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On the distribution and acquisition of the West Germanic NEEDS: German between Dutch and English

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This paper investigates three verbs expressing necessity in the three West Germanic languages: Dutch *hoeven*, English *need*, and German *brauchen*. These three verbs are all categorised as NEGATIVE POLARITY ITEMS (NPIs). However, there are differences in their distributions as NPIs, which posit German *brauchen* between English *need* and Dutch *hoeven*. By analysing two factors that may influence acquisition, namely OPACITY and INPUT FREQUENCY, this paper moreover presents a similar pattern for the acquisition of these NPIs: the Dutch NPI *hoeven* emerges earlier in child language development than its German counterpart, which in turn arises earlier than the English NPI *need*.

1. Introduction.

Negative polarity items (hereafter NPIs) are words or expressions that survive only in certain kinds of negative environments (cf. Ladusaw 1979). A well-studied example is the English indefinite *any*, which, as illustrated in the examples below, is only accepted in negative contexts such as those introduced by the sentential negation *not*, a negative indefinite like *nobody*, or a semi-negative expression such as *few*.

- (1) a. Mary could *(not) find any robins.
- b. Nobody/*Somebody could find any robins.
- c. Few/*Many students could find any robins.

The focus of this paper is not the English indefinite *any* but three verbal NPIs expressing necessity in the three West Germanic languages: Dutch *hoeven*, English *need*, and German *brauchen*. These Germanic NEEDS all exhibit typical NPI distributions, as they do not survive in the absence of negation (Zwarts 1981, Van der Wouden 1997, Hoeksema 2000). However, as section 2 will illustrate, these verbs do show distributional differences (cf. Van der Wouden 2001). These differences will give rise to a pattern in which German is located between Dutch and English.

By discussing two factors that may affect the pace of language acquisition, namely *opacity* and *frequency*, section 3 will motivate why the pattern observed for the distribution of the West Germanic NEEDS will also predict the same pattern when looking at language acquisition. In particular, acquisition of the German NPI *brauchen* is predicted to take place earlier than that of the English NPI *need*, but later than Dutch children's acquisition of the NPI *hoeven*.

To examine the prediction for language acquisition, a corpus investigation of the distribution of the three verbal NPIs in child English, child Dutch, and child German was conducted. For data collection, the CHILDES database (MacWhinney 2009) was employed. Section 4 will present the exact procedure of the corpus research, and will also provide information about the subcorpora analysed in the current research.

Results will be presented in section 5, which will show that the Dutch NPI *hoeven* already emerges around age two, whereas its English counterpart *need* is never attested in child English. With respect to the German NPI, the corpus data will show that the first *brauchens* found in early child German are virtually all non-NPIs, and NPI-*brauchen* does not appear at a rate of more than 10% until the age of six.

Section 6 will conclude the paper. Some implications for language change arising from the acquisition pattern will be discussed as well.

2. Distribution of the West Germanic NEEDS.

English *need*, Dutch *hoeven*, and German *brauchen* all show NPI distributions (Zwarts 1981, Van der Wouden 1996, 1997, 2001, Hoeksema 2000). This is illustrated in the examples below, where we see that without the sentential negation *not*, *niet*, or *nicht* in the a-sentences, or the negative indefinite *nobody* or *niemand* in the b-sentences, the appearance of *need*, *hoeven*, or *brauchen* is ungrammatical.

- (2) a. Mary need *(not) cry.
 b. Nobody/*Somebody need cry.
- (3) a. Marie hoeft *(niet) te huilen.
 Mary needs not to cry
 ‘Mary does not need to cry.’
 b. Niemand/*Iemand hoeft te huilen.
 nobody/somebody needs to cry
 ‘Nobody needs to cry.’
- (4) a. Maria braucht *(nicht) zu weinen.
 Mary needs not to cry
 ‘Mary does not need to cry.’
 b. Niemand/*Jemand braucht zu weinen.
 nobody/somebody needs to cry
 ‘Nobody needs to cry.’

A closer look at the distribution of the West Germanic NEEDS, however, reveals a number of differences. The English verb *need* can appear as a lexical verb, a modal verb, or a modal auxiliary, as illustrated in the examples below; but only when *need* is used as a modal auxiliary it

exhibits an NPI distribution and requires proper licensing by negation (see 5c) (cf. Van der Wouden 1996, 2001, among others).

