *Boston University Conference on Child Language Development (BUCLD)* 20, 670–681.
- Stromswold, Karin. 1990. *Learnability and the acquisition of auxiliaries*. Ph.D. dissertation, MIT.
- Tesan, Graciela. 2005. *What do children have in their heads? Functional categories and parameter setting in child language*. Ph.D. dissertation, University of Maryland, College Park.
- Thornton, Rosalind. 2008. Why continuity. *Natural Language & Linguistic Theory* 26, 107–146.
- Thornton, Rosalind & Graciela Tesan. 2007. Categorical acquisition: Parameter setting in Universal Grammar. *Biolinguistics* 1, 49–98.
- Thráinsson, Höskaldur. 1996. On the (non)universality of functional categories. In Werner Abraham, Samuel Epstein, Höskaldur Thráinsson & Jan-Weuter Zwart (eds.), *Minimal ideas: Syntactic studies in the minimalist framework*, 253–281. Amsterdam: John Benjamins.
- Tomasello, Michael. 2000. Do children have syntactic competence? *Cognition* 74, 209–253.
- Tomasello, Michael. 2003. *Constructing a language: A usage-based theory of language acquisition*. Cambridge, MA: Harvard University Press.
- Travis, Lisa. 1984. *Parameters and the effects of word order variation*. Ph.D. dissertation, MIT.
- Ura, Hiroyuki. 1996. *Multiple feature-checking: A theory of grammatical function-splitting*. Ph.D. dissertation, MIT.
- Vikner, Sten. 1995. *Verb movement and expletive subjects in Germanic languages*. Oxford: Oxford University Press.

- Wells, C. Gordon. 1981. *Learning through interaction: The study of language development*. Cambridge: Cambridge University Press.
- Wexler, Kenneth. 1994. Optional infinitives, head movement, and the economy of derivation in child language. In David Lightfoot & Norbert Hornstein (eds.), *Verb movement*, 288–315. Cambridge: Cambridge University Press.
- Wexler, Kenneth. 1998. Very early parameter setting and the unique checking constraint: A new explanation of the optional infinitive stage. *Lingua* 106, 23–79.
- Wexler, Kenneth & Peter W. Culicover. 1980. *Formal principles of language acquisition*. Cambridge, MA: MIT Press.
- Wexler, Kenneth & M. Rita Manzini. 1987. Parameters and learnability in binding theory. In Roeper & Williams (eds.), 41–76.
- Wilson, John & Alison Henry. 1998. Parameter setting within a socially realistic linguistics. *Language in Society* 27, 1–21.
- Wode, Henning. 1977. Four early stages in the development of L1 negation. *Journal of Child Language* 4, 87–102.
- Zanuttini, Rafaella. 1991. *Syntactic properties of sentential negation*. Ph.D. dissertation, University of Pennsylvania.
- Zanuttini, Rafaella. 2001. Sentential negation. In Mark Baltin & Chris Collins (eds.), *The handbook of contemporary syntactic theory*, 511–535. Malden, MA: Blackwell.
- Zeijlstra, Hedzer Hugo. 2004. *Sentential negation and negative concord*. Ph.D. dissertation, University of Amsterdam.
- Zeijlstra, Hedzer Hugo. 2007. Doubling: The semantic driving force behind functional categories. In Balder ten Cate & Henk Zeevat (eds.), *Logic, language and computation*, 260–280. Berlin: Springer.
- Zeijlstra, Hedzer Hugo. 2008a. On the syntactic flexibility of formal features. In Theresa Biberauer (ed.), *The limits of syntactic variation*, 143–174. Amsterdam: John Benjamins.
- Zeijlstra, Hedzer Hugo. 2008b. Negative concord is syntactic agreement. <http://ling.auf.net/lingBuzz/000645> (retrieved 24 May 2012).
- Zeijlstra, Hedzer Hugo. 2010. Not in the first place. <http://ling.auf.net/lingBuzz/000523> (retrieved 18 October 2010).

Authors' addresses: (Thornton)

*Linguistics Department, Macquarie University,
North Ryde, NSW 2109, Australia
Rosalind.Thornton@mq.edu.au*

(Tesan)

*Department of Cognitive Science, Macquarie University,
North Ryde, NSW 2109, Australia
Graciela.Tesan@mq.edu.au*