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What part of *no* do children not understand? A usage-based account of multiword negation*

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ABSTRACT

The study investigates the development of English multiword negation, in particular the negation of zero marked verbs (e.g. *no sleep*, *not see*, *can't reach*) from a usage-based perspective. The data was taken from a dense database consisting of the speech of an English-speaking child (Brian) aged 2;3–3;4 (MLU 2·05–3·1) and his mother. The focus of the study was the emergence and usage of negators in the child's and mother's speech (e.g. *no*, *not*, *can't*, *won't*, *don't*). Two analyses were conducted: firstly, the emergence and usage of all negators in Brian's speech and in the input were calculated in order to present an overall picture of negator usage across the sample. The findings indicate a gradual and systematic development of negator selection in Brian's speech which follows the trajectory *no–not–'nt*. The pattern of negator emergence was found to follow the frequency of negators in the input; that is negators used frequently in the input were the first to emerge in the child's speech. Secondly, a more fine-grained analysis of utterances

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containing negated zero marked verbs (*neg V* utterances) was conducted on both the child's and mother's speech. In the first instance the development of negator selection for all *neg V* utterances was calculated. The results indicated the same *no–not–'nt* cline as attested in the initial analysis. A function-based analysis of *neg V* utterances was also conducted which indicated that the speed of movement across the *no–not–'nt* cline varied from one function to the next. A function-based analysis of the input suggested that the speed at which Brian moved across the cline within a particular function could be traced to function-based frequency effects in the input. Thus the findings of the study indicate function-based, input-driven learning which is consistent with the usage-based approach. However the findings also indicate creative learning on the part of the child from the earliest stages of multiword negation.

INTRODUCTION

The expression of negation in English is complex and has received a large degree of attention from linguists over the years. English has two negative morphemes *no* and *not*, the latter of which can combine with auxiliary verbs to form *'nt* negators (e.g. *can't*, *don't*, *won't*). Each negator occurs with a particular subset of word classes to express specific subfunctions of negation, for example NON-EXISTENCE (e.g. *There's no juice left*), REJECTION (e.g. *I don't want anymore*) and PROHIBITION (e.g. *No swimming*).

Numerous studies of negation development in English-speaking children have been conducted, especially within the generative tradition. Klima & Bellugi (1966) present the findings of a holistic description of negation in English and identify three stages of development which in their basic form are still referred to by many child language researchers. At Stage 1, the child uses *no* or *not* to signal negation. This results in appropriate use of negators where the child's use of *no* and *not* could be considered to mirror the input (e.g. *no juice* to express NON-EXISTENCE or REJECTION and *not red* to express DENIAL) but also leads to erroneous use of negators (e.g. **no see*, **not run*[1]). The identification of *no* and *not* as Stage 1 negators has been taken by some researchers to mean that *no* and *not* are interchangeable at this stage (e.g. Harris & Wexler, 1996).

During Stage 1, negation is considered to be external to the clause. Klima & Bellugi also claim that children at this stage produce external sentential negation (e.g. *no the sun shining*, *no Nathanial a king*), where the negator is

[1] While it could be argued that utterances such as *not run* may be attested in the input as part of *aux+not V* units (e.g. *I can not run*), studies have indicated that the contracted form of *not* (i.e. *'nt*) is used with much higher frequency than the full form in Child Directed Speech (Bellugi, 1967; Choi, 1986).

external to a full sentence. However Bloom (1970) and Wode (1977) claim that negation in some of these utterances is anaphoric, that is, it relates to the previous utterance. For example in (1) the negator in the child's speech does not relate to the other lexical item in the utterance (i.e. *sugar*) but instead to the previous utterance produced by the adult (Wode, 1977).

(1) ADULT: Do you want salt?
CHILD: No, sugar.

Wode suggests that children pass through a period of anaphoric negation before moving on to produce non-anaphoric negation constructions.

Stage 2 is characterized by the emergence of *can't* and *don't* as negators of zero marked verbs (that is verbs with no overt tense or aspectual marking) and the continuation of Stage 1 negators (i.e. *no* and *not*) in both grammatical and ungrammatical environments. Klima & Bellugi claim that during this stage *can't* and *don't* are unanalyzed wholes as opposed to *auxiliary* + *'nt* constructions since *can* and *do* are not attested in any other forms of constructions (i.e. declaratives or questions). This claim is supported by Choi (1988), who adds *won't* to the list of unanalyzed *auxiliary* + *'nt* units that occur in the early stages of negation development.[2] At Stage 2, negation is considered to be internal to the clause (e.g. *I no want juice*, *I can't see*). By Stage 3, the child is considered to have an adult-like command of negators, that is *no* and *not* are used appropriately and also a wide range of *'nt* negators (e.g. *didn't*, *isn't*, *won't*) are attested in the child's speech.

Given the close link between form and function in negation, child language researchers have argued that both form and function need to be analyzed in order to understand how children acquire the negation system of their target language (e.g. Bloom, 1970; de Villiers & de Villiers, 1979; Choi, 1988). Bloom (1970) identified three functions of negation which emerged in the same order for all children in her sample, that is, NON-EXISTENCE (e.g. *There's no juice*), REJECTION (e.g. *I don't want juice*) and DENIAL (e.g. *That's not juice*). Bloom suggested that newly emerging functions are expressed by existing forms. Furthermore, Bloom claimed that the emergence of multiword forms followed the same trajectory as the initial order of emergence of functions, that is adult-like multiword forms emerged first in NON-EXISTENCE, then in REJECTION and finally in DENIAL utterances.

Choi (1988) investigated the early stages of negation development in English, French and Korean children. Choi categorized negation into eight functions as opposed to Bloom's three, arguing that Bloom's taxonomy was not sufficiently fine-grained to present a clear picture of form–function

[2] Given the phonetic irregularity between some affirmative and negated forms of auxiliaries (see Zwicky & Pullum, 1983), it could be argued that all *aux'nt* units are learned as unanalyzed wholes (Choi, 1986).

development. Choi suggested that the emergence of forms to express particular functions was affected by the stage of development in which the function emerged. In the expression of early emerging functions (e.g. PROHIBITION, REJECTION and NON-EXISTENCE), an existing form was used initially, whereas functions that emerged later in development (e.g. DENIAL, INABILITY and EPISTEMIC NEGATION) were expressed by new forms which were specific to the function in question.

Both studies present insights in the development of negation but bring with them a number of limitations. Firstly, the samples used in the studies are relatively small. This is of particular importance when the sample is being broken down into fine-grained categories of negation function; patterns of development can easily remain hidden. Secondly, the studies do not systematically investigate where the forms used by the children come from, and why the forms emerge in a particular sequence. Finally, previous studies of negation which take a function-based approach do not fully situate the findings within a robust framework of language development. Without a model of development, studies can only describe patterns of development, as opposed to explain them.

In the present study, we will argue that the development of negation in English-speaking children fits naturally within usage-based approaches to language development, specifically the approach proposed by Tomasello (2000, 2003). Usage-based researchers claim that linguistic structure emerges from experience (e.g. Langacker, 1987; Bybee & Scheibmann, 1999; Croft, 2001). In the case of the child, this relates to the linguistic signal they experience on a day-to-day basis (the input) and also their own existing system of linguistic representation at a given point in development. The main focus of the present paper will be the way in which children use linguistic input and how this interacts with their current state of linguistic development. Tomasello (2000, 2003) claims that children use a range of cognitive–general learning mechanisms during language development. These include intention-reading (the ability of children to work out the meaning behind their daily experiences), analogy (the ability to compare entities), structure combining (the combination of existing structures to create new ones) and competition (sensitivity to differences between input features and the child's own representation; similar to Bates & MacWhinney's (1987) Principle of Competition, and Clark's (1987) Principle of Contrast).

The notion of competition is a powerful one. Essentially, the process can be divided into two subprocesses, entrenchment and preemption. Entrenchment is a key tenet of all usage-based models. The process relates to the habituation of repeated behaviour:

> Entrenchment simply refers to the fact that when an organism does something in the same way successfully enough times, that way of doing

> it becomes habitual and it is very difficult for another way of doing that same thing to enter the picture. (Tomasello, 2003:300)

With regard to language development, entrenchment can be viewed as an outcome of the learning process. If the child has arrived at a particular way of saying X and consistently finds that saying X brings the desired result, then this form may become entrenched in the child's representation of a particular communicative function. While this may lead to an adult-like representation of some linguistic structure, it can also lead to the entrenchment of a child's creative linguistic structures which may have been formed for example by structure building or analogy. Preemption allows the child to contrast their existing linguistic representation with the input. For example, if a child uses the form **breaked* in a particular communicative event but only ever hears *broke* in the expression of the same event, then the attested form will eventually be adopted by the child, resulting in a more adult-like representation of the structure in question.

The notion of communicative intent is central to the usage-based approach; children learn language to get things done and thus their acquisition of language is best understood as a process of acquiring conventional ways of 'doing things with words', to adapt Austin's well-known description of adult language (Austin, 1962). With regard to the development of negation, this implies that the child is working out how to reject, how to deny, how to prohibit and so on. If the input provides a clear mapping between form and function, and the child is ready to acquire a specific function, then it stands to reason that the form will be readily assimilated into the child's linguistic system. However, if the form–function mapping is opaque (for example a function is expressed by a number of different forms, or conversely one form expresses a range of functions) or infrequent in the input then this could hinder the child's acquisition of the form. These hypotheses are captured formally in the Competition Model (Bates & MacWhinney, 1987, 1989), where the cue validity (i.e. the reliability and availability of cues) is claimed to affect the sequence in which grammatical markers emerge in the child's linguistic representation.

The study of negation provides a useful test bed for usage-based approaches to language development, since form and function are inextricably linked within its representation. Negation development also provides a challenge for data driven theories such as usage-based models, since in the early stages of development English-speaking children produce a large proportion of utterances that are unattested in the input (e.g. *no see it*, *not want sleep*). Given that it is claimed that children learn their target language from the input, it is important for the usage-based approach to account for such data and also to explain how the child moves on from this stage towards a more adult-like linguistic representation.

The present study investigates the development of negators in the speech of one English-speaking child (Brian) and in the speech of his mother. The analysis benefits from the densely sampled data that constitutes Brian's corpus. The first aim of the study is to present a global picture of negation development and compare these findings with previous studies. A detailed lexically based analysis of the input data will also be presented in order to ascertain the extent to which the development mirrors input frequencies. The second aim of the study is to investigate the development of a specific group of utterances in detail. Negated utterances containing zero marked verbs were chosen for the more fine grained analysis since it is only *no V* utterances (e.g. *no see*, *no reach*) which we can be sure are unattested in the input and thus are most problematic for the usage-based approach. Furthermore, unlike other verb forms or parts of speech, *neg V* utterances almost always require *'nt* negators (e.g. *can't*, *don't*, *won't*) in the target language and thus provide a perfect setting for investigating the development of *'nt* negation, which constitutes the later stages of negation development as defined by Klima & Bellugi (1966).

METHODOLOGY

Participants

The data for the study were taken from a dense database containing the speech of one child (Brian) and his mother. Both participants are monolingual English speakers. The dyad was recorded for an hour five times a week (four audio and one video recording) over a year from age 2;0 until 3;3 and from then on for five hours within one week every month. The recordings were conducted by trained staff from the Max Planck Child Study Centre at the University of Manchester. Brian's family live in the Manchester area and he is an only child. Brian's mother is the primary caregiver.

Transcription

Research assistants transcribed all of the tapes using standard CHAT procedures (MacWhinney & Snow, 1990). During the training stage, all transcripts were checked by the research coordinator. Following this, each transcript was subsequently linked to the sound file by a second transcriber. Any differences noted between the transcript and what the second transcriber could hear on the sound file were referred to the research coordinator for adjudication and, if necessary, subsequently changed. Finally, the transcripts were run through the MOR programme and any further errors in morphemization were corrected.

TABLE 1. *Age, MLU and amount of data incorporated in each of Brian's data samples*

Age	MLU	Hours of recordings
2;3	2·05	20
2;6	2·2	20
2;9	2·75	19
3;0	3·0	14
3;3 & 3;4	3·1	10

Brian's speech sample

The present study tracked Brian's speech from 2;3 to 3;4.[3] Month long samples were taken at tri-monthly intervals resulting in five time samples for Brian's speech. Imitations, self repetitions and incomplete utterances were excluded from the sample. Table 1 displays the age, MLU and hours of recording incorporated in each of the five samples.

Brian's mother's speech sample

The input sample included five hours of data taken from the first week of Brian's recordings at age 2;1 and also five hours taken from the recordings at 2;8. Thus in total ten hours of data were analysed. Incomplete utterances and routines (e.g. story-telling and songs) were excluded from the analysis.

Two samples from different periods were chosen in order to determine whether the input addressed to Brian at 2;1 was significantly different from that produced at 2;8, and whether these differences correlated to the patterns of development found in Brian's speech. Care was taken to select the mother's sample from different recordings from those used in Brian's analysis in order to be sure that any correlations between Brian's speech and his mother's were not just the result of discourse factors such as repetitions and recasts on the part of the mother. The 2;1 sample was chosen to present an indication of the type of input available to the child at the onset of the study, while the 2;8 sample was chosen because it marked a middle point in Brian's data sample.

[3] Ideally the sample would have spanned a year exactly. However, only four files were available at the time of analysis for the 3;3 sample, resulting in a smaller sample for this age than the previous samples. Therefore two months (i.e. 3;3 and 3;4) were combined for the final sample.

Procedure

In the first instance, all multiword negated utterances were extracted from Brian's speech sample and coded according to negator type (e.g. *no*, *not, can't*, *don't*). The development of other constituents of negated utterances, e.g. subjects and objects, was omitted from the study. Next, all negated utterances containing *neg V* (that is utterances containing zero marked verbs, e.g. *sit*, *sleep*, *reach*) were extracted from Brian's speech and coded for pragmatic function (e.g. FAILURE, INABILITY).

All negative utterances containing *no*, *not* and negated auxiliaries were included in the input sample in order to gain a more holistic picture of negation in Brian's mother's speech at a particular point in time. Also for this reason both single word and multiword negation utterances were included in the input sample. The input sample was also coded for negator and pragmatic function.

Categorization of functions

The coding taxonomy used in the present study is a modified version of the taxonomy proposed by Choi (1988). The taxonomy adopted in the present study uses seven of Choi's original nine codes (omitting inferential and normative negation) and adds a new code labelled 'OTHER'. The categories used in the present study are presented below with examples taken from Brian's speech.

NON-EXISTENCE: absence of an entity/non-ownership of an entity (Brian 2;3)

MOTHER: no.
MOTHER: I think he's run away.
CHILD: no more Bow.
MOTHER: no more Bow.
MOTHER: he's gone, hasn't he?

FAILURE: non-occurrence of a particular event (Brian 2;6)

MOTHER: I'll play with you.
CHILD: oh.
CHILD: no fit in da box.
MOTHER: no.
MOTHER: it wouldn't fit in the box.

DENIAL: negate the truth of a previous proposition where the proposition may or may not be explicit (Brian 2;6)

MOTHER: Is it soggy?
CHILD: No soggy.

REJECTION: negate proposed/future event/state in which the speaker is to be involved (Brian 2;6)

CHILD: Crash.
MOTHER: No.
CHILD: No watch.
MOTHER: No.
MOTHER: You don't have to watch it, sweetheart.
MOTHER: especially not if it upsets you.

PROHIBITION: negate interactant's activity (includes self prohibition) (Brian 2;3)

CHILD: Mum-mum.
CHILD: No move.
MOTHER: I won't move.
MOTHER: Don't you worry.

INABILITY: negate physical ability (Brian 2;3)

CHILD: White one reach.
CHILD: No reach.
MOTHER: No reach?
MOTHER: You'd like the red one?
MOTHER: Can you not reach it?

EPISTEMIC NEGATION: negate possession of knowledge (Brian 2;6)

MOTHER: and do you know who this is?
MOTHER: what's this a picture of?
CHILD: I don't know.
MOTHER: you don't know.

OTHER: This category was created to capture a set of complex utterances found in the mother's speech. In these utterances the negator relates to the main clause as opposed to the utterance as a whole.

CHILD: no down there.
MOTHER: alright.
MOTHER: shh shh.
MOTHER: I don't think you are very well.

Codes were identified by considering the target sentence in context. If the pragmatic function of the utterance could not be ascertained it was coded as ambiguous. The main analysis focuses on the pragmatic functions in which Brian uses *neg V* utterances productively. However, in order to gain a general picture of the input the present study calculated the overall frequency of all functions found in the input sample in the first instance.

Coding reliability

Ten percent of the negation utterances from each of Brian's data samples (i.e. 2;3, 2;6, 2;9, 3;0 and 3;3) and 10% of Brian's mother's 2;1 and 2;8 data samples were coded by a second researcher and resulted in 87% agreement (Cohen's kappa = 0·81) for Brian and 93% agreement (Cohen's kappa = 0·91) for the mother.

Analyses

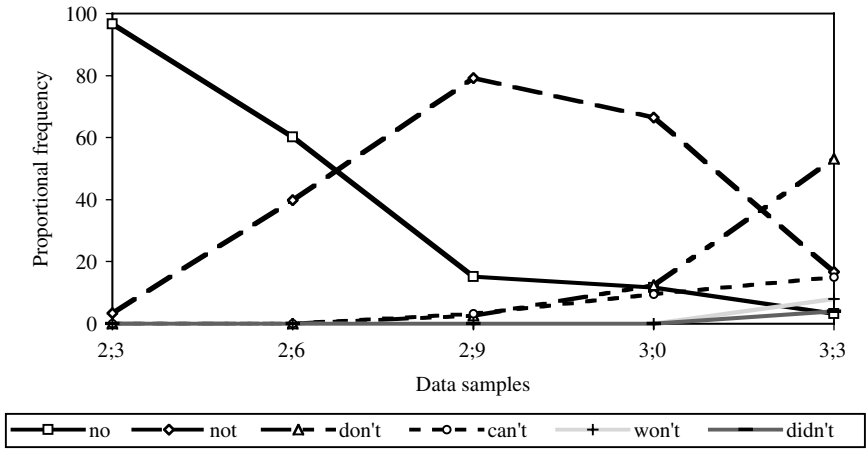
Three analyses were conducted:

Analysis 1: Overall development of negators in Brian's sample. The first analysis was based on all multiword negated utterances in Brian's speech samples. All utterances containing negators were isolated from Brian's speech samples and the proportional frequency of each negator was then calculated in order to gain an overall picture of negation development. Only negators used with three or more different lexical items (referred to as the *3+ productivity criteria* from this point) were included in the analysis to avoid the inclusion of rote-learned utterances. The aim of the analysis was to present a global picture of negation development and the function-based analysis was not included in this initial analysis.

A similar analysis was calculated within each of the two input samples. Both single and multiword negation utterances were included, even though the study is limited to the development of multiword utterances in the child's speech. This decision is based on the hypothesis that all negators in the input, whether they occur in isolation or embedded within multiword utterances, will be used to shape the linguistic system of the child.

Analysis 2: Development of the neg slot in neg V *utterances*. The second analysis focused specifically on the development of the negators found in *neg V* utterances in Brian's speech. Again the analysis presents an overall picture of negator development and the function-based analysis was not incorporated at this stage. The results of Analysis 2 were then compared with the findings of Analysis 1 to ascertain whether the development of negators in the *neg V* unit followed a similar pattern as negator development in Brian's negation system as a whole.

Analysis 3: Development of the neg slot in neg V *utterances within each function*. This analysis investigated the development of *neg V* at a function-based level. The aims of the analysis were to investigate whether the development of the *neg V* utterances differed within the negation functions found in Brian's speech, and whether any differences could be attributed to patterns attested in the input sample. All *neg V* utterances were grouped according to function (e.g. REJECTION, INABILITY) in both Brian's speech and the input. The negators within each function were then analyzed. Only negators which met the 3+ productivity criteria WITHIN the function



Token and proportional frequencies are displayed in Appendix A

Fig. 1. Proportional frequency of negators in Brian's speech samples.

were included in the analysis. All NEGATED utterances (both single and multiword) found in the input sample were coded according to function, and within each function according to negator.

RESULTS

Analysis 1: Proportional frequency of negators in Brian's speech samples

The analysis focused on the types of negators used in each of Brian's speech samples. The results are shown in Figure 1.

The data indicate some clear development trends with regards to Brian's use of negators. At 2;3 the predominant multiword negator in Brian's speech is *no*. Consequently utterances such as examples (2–5) comprise the main multiword negation strategy used in Brian's early sample:

(2) No move.
(3) No man.
(4) No there.
(5) No work.

While some of these utterances could be viewed as fragments of adult-like speech (e.g. *no man* could have been segmented from a utterance such as *There's no man in there anymore*), other utterances appear to be more novel, for example *no* in combination with zero marked verbs as shown in (2) and (5). The only other negator used during this time sample was *not*, of which there were only four tokens accounting for 3% of Brian's 2;3 sample.

By 2;6 the frequency of utterances containing *not X* has increased dramatically. Examples (6) to (9) illustrate Brian's use of *not X* during this sample:

(6) Not crunchy.
(7) Not going there.
(8) Not go.
(9) Not open the lid.

Not X utterances become and remain the predominant negation construction in Brian's speech until the final 3;3 sample. Conversely *no X* constructions decreased from 2;3 onwards. The most marked reduction in frequency appears to coincide with the rise in frequency of *not X* utterances.

Don't and *can't* are the first*'nt* negators to emerge in Brian's speech and are used productively by 2;9 as illustrated by (10) and (11).

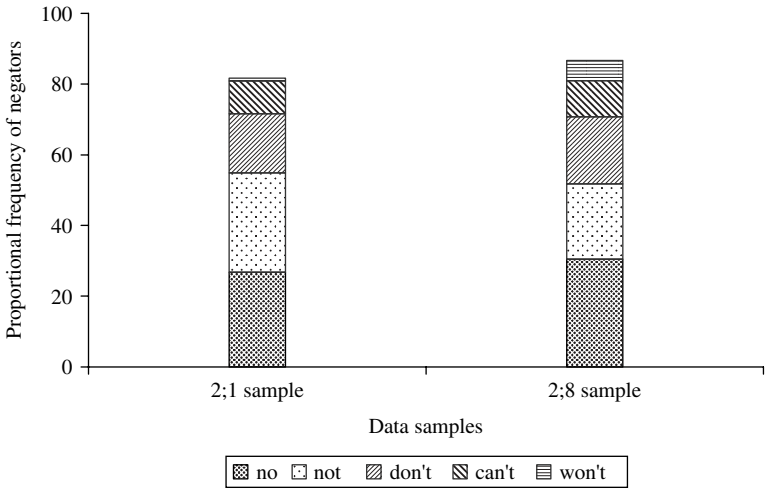
(10) Don't sit down here.
(11) I can't talk.

By 3;3, *don't* is the predominant negator in Brian's speech, accounting for just over half of all Brian's negated utterances. At this stage *no* accounts for only 3% of Brian's negated utterances and *not* has decreased in frequency dramatically since 3;0 and now accounts for only 17% of negated utterances in the final speech sample. *Didn't* and *won't* emerge in the final sample, accounting for approximately 8% and 4% respectively of negated utterances in the final sample. Examples of Brian's *didn't* and *won't* utterances during this period are shown in (12) and (13) respectively.

(12) I didn't have it a long time, have I?
(13) I won't play anymore.

Brian's data support the developmental pattern of English negation as attested in previous studies (e.g. Bellugi, 1967; Choi, 1988). That is, Brian's earliest multiword negation strategies are overwhelmingly *no X* and *not X* utterances, with *don't* and *can't* being the first *'nt* negators to emerge. However, the data indicate that *no* and *not* are not used interchangeably as previous studies have suggested (e.g. Harris & Wexler, 1996), but represent two developmental stages which at some point overlap. Thus the development of negators in Brian's speech appears to indicate a *no–not–'nt* cline of progression.

Proportional frequency of negators in the input. The frequency of negators as a proportion of all negated utterances was calculated for the mother's speech in the 2;1 and 2;8 samples in order to ascertain whether any differences existed between the samples, and the extent to which the frequency of negators in the input reflected the emergence of negators in Brian's speech sample. Figure 2 illustrates the proportional frequency of negators with a



Token and proportional frequencies are displayed in Appendix B

Fig. 2. Proportional frequency of negators (5% and over) in 2;1 and 2;8 input samples.

proportional frequency of 5% or above in either or both of sample 2;1 and sample 2;8.

In both samples *no* (as a single word negator), *not*, *can't* and *don't* are the most frequent negators and together account for 81% of the 2;1 and 2;8 samples. Chi-square analysis indicates that there is no significant difference in the frequency of these negators between the two samples ($\chi^2 = 4{\cdot}201$, $df = 3$, $p = 0{\cdot}241$).

The analysis of Brian's negators and the frequency of negators in the input samples indicate a relationship between the order of emergence of negators in Brian's speech and the frequency with which negators occur in the input. *No* (as a single word negator) and *not* are the most frequent negators in each of the input samples and are the first to emerge in Brian's speech. However, it is interesting to note that *no* emerges first in Brian's speech even though *not* also occurs with high frequency. Furthermore, Brian uses *no* as a multiword negator in combination with a range of word classes, but in the input sample *no* is used in all but two instances as a single word negator. Thus it would appear that input frequency may contribute to the early emergence of *no X* constructions in Brian's speech, but that other factors must also play a role. It is probable, for example, that Brian used *no* as a single word negator prior to multiword negation, and that this subsequent familiarity with the negator may contribute to his initial reliance on *no X* utterances. Unfortunately, the present data set does not start prior to multiword negation, but a brief survey of the 2;3 sample indicates that

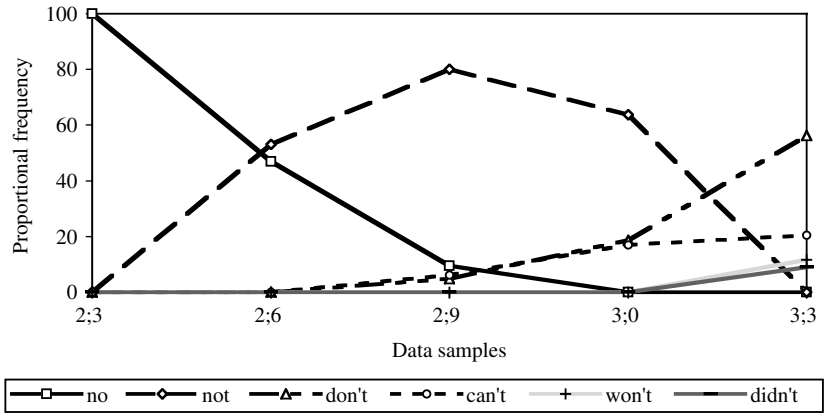
Brian used *no* frequently as a single word negator. Consequently his early *no X* utterances may well result from a combination of his existing one word negator (i.e. *no*) and the entity or state which he wishes to negate. In this sense it could be argued that Brian's early multiword negation strategy of *no X* is not based on input frequencies as such but, instead, on his existing negation representation. This view is supported by the fact that Brian's mother produces hardly any multiword utterances containing *no* in the speech samples, further indicating that *no X* is a creative negation strategy in Brian's speech.

Another asymmetry between the input and Brian's speech can be seen in the emergence of *can't* and *don't*. Even though *don't* is more frequent than *can't* in both input samples, Brian uses *can't* more frequently than *don't* when these negators first emerge (i.e. at 2;9) and also in the 3;0 sample. However by 3;3, *don't* is the most frequent negator influencing Brian's multiword negation utterances. Again, this observation indicates that overall frequency of negators in the input sample is not the only factor in negator emergence and use in Brian's speech. The following analyses attempt to present a more detailed analysis of negator development and use by investigating a particular subset of negated utterances and the types of functions that they express.

Analysis 2: Development of the negator slot in neg V

The previous analyses indicated some general aspects of negator development in Brian's speech and also a general picture of negator frequencies in the input samples. The remainder of the study focuses on a subset of the child's negated utterances, that is utterances containing negated zero marked verbs. As mentioned previously, the reason for choosing this specific set of utterances is that zero marked verbs typically involve *'nt* negation in adult speech (e.g. *I can't reach*, *You didn't say* '*please*', *Don't put that in your mouth*) and therefore the child needs to move all the way across the *no–not–'nt* cline in order to master this form of negation. Also, it is only in the negation of zero marked verbs that we can be sure that the child's multiword *no* negation utterances (e.g. *no see*) are instances of creative speech on the part of the child and not simply fragments of the input. Consequently these types of utterances provide a very important area of focus for data driven approaches such as the one proposed in the present paper.

The following analysis focuses on the development of *neg V* negators in Brian's speech. We begin by presenting an overview of negator development in Brian's *neg V* utterances in Figure 3. The aim of this analysis is to ascertain the extent to which negation in this specific subset of utterances reflects Brian's development of multiword negation in its entirety. If the trajectory of development attested in Brian's *neg V* utterances is similar to



Token and proportional frequencies are displayed in Appendix C

Fig. 3. Proportional frequency of negators in Brian's *neg V* utterances.

that shown in Analysis 1, then we can more confident about generalizing the finding of the fine-grained function-based analysis of *neg V* to Brian's negation development as whole.

Overall, Brian's development of negators within *neg V* utterances (as shown in Figure 3) is very similar to the development of negators attested in Analysis 1, in which all multiword negators were analyzed. *No* is the only negator used in the 2;3 sample. Examples of *no V* during this period are displayed in (14) and (15).

(14) No drop it.
(15) No reach.

By 2;6, *no V* utterances are still frequent but *not* has taken over as the main negator of zero marked verbs, as examples (16) and (17) indicate:

(16) Not bite them.
(17) Not like them now.

This trend continues into the 2;9 sample, by which time *not V* utterances account for just over 60% of all *neg V* utterances. During this sample *can't* (18 and 19) and *don't* (20 and 21) emerge:

(18) I can't see anyone.
(19) I can't do this job.
(20) I don't like it.
(21) Don't worry.

By 3;0, Brian's *no V* utterances have disappeared from the speech sample, while *not V* utterances continue to dominate. Finally, by 3;3 Brian's use of

negators appears to have moved on to the final stage in the *no–not–'nt* cline. By this point, all Brian's zero marked verbs are negated by *'nt* negators (i.e. *don't*, *can't*, *won't* and *didn't*). This finding contrasts with the final sample of Analysis 1, in which *no* and *not* were still used productively in Brian's speech. This difference is expected, given the fact that Analysis 1 incorporated all negated utterances as opposed to only those containing zero marked verbs. By 3;3, Brian is using negators in a similar way to the input; thus *no* and *not* are no longer used with zero marked verbs but are still used in combination with other word classes, as indicated by Analysis 1 (e.g. *That's not crunchy*, *There's no juice*).

Analysis 3: Development of neg V *within functions*

In Analysis 3 we investigated Brian's development of *neg V* within functions in order to investigate whether function-based frequency of negators in the input provided a more reliable predictor of negator emergence and use in Brian's speech than overall input frequency alone.

Brian used *neg V* utterances productively (that is with three or more different verb types) to express FAILURE, REJECTION, PROHIBITION and INABILITY from the 2;3 sample onwards, and therefore the present analysis will focus on the development of negators in these four functions. *Neg V* utterances also occurred in the expression of DENIAL, but only from 2;6 and therefore DENIAL as a function has not been included in the present analysis.[4]

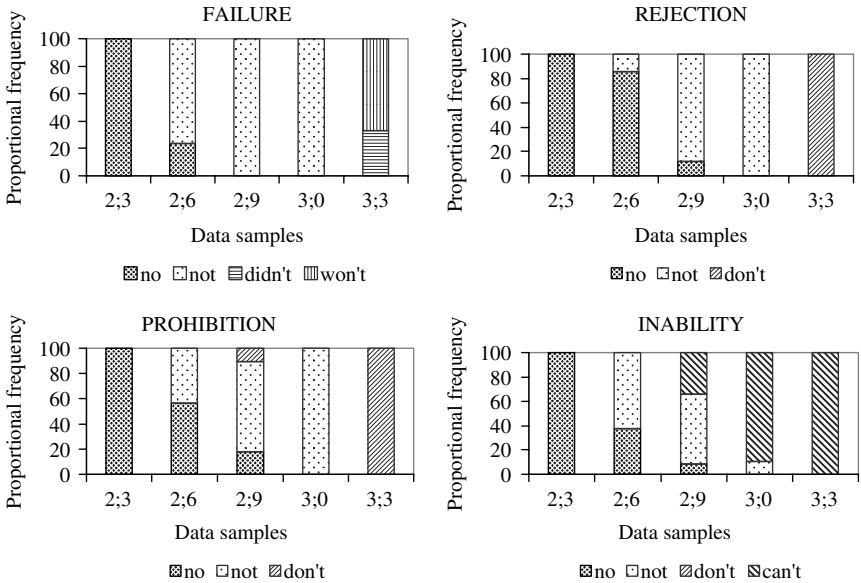
Figure 4 illustrates the proportional frequencies of negators within the functions at each time sample in Brian's speech. Chi-square analyses were conducted where possible to ascertain whether any differences in negator frequency between functions were statistically significant. This analysis was only possible for the 2;6 and 2;9 sample due to insufficient tokens of more than one negator in other samples.

No *and* not *in Brian's* neg V *constructions*

No is the only negator used in the four functions at 2;3. Examples (22) to (25) present instances of *no V* utterances and the function that they express in Brian's speech.

(22) No move. (FAILURE)
(23) No touch. (PROHIBITION)
(24) No apple. (REJECTION)
(25) No reach. (INABILITY)

[4] Brian also used *neg V* in EPISTEMIC NEGATION from 2;6 but the utterances involved only one verb (i.e. *know*) and thus did not meet the 3+ productivity criteria outlined in the methodology section.



Token and proportional frequencies are displayed in Appendix D

Fig. 4. Proportional frequency of negators within functions over time in Brian's speech.

At 2;6, *no V* utterance decrease in frequency in all functions as *not V* utterances emerge (see examples 26 to 29). Thus the data indicate that the first shift across the *no–not–'nt* cline occurs in all functions by 2;6:

(26) Not fit. (FAILURE)
(27) Not lose it. (PROHIBITION)
(28) Not play. (REJECTION)
(29) Not reach. (INABILITY)

However, the extent to which *no V* utterances have decreased and *not V* utterances dominate at 2;6 varies from one function to the next. At 2;6, *no* is still the predominant negator in *neg V* utterances expressing PROHIBITION and REJECTION, but is less frequent in FAILURE and INABILITY, where *not V* utterances appear to dominate. Chi-square analysis indicates that the difference in *no*/*not* usage between functions is significant ($\chi^2 = 16{\cdot}67$, $df = 3$, $p < 0{\cdot}01$).

By 2;9, *no V* has decreased again in all functions and *not* has become the predominant negator of zero marked verbs in all functions. At this point *no V* is no longer attested in FAILURE, and is infrequent in both REJECTION (12%) and INABILITY (9%). It occurs with the highest frequency in PROHIBITION but again the proportional frequency is low,

accounting for only 18% of all *neg V* utterances within this function. *Don't* and *can't* emerge during the 2;9 sample and account for 11% of PROHIBITION utterances and 35% of INABILITY utterances respectively. Examples (30) and (31) display instances of each negator in its associated function:

(30) Don't spit in it. (PROHIBITION)
(31) I can't get them out. (INABILITY)

By 3;0, Brian uses *not V* exclusively in all functions with the exception of INABILITY, where *can't* has become the dominant *neg V* negator. By 3;3, *not V* utterances have disappeared from all functions. Instead each function is expressed by *'nt* negators: all INABILITY *neg Vs* are expressed by *can't*, and all PROHIBITION and REJECTION utterances by *don't*, while FAILURE utterances are expressed by *won't* and *didn't*.

The data when analysed from a function-based perspective therefore still adhere to the *no–not–'nt* cline of development. However, the data indicate that the speed at which this cline is traversed varies from function to function. In order to ascertain whether input frequency affects Brian's move across the *no–not–'nt* cline, we analyzed the use of negators in the input within functions.

Function-based analysis of input

For the input analysis, we firstly calculated the frequency of each of the function types expressed by *neg V* in Brian's speech samples (i.e. FAILURE, PROHIBITION, REJECTION and INABILITY) in both of the input samples.

The results (as shown in Figure 5) indicate that PROHIBITION is the most frequently expressed function of the four in both data samples, accounting for 33% of the 2;1 sample and 26% of the 2;8 sample. FAILURE has the second highest proportional frequency in each sample, accounting for 13% of the 2;1 sample and 15% of the 2;8 sample. A difference between the samples is attested in the frequency of REJECTION and INABILITY: at 2;1 REJECTION has a slightly higher proportional frequency than INABILITY, while the converse is true in the 2;8 sample.

Comparison of negators within functions in the input and in Brian's speech. This analysis investigated the input frequency of negators in FAILURE, PROHIBITION, REJECTION and INABILITY, as these are the functions in which Brian uses *neg V* productively from 2;3 to 3;3. The findings of the analysis are then related to the use of negators within functions in Brian's speech in order to evaluate the role played by function-based frequencies in the input. The present input analysis was limited to only those negators found in Brian's speech (i.e. *no*, *not*, *don't*,

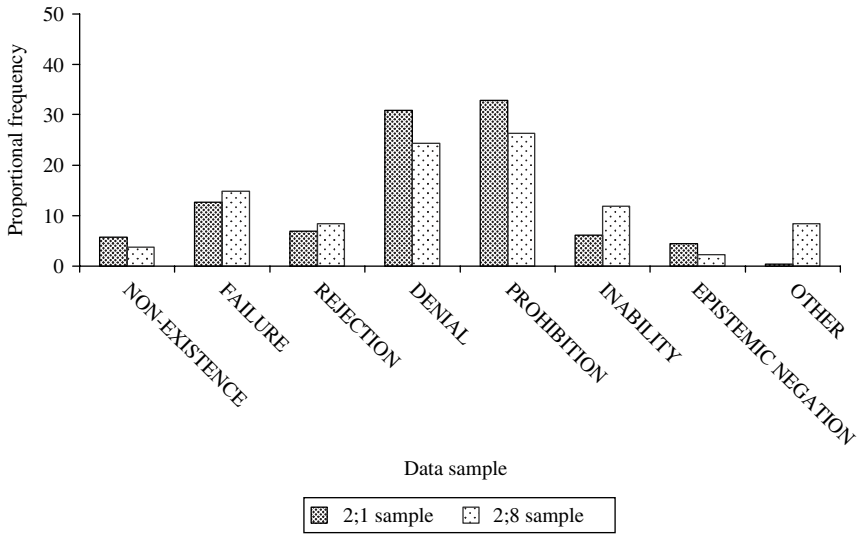


Fig. 5. Proportional frequency of functions in the input.

can't, *won't* and *didn't*). The items will be referred to as target negators for the purposes of the present study. The frequency of each target negator within each of the four functions mentioned above was calculated as a proportion of negated utterances within the function. The results thus display the frequency with which each function is expressed by each target negator (see Table 2).

Proportional frequency of no *within the four functions in the input samples*. *No* as a single word negator is found in all four target functions in the input. However, the frequency of *no* varies widely from one function to the next. *No* in the expression of PROHIBITION was the most frequent form–function mapping found in the input sample, accounting for 51·85% and 57·55% of PROHIBITION utterances in the 2;1 sample and 2;8 sample respectively. However, *no* is less frequent in the expression of REJECTION and even rarer in the expression of FAILURE and INABILITY. Nevertheless, Brian uses *no* exclusively in his 2;3 *neg V* utterances in all functions. At this stage function-based frequency of negators in the input does not appear to play a role in Brian's reliance on *no V* utterances. Instead, as mentioned in Analysis 1, Brian's use of *no* as a multiword negator may be based on the overall frequency of *no* (as a single word negator) in his own speech and in the speech of his mother.

Proportional frequency of not *within the four functions in the input samples*. *Not* is attested in all four target functions in the input, though

TABLE 2. *Proportional frequency of target negators within functions in the input sample*

	FAILURE		REJECTION		PROHIBITION		INABILITY	
	2;1	2;8	2;1	2;8	2;1	2;8	2;1	2;8
no	9·67% (3)	10·00% (6)	29·41% (5)	11·76% (4)	51·85% (42)	57·55% (61)	6·67% (1)	6·25% (3)
not (X)	48·39% (15)	21·67% (13)	17·65% (3)	38·23% (12)	6·17% (5)	2·83% (3)	0	0
can't V	0	0	0	0	11·11% (9)	2·83% (3)	93·33% (14)	79·17% (38)
didn't V	9·68% (3)	10·00% (6)	0	5·88% (2)	0	0	0	0
don't V	3·23% (1)	6·67% (4)	23·52% (4)	29·41% (10)	23·46% (19)	25·47% (27)	0	6·25% (3)
won't V	0	33·33% (20)	5·88% (1)	2·94% (1)	0	1·89% (2)	0	0

Token frequencies are displayed in parentheses. Since only target negators are included in the table, percentages within columns do not always add up to 100.

again with varying frequency. *Not X* as an expression of FAILURE is relatively frequent in the input, accounting for 48·39% of FAILURE utterances in the input at 2;1, though this figure drops to 21·67% at 2;8. However, *not X* is infrequent in PROHIBITION and REJECTION (at 2;1) and is not used at all in the expression of INABILITY at 2;1. Despite the infrequency of *not V* in three of the four functions in the input at 2;1 (and its continuing infrequency in PROHIBITION and INABILITY within the 2;8 sample), Brian uses *not V* in all four functions in the 2;6 sample, and *not V* becomes the dominant negation strategy in all functions by 3;0.

Therefore Brian's GENERAL shift towards *not V* does not appear to be related to function-based frequencies in the input. Nevertheless, there must be some motivation on Brian's part to move from *no V* to *not V*. The input results for Analysis 1 indicated that *not* was the most frequent multiword negator in Brian's mother's speech, and it is possible that the overall frequency of *not* as a MULTIWORD negator in the input motivates Brian to move from *no V* to *not V* dominance. Thus, this shift may mark a more input-driven approach to Brian's representation of negation. Rather than relying on his previous creative strategy of combining single word *no* with zero marked verbs, Brian is now more sensitive to the types of multiword negation strategy used in the input. However, at this stage in development this sensitivity is still quite broad, that is Brian appears to select the negator based solely on overall input frequency of the lexical item as opposed to function-based frequencies.

Although the 2;6 sample is defined by a general move towards *not V* utterances, there appear to be some function-specific characteristics associated with the shift, that is *not V* dominance occurs earlier in particular functions. The data displayed in Figure 4 suggest that the extent to which Brian uses *not V* in the 2;6 sample varies significantly between functions. The question is whether these differences can be attributed to input frequency within functions (see Table 2). The input offers a possible explanation for the relatively early dominance of *not V* in FAILURE. In the 2;1 sample, *not* is used in the expression of FAILURE more often than any of the other functions. Thus the frequency of *not X* within FAILURE in the input may preempt Brian's *no V* utterances within this function. The converse may be true for PROHIBITION and to some extent REJECTION. In these functions Brian may still favour *no V* utterances due to the fact that *no* is used frequently in the expression of PROHIBITION and REJECTION (though in the case of REJECTION only in the 2;1 sample). Thus the high frequency of *no* to express these functions in the input may serve to further entrench the use of *no V* in Brian's PROHIBITION and REJECTION utterances. Consequently the shift to *not V* dominance only occurs in the 2;9 sample.

Proportional frequency of 'nt *negators within the four functions in the input samples*. *Can't* in the expression of INABILITY and *don't* in the expression of PROHIBITION were the most frequent *'nt* negators in the input sample. *Don't* and *can't* were also the first *'nt* negators to emerge in Brian's speech samples and were used to express PROHIBITION and INABILITY respectively.

Thus the most frequently used *'nt* negators in the input were the first to emerge in Brian's speech, and furthermore they emerged earliest in the functions in which they were used frequently in the input. *Don't* eventually emerges in the expression of REJECTION, but only approximately six months after Brian first used it in the expression of PROHIBITION (i.e. at 3;3). *Won't* and *didn't* also emerge in the 3;3 sample, and again the frequency of the forms within the specific functions (and in the input overall) is low. Thus function-based input frequency of negators appears to play a central role in this final stage on the *no–not–'nt* cline.

GENERAL DISCUSSION

The present study provides a general picture of negator development and also a detailed description of negator development in *neg V* utterances within the speech of one child. In this section we discuss the findings in relation to previous studies and also from the perspective of the usage-based model.

The pattern of negator development attested in Brian's speech supports previous studies of negation development (e.g. Klima & Bellugi, 1966; Choi, 1988). That is, Brian's earliest multiword negation utterances involve *no* and *not* in both grammatical and non-grammatical environments. However, Brian's negator use presents a more detailed picture, specifically with regard to the production of *no* and *not* utterances in the early stages of development. Brian's negator development can be divided into three stages. During Stage 1, *no* is the predominant negator of zero marked verbs (e.g. *no see*, *no reach*). Stage 2 is marked by the onset of competition between the negators *no* and *not* in *neg V* units, resulting in *not V* dominance. Thus the use of *no* and *not* in Brian's speech appears to mark two different stages on a developmental cline, as opposed to being used at random. Stage 3 is marked by the gradual emergence of *'nt* negators in Brian's *neg V* utterances, with *can't* and *don't* emerging as the first *'nt* units.

The findings of the study present an explanation for the attested trajectory of development which is situated within a usage-based approach to language development. Brian's development of negation appears to be driven by experience, both in terms of the input and also his own linguistic experience of formulating negated utterances. The data indicate that the role played by the input changes over time as Brian becomes more sensitive to finer-grained distinctions encompassed within the form–function mappings.

In the first stage of development (i.e. *no V* dominance), the influence of the input is extremely broad; Brian chooses one of the most frequent negators in the input (from single and multiword constructions) across functions as the basis for his *neg V* utterances. However, other factors may also play a role in Brian's early adoption of *no* as a multiword negator. For example, *no* is probably a more salient negator than others attested in the input since it overwhelmingly occurs as a single word utterance. This may explain why *no* is used initially as opposed to *not*, even though *not* is marginally more frequent in the 2;1 input sample.

It is also possible that at this early stage in development Brian does not rely only on input frequencies but also on his own representation of single word negation. A brief survey of the data indicates that Brian uses *no* as a single word negator from the onset of the sample (i.e. at 2;3). Thus it is possible that Brian's early *no V* constructions are an amalgamation of his existing negation strategy (i.e. single word *no*) with various entities, states or processes that he wishes to negate. In this way, Brian's *no V* utterances represent a structure-building approach to multiword negation, as opposed to imitation of existing multiword combinations in the input.

During the second stage, *not V* utterances emerge and become the dominant form of *neg V* utterances in the 2;9 and 3;0 samples. Again, Brian's *not V* utterances appear to be formed by isolating a frequently used negator from the input and incorporating it through structure building to form a type of negation structure which is extremely rare in the input (i.e. *not V*). It could be argued that Brian's *not V* utterances are truncated forms of *aux not V* utterances (e.g. *I can not reach*) and thus that they could be based on input patterns. Support against this interpretation can be found in a number of minimal pairs attested in the sample. Example of these pairs are displayed in (32).

(32) a. MOTHER: and I didn't write it down.
CHILD: (*schwa*) not write it down.
b. MOTHER: I don't think he gets fed properly, does he?
CHILD: not get fed properly.
c. MOTHER: it doesn't say, does it?
CHILD: not say.

In (32 a–c) Brian appears to substitute *not* for *aux'nt* negators in recasts of his mother's speech. These examples were taken from the 2;6 and 2;9 samples, where *not V* constructions were predominant in Brian's speech. Thus Brian's use of *not V* appears to be a creative strategy based partially on the overall frequency of *not* in the input.

While *not V* occurs across all functions and may be related to overall input frequencies of *not*, there is also evidence of function-based differences

in the frequency of *no* and *not* in Brian's speech at 2;6. That is, the shift from *no* to *not* dominance occurred more rapidly in FAILURE and INABILITY than in PROHIBITION and REJECTION. Input frequencies of *no* and *not* within functions combined with the process of competition may provide an explanation for this observation. High-frequency *not X* units within functions in the input (i.e. FAILURE) may facilitate the shift towards *not V* in Brian's expression of the same function through the process of preemption. That is, Brian receives positive evidence in the input which challenges his existing *no V* linguistic representation. Conversely, functions containing a high proportion of *no* utterances in the input (i.e. PROHIBITION and REJECTION at 2;1) may inhibit the shift towards *not* negation by entrenching the negator *no* in Brian's linguistic representation of a particular function.

The differences in frequency of *no* and *not* within functions in Brian's speech are the first indication that function plays a role in Brian's structural development of negation. This observation is seen more clearly as development progresses. In the final stage (i.e. *'nt V* dominance), Brian's development of *neg V* utterances seems to reflect form–function frequencies in the input much more closely. Firstly, Brian begins to use negators that co-occur with zero marked verbs in the input (i.e. *aux'nt* negators). Up until this stage, Brian's use of negators with zero marked verbs had deviated from input patterns (e.g. *no move*, *not reach*). Furthermore, the specific *'nt* negators that emerge in Brian's speech directly reflect the frequency of *'nt* negators within function in the input samples. The present approach presents a more fine-grained picture of early *'nt* usage than previous studies (e.g. Klima & Bellugi, 1966), as it indicates that the emergence of *'nt* negators is function-specific. Negators which occur frequently in the input within particular functions (e.g. *can't* to express INABILITY) emerge earlier in Brian's speech than less frequent form–function pairings. This pattern is seen in the emergence of *don't*; while *don't* is used by Brian in the expression of PROHIBITION at 2;9, it only emerges in REJECTION utterances approximately six months later.

However, other factors may contribute to the earlier emergence of *can't* and *don't* in INABILITY and PROHIBITION, respectively; for example, the semantic content of the negator when used in the expression of a specific function. Both *can't* and *don't* can be used in single-word utterances in the expression of INABILITY and PROHIBITION given appropriate discourse factors, as shown in (33) and (34):

(33) A: Can you be over here in five minutes?
B: Can't, sorry. I've got an appointment at 2.00.
(34) A: I'll just have a look at this one.
B: Don't!

This feature does not hold for *don't* when used to express REJECTION (35):

(35) A: Do you want milk with that?
B: *Don't.

Examples (33) and (34) appear to indicate that *don't* and *can't* have inherent semantic content, as opposed to filling a purely grammatical role. This may make their function more accessible to a child, and consequently contribute to the early emergence of *can't* in INABILITY and *don't* in PROHIBITION utterances.

To summarize, the data presented in the study support a usage-based approach to language development by indicating the role played by the input and also the child's own linguistic representation within the developmental process. The findings indicate that processes at the heart of usage-based approaches, such as preemption, entrenchment and competition, can account for the developmental trajectory attested in Brian's use of negators.

The findings of the study also confirm the importance of communicative intent in the development of early linguistic structure. Brian's development of negation is driven by a need to communicate and be understood. However, given the complexities of the English negation system, it takes time to acquire it. The difference in speed of development from one function to the next is a strong indicator that function plays a central role in the development of linguistic form. Of interest here is whether Brian uses function-general knowledge in the adoption of early negators (i.e. *no* and then *not*) because he views negation as a unitary function as opposed to a collection of subfunctions such as INABILITY and PROHIBITION, or whether he simply picks out the most salient negator in the input, which is probably based on input frequency and his own previous productions. It could be argued that at 2;3 Brian has a broad conceptualization of negation, that is negation is represented as a unitary category in conceptual space. Although different functions were identified in Brian's speech at the onset of the data sample (e.g. FAILURE, REJECTION, PROHIBITION and INABILITY) we have no way of knowing whether these distinctions exist in Brian's conceptual system since no structural distinction is made at 2;3. It is possible that a prosodic analysis might well indicate linguistic distinctions but this awaits future research.

Clark (2001) proposes that in the early stages of development, children sometimes form 'emergent categories'; categories that 'carve up' conceptual space differently from adults. Brian's early conceptual representation may be an instance of an emergent category inasmuch as there is no evidence of the fine-grained conceptual distinctions which are found in native English speaking adults. Over time Brian's conceptual organization of the category

of negation may be shaped by linguistic evidence found in the input, a distinctly Whorfian hypothesis which is once again gaining ground in child language research (e.g. Shatz, 1991; Gentner & Medina, 1997; Bowerman & Choi, 2001). However,it could just as easily be argued that Brian's conceptualization of negation is in keeping with adult English speakers and the only adjustment to be made is linguistic. From this perspective Brian's representation of negation already contains the fine-grained distinctions that underlie the English negation system and his main task is to discover how his target language realizes these distinctions.

CONCLUSION

The fine-grained analysis of dense data from both the caregiver's and child's speech results in an informative picture of the development of negators within *neg V* utterances and negation in general. The findings support a usage-based approach to language development in which the child's linguistic system is shaped by experience. The study also presents an insight into the accessibility of the input to a young language learner by indicating that the way in which the child attends to the input changes over time.

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APPENDIX A

TOKEN AND PROPORTIONAL FREQUENCY OF NEGATORS IN BRIAN'S SPEECH SAMPLES

	Negators						
	no	*not*	*don't*	*can't*	*won't*	*didn't*	Total no. of negators
2;3	96·69% (117)	3·31% (4)	0	0	0	0	121
2;6	60·17% (213)	39·83% (141)	0	0	0	0	354
2;9	15·13% (77)	79·17% (403)	2·55% (13)	3·14% (16)	0	0	509
3;0	11·68% (32)	66·42% (182)	12·41% (34)	9·49% (26)	0	0	274
3;3	3·17% (4)	16·67% (21)	53·18% (67)	15·08% (19)	8·00% (10)	4·00% (5)	126

Token frequencies displayed in parentheses.

APPENDIX B

TOKEN AND PROPORTIONAL FREQUENCIES OF NEGATORS IN THE 2;1 OR 2;8 INPUT SAMPLES

	Input sample	
	2;1	2;8
no	26·83% (66)	30·45% (123)
not	28·05% (69)	21·29% (86)
don't	16·67% (41)	19·06% (77)
can't	9·35% (23)	10·15% (41)
won't	0·81% (2)	5·69% (23)
Negators under 5% in both samples	18·29% (45)	13·37% (54)
Total no. of all negators in each sample	246	404

Token frequencies displayed in parentheses.

APPENDIX C

TOKEN AND PROPORTIONAL FREQUENCY OF NEGATORS IN BRIAN'S *NEG V* UTTERANCES

	Negators						
	no	*not*	*don't*	*can't*	*won't*	*didn't*	Total no. of negators
2;3	100% (60)	0	0	0	0	0	60
2;6	47% (64)	53% (72)	0	0	0	0	136
2;9	9·47% (25)	80% (210)	4·9% (13)	6·1% (16)	0	0	264
3;0	0	64·09% (116)	18·78% (34)	17·13% (31)	0	0	181
3;3	0	0	57·80% (63)	21·10% (23)	11·93% (13)	9·17% (10)	109

Token frequencies displayed in parentheses.

APPENDIX D

TOKEN AND PROPORTIONAL FREQUENCY OF NEGATORS WITHIN FUNCTIONS IN BRIAN'S SPEECH SAMPLES

FAILURE	*no*	*not*	*don't*	*can't*	*didn't*	*won't*	Total
2;3	100% (13)	0	0	0	0	0	13
2;6	23·53% (4)	76·47% (13)	0	0	0	0	17
2;9	0	100% (18)	0	0	0	0	18
3;0	0	100% (15)	0	0	0	0	15
3;3	0	0	0	0	33·33% (5)	66·67% (10)	15

REJECTION	*no*	*not*	*don't*	*can't*	*didn't*	*won't*	Total
2;3	100% (5)	0	0	0	0	0	5
2;6	85·71% (15)	14·29% (3)	0	0	0	0	18
2;9	11·88% (12)	88·12% (89)	0	0	0	0	101
3;0	0	100% (29)	0	0	0	0	29
3;3	0	0	100% (54)	0	0	0	54

PROHIBITION	*no*	*not*	*don't*	*can't*	*didn't*	*Won't*	Total
2;3	100% (24)	0	0	0	0	0	24
2;6	56·67% (17)	43·33% (13)	0	0	0	0	30
2;9	17·89% (5)	71·44% (20)	10·7% (3)	0	0	0	28
3;0	0	100% (11)	0	0	0	0	11
3;3	0	0	100% (9)	0	0	0	9

TOKEN AND PROPORTIONAL FREQUENCY OF NEGATORS WITHIN FUNCTIONS IN BRIAN'S SPEECH SAMPLES (*Cont.*)

INABILITY	*no*	*not*	*don't*	*can't*	*didn't*	*won't*	Total
2;3	100% (13)	0	0	0	0	0	13
2;6	37·74% (20)	62·26% (33)	0	0	0	0	53
2;9	8·51% (4)	57·45% (27)	0	34·04% (16)	0	0	47
3;0	0	10·34% (3)	0	89·66% (26)	0	0	29
3;3	0	0	0	100% (19)	0	0	19