- | | | |
|-----|-------------------------------------|-----------------|
| (5) | a. We need (no) water. | lexical verb |
| | b. We (do not) need to drink water. | modal verb |
| | c. We need *(not) drink water. | modal auxiliary |

The German NEED *brauchen* appears to have similar functions as the English NEED. As shown in 6, *brauchen* is also attested as a lexical verb, a modal verb, or a modal auxiliary. Different from *need* in English, however, German *brauchen* is an NPI not only when it is used as a modal verb (see 6b), but also when it appears as a modal auxiliary (see 6c) (cf. Duden Zweifelsfälle 1972 in Van der Wouden 2001).

- | | | |
|-----|--|-----------------|
| (6) | a. Wir brauchen (kein) wasser.
we need no water
'We need (no) water.' | lexical verb |
| | b. Wir brauchen *(kein) wasser zu trinken.
we need no water to drink
'We don't need to drink water.' | modal verb |
| | c. Wir brauchen *(kein) wasser trinken.
we need no water drink
'We need not drink water.' | modal auxiliary |

Compared to its English and German counterparts, the Dutch NEED *hoeven* has no auxiliary use and appears only as a lexical verb (see 7a to 7c), or a modal verb (see 7d).¹ In both its uses,

¹ As Van der Wouden (2001) mentions, verbs that are commonly referred to as *auxiliaries* share syntactic, morphological and semantic properties. For instance, English auxiliaries directly take verbal complement without the complementizer *to* (i.e. a syntactic property), and they do not have inflected forms in present tense (i.e. a morphological property). However, these properties are not universal in defining the class of auxiliaries cross-linguistically. German *brauchen*, for instance, can take verbal complement with and without the complementizer *zu* (cf. (6b) and (6c)); but in both its appearances, *brauchen* has inflected forms in the present tense – just like generic lexical verbs in the language, but unlike the so-called auxiliaries in English. Nonetheless, the discussion on how exactly the category of auxiliaries is characterised is not crucial to what this paper aims to show. Therefore, I opt for the presence/absence of a complementizer *to/zu/te* as the only criterion in this respect, in line with which Dutch *hoeven* is treated as not having an auxiliary use in this paper.

hoeven is an NPI: it does not survive without negation (Zwarts 1981, Hoeksema 2000, Van der Wouden 2001).²

- (7) a. Wij hoeven*(geen) water. lexical verb
 we need no water
 ‘We need no water.’
- b. Wij hoeven niet naar buiten. lexical verb
 we need not to outside
 ‘We do not need to go outside.’
- c. Wij hoeven niet veel. lexical verb
 we need not many
 ‘We do not need many.’
- d. Wij hoeven*(geen) water te drinken. modal verb
 we need no water to drink
 ‘We do not need to drink water.’

The observations described above give rise to a distributional pattern of the West Germanic NEEDS, in which German *brauchen* holds the position in between English *need* and Dutch *hoeven*. This pattern with respect to the NPI-uses of the West Germanic NEEDS is presented in Table 1.

NEEDS	Lexical verb	Modal verb	Modal auxiliary
English <i>need</i>	-NPI	-NPI	+NPI
German <i>brauchen</i>	-NPI	+NPI	+NPI
Dutch <i>hoeven</i>	+NPI	+NPI	*

Table 1. German *brauchen* between English *need* and Dutch *hoeven*.

² As one of the anonymous reviewers suggests, the Dutch main verb *behoeven* ‘need’ should be part of the discussion in the current paper, because *behoeven* can be analysed as *hoeven* plus a prefix *be-*, which has a syntactic origin (cf. Hoekstra et al. 1988). Since *hoeven* does not show an NPI-distribution when it appears together with the prefix *be-*, it would be interesting to investigate *behoeven* as well. However, this paper considers *hoeven* to be a different verb from *behoeven*. Although these verbs are historically related, the unified analysis of *(be)hoeven* (cf. Hoekstra et al. 1988) is not supported by any input evidence from a child perspective. In the language input (i.e. child-directed Dutch of the CHILDES database (MacWhinney 2009); see further section 4 Methodology), *hoeven* is never attested with the prefix *be-*. Due to the lack of input evidence, it is hardly possible to assume that Dutch-acquiring children are able to develop the unified analysis of *(be)hoeven*. Hence, *behoeven* is not discussed here.

The pattern of German *brauchen* in between English *need* and Dutch *hoeven*, with respect to their NPI-appearance, is not only observed for their distributions in adult language use. As the next section will motivate, the same pattern is also predicted for language acquisition. By taking two factors into consideration, namely *opacity* and *input frequency*, section 3 will present arguments for the prediction that the Dutch NPI *hoeven* is acquired earlier than the German NPI *brauchen*, which is in turn acquired earlier than their English counterpart *need*.

3. Predictions for language acquisition.

This paper assumes (at least) two factors that may influence the word learning process by language-acquiring children: *opacity* and *input frequency*. These factors will be defined and examined in subsections 3.1 and 3.2, respectively. As we will see, both factors predict the same pattern, in which German *brauchen* holds a position between English *need* and Dutch *hoeven*, when looking at the pace of language acquisition.

3.1. Opacity.

Opacity is defined in this paper as the degree of transparency between certain lexical form and its possible use(s) or meaning(s). In the particular case of the West Germanic NEEDS, the factor of opacity is interpreted as follows. English *need* is the most opaque form. This is because the lexical form [NEED] has three different uses (as a lexical verb, a modal verb, or a modal auxiliary) but only in its use as a modal auxiliary [NEED] exhibits an NPI distribution (consider again the examples in 5). Dutch *hoeven* is positioned on the other end of the scale: it is the least opaque form of the three. Although the lexical form [HOEVEN] is shared by both its lexical and modal verb use, the verb *hoeven* can only appear as an NPI independent of whether it is used as a lexical verb or a modal verb (cf. 7). Compared to its English and Dutch counterparts, German *brauchen* seems to hold an in-between position in terms of lexical opacity. The lexical form [BRAUCHEN] has three uses (as a lexical verb, a modal verb or a modal auxiliary), just like English [NEED]. Nevertheless, since [BRAUCHEN] shows an NPI distribution only when it is *not* used as a lexical verb (compare 6a to 6b and 6c), German *brauchen* can be described as less opaque than English *need*, but more opaque than Dutch *hoeven*.

What has been discussed above gives rise to an opacity scale, which can be presented as follows. On this scale, '>' stands for 'more opaque than'; and we see that German *brauchen* holds the position between English *need* and Dutch *hoeven*.

- (8) The opacity scale of the West Germanic NEEDS:
English *need* > German *brauchen* > Dutch *hoeven*

The opacity scale summarised in 8 leads to a prediction about the order in which the Germanic NEEDS emerge as NPIs in child language development. Assuming that the more opaque a lexical form is, the longer it takes before children acquire it, the English NPI *need* is expected

to be acquired later than both its German and Dutch counterparts, of which the Dutch counterpart is predicted to be acquired earlier than the German one.

However, opacity alone is not always sufficient in predicting or explaining a certain acquisition pattern. Distribution of a target word or expression in the language input can be of crucial importance as well. Take English *need* for instance. Although [NEED] is the most opaque form of the three NEEDS investigated in this paper, its NPI use may be acquired earlier than that of the other two NEEDS if *need* appears frequently, and almost only as an NPI in the language input. This means that acquisition may be facilitated by robust input evidence – despite a high degree of opacity. On the other hand, we may imagine that acquisition can be delayed in the absence of sufficient input evidence – even if the target form may not be opaque at all, having only a single use in the target language. Clearly, in addition to the factor of opacity, input frequency needs to be taken into consideration as well when talking about predictions for language acquisition. This will be discussed in more detail in the next subsection.

3.2. Input frequency.

Input frequency refers to how often a target form is attested in adult language speech towards language acquiring children (i.e. child-directed speech). Input frequency influences the pace of the word learning process in the following way: the more frequent a target form is attested in the input, the earlier it is acquired by language acquiring children. In order to explore the role of input frequency in predicting the order of emergence of the Germanic NEEDS in child language development, frequency data of how *need*, *hoeven*, and *brauchen* are distributed in child-directed speech are required. Therefore, a corpus investigation in the CHILDES database (MacWhinney 2009) was conducted for frequency data collection – under the assumption that corpus data at least provide a representative and quantitative view of how the three NEEDS may be distributed in real language input. Results of this corpus investigation are summarised in the table below, in which bold figures represent NPI frequencies.

NEEDS	Lexical verb	Modal verb	Modal auxiliary	TOTAL
English <i>need</i>	3458 (67.63%)	1653 (32.33%)	2 (0.04%)	5113
German <i>brauchen</i>	1184 (86.7%)	102 (7.5%)	79 (5.8%)	1365
Dutch <i>hoeven</i>	142 (38.4%)	228 (61.6%)	*	370

Table 2. Distribution of the Germanic NEEDS in the language input.

English *need* is most frequently attested in the language input.³ Altogether, 5113 utterances containing this target verb are attested in the investigated subcorpora. However, only in 2 of

³ Relevant data were collected from the child-directed speech of the following subcorpora in the CHILDES database (MacWhinney 2009): *Belfast* (Henry 1995, Wilson & Henry 1998), *Cruttenden* (Cruttenden 1978), *Fletcher* (Karmiloff-Smith 1986, Fletcher & Garman 1988,

these 5113 utterances was *need* used as a modal auxiliary, and thus as an NPI (amounting to 0.04% of the input evidence).

In child-directed German, the verb *brauchen* is attested in a total of 1365 utterances.⁴ Among these utterances, 1184 contain *brauchen* used as a lexical verb, and hence not as an NPI. This amounts to approximately 87% of the input data. In the remaining 13% of the input evidence, *brauchen* appears as either a modal verb (i.e. 102 out of 1365) or a modal auxiliary (i.e. 79 out of 1365). In both of these uses, *brauchen* displays an NPI constraint.

Finally, let's look at the distribution of Dutch *hoeven*.⁵ Although only 370 utterances containing *hoeven* are attested in the input, each of these 370 utterance represents the NPI use of the Dutch NEED. Thus, there seems to exist robust input evidence supporting *hoeven*'s appearance as an NPI, from a learner's perspective, which amounts to 100% of the input.

However, what has been presented above does not provide us a relative view of how the West Germanic NEEDS are distributed in child-directed speech. We do not know, for instance, how often in a day these NEEDS appear as NPIs in the input. Therefore, in order to relativize the frequency data presented in Table 2, the total number of recording hours of the CHAT files that were included for frequency data collection were calculated. This information is presented in the following table (i.e. the third column), for each of the investigated NPIs. Note that for the English files, a total number of recording hours was not available due to a lack of corpus information.

NEEDS	Frequency as NPIs	Total hours of recording	Frequency as NPIs per hour
English <i>need</i>	2	N.A.	N.A.
German <i>brauchen</i>	181	1130	0.16
Dutch <i>hoeven</i>	370	331.5	1.12

Table 3. Frequency of the Germanic NEEDS as NPIs per recording hour.

Crystal et al. 1989), *Forrester* (Forrester 2002), *Howe* (Howe 1981), *Lara* (Rowland & Fletcher 2006), *Manchester* (Theakston et al. 2001), *Thomas-Heritage* (Lieven et al. 2009), and *Wells* (Wells 1981).

⁴ Relevant data were collected from the child-directed speech of the following subcorpora in the CHILDES database (MacWhinney 2009): *Caroline* (these data were used with the permission of the Language Archive (MPI for Psycholinguistics, Nijmegen)), *Leo* (Behrens 2006), *Miller* (Miller 1979), *Szagun* (Szagun 2001), *Rigol* (Rigol 2007), and *Wagner* (Wagner 1985).

⁵ Relevant data were collected from the child-directed speech of the following subcorpora in the CHILDES database (MacWhinney 2009): *BolKuiken* (Bol & Kuiken 1990), *CLPF* (Fikkert 1994, Levelt 1994), *Groningen* (Wijnen & Bol 1993), *VanKampen* (Van Kampen 1994), and *Wijnen* (Wijnen 1988, 1992).

Given the absolute frequencies of the West Germanic NEEDS when appearing as NPIs, and the total hours of recording, a relative frequency is calculated for each NPI per recording hour. Assuming that the child-directed speech recorded in the CHILDES database provides a representative overview of the real language input that language acquiring children receive, the relative frequency data presented in Table 3 (i.e. in the fourth column) give us an idea how often children are confronted with an utterance that contains the NPI use of the NEEDS in their input.

Although it was not possible to retrieve the total number of recording hours for the English NPI, it is clear that the NPI appearance of *need* is extremely infrequent in the input. Comparing the relative frequencies of the German NPI *brauchen* and the Dutch NPI *hoeven*, we see that Dutch *hoeven* appears almost seven times often as an NPI than its German counterpart. These relative frequency data lead to the following scale with respect to the input frequency of the West Germanic NEEDS. On this scale, '>' stands for 'more frequently attested than'. In this respect, the German NPI *brauchen* again holds the in-between position.

- (9) The input frequency scale of the West Germanic NEEDS
 Dutch *hoeven* > German *brauchen* > English *need*

Assuming that the more frequent an item is attested in the input, the earlier children acquire it, the above scale of input frequency makes a prediction for the order of emergence of the Germanic NEEDS as NPIs in child language development. In particular, the Dutch NPI *hoeven* is predicted to emerge earlier than its German counterpart *brauchen*, which is predicted to arise earlier than the English NPI *need*.

3.3. Acquisition pace of the West Germanic NEEDS.

Two factors that may influence the pace of language acquisition are discussed in the particular case of the West Germanic NEEDS appearing as NPIs, namely the factor of *opacity* in 3.1 and that of *input frequency* in subsection 3.2. By defining *opacity* as the degree of the transparency between a certain lexical form and its possible meaning(s) or use(s), 3.1 presents an opacity scale on which German *brauchen* is between English *need* (the most opaque of the three) and Dutch *hoeven* (the least opaque of the three). By taking relative frequency data into consideration, subsection 3.2 presents a scale of input frequency on which German *brauchen* again holds a position between English *need* (the least frequent of the three) and Dutch *hoeven* (the most frequent of the three).

The two factors discussed in this section both predict that the German NPI is acquired earlier than its English counterpart *need*, but later than its Dutch counterpart *hoeven*. This means that when looking at the acquisition pace of the West Germanic NEED NPIs, the same pattern observed for their distributions in adult language use is expected too.

4. Methodology.

In order to examine the prediction that the Dutch NPI *hoeven* is acquired earlier than the German NPI *brauchen*, which is in turn acquired earlier than its English counterpart *need*, a corpus investigation was conducted in the CHILDES database (MacWhinney 2009).

Data of child Dutch were collected in the following subcorpora of CHILDES: *BolKuiken* (Bol & Kuiken 1990), *CLPF* (Fikkert 1994, Levelt 1994), *Groningen* (Wijnen & Bol 1993), *VanKampen* (Van Kampen 1994), and *Wijnen* (Wijnen 1988, 1992). Altogether, 710 CHAT files were analysed, covering speech data of 59 monolingual Dutch children between approximately one and five years old.

For English data collection, the following subcorpora in CHILDES were employed: *Belfast* (Henry 1995, Wilson & Henry 1998), *Cruttenden* (Cruttenden 1978), *Fletcher* (Karmiloff-Smith 1986, Fletcher & Garman 1988, Crystal et al. 1989), *Forrester* (Forrester 2002), *Howe* (Howe 1981), *Lara* (Rowland & Fletcher 2006), *Manchester* (Theakston et al. 2001), *Thomas-Heritage* (Lieven et al. 2009), and *Wells* (Wells 1981). A total of 1492 CHAT files were investigated, and 145 monolingual English children between age one and five were included.

Finally, data of German children were collected from six subcorpora in CHILDES. They were: *Caroline*,⁶ *Leo* (Behrens 2006), *Miller* (Miller 1979), *Szagun* (Szagun 2001), *Rigol* (Rigol 2007), and *Wagner* (Wagner 1985). Altogether, 917 CHAT files were analysed, including speech data of 41 monolingual German children. Since the subcorpora *Wagner* and *Rigol* also provide longitudinal data of eleven children until the age of twelve, the age range of German children studied in the current research was larger compared to that of Dutch and English children.

The exact procedure of the investigation is as follows. The frequency of the target verbs (i.e. *need*, *hoeven*, and *brauchen*) in different inflected forms of the present and past tense, as well as their infinitive form, was first counted by employing the freq-command of the CLAN program. For the English NEED, it concerned three forms: *needs*, *need*, and *needed*; whereas for its Dutch counterpart, six forms were involved: *hoef*, *hoeft*, *hoeven*, *hoefde*, *hoefden*, and *gehoeven*. As for the German NEED, the following forms were included while running the freq-command: *brauche*, *brauchst*, *braucht*, *brauchen*, *brauchente*, *brauchtest*, *brauchtest*, *brauchtet*, *brauchten*, and *gebraucht*.

After collecting the frequency data, each utterance containing the target verb (i.e. *need*, *hoeven*, or *brauchen*) was further analysed for how the target verb was used: as a lexical verb, a modal verb, or a modal auxiliary in the case of English and German. This was done by using the kwal-command of the CLAN program. Generally, three lines of context preceding and following an utterance containing the target verb were analysed by adding “+w3” and “-w3” to the command. If a total of six lines of context were not sufficient to evaluate the use of the target verbs, more contextual data were examined manually.

5. Results.

Results of the corpus research will be presented per language: Dutch *hoeven* in subsection 5.1, English *need* in subsection 5.2, and German *brauchen* in subsection 5.3. The development of

⁶ See further footnote 4.

each NEED will be presented by different groups based on the chronological age of the children at the recording moment, ranging from one-year-olds to four-year-olds in the case of English *need* and Dutch *hoeven*, but up to six-year-olds and beyond in the case of German *brauchen*. A summary of the corpus results will follow in subsection 5.4.

5.1. The development of Dutch *hoeven*.

The development of Dutch *hoeven* is approached by analysing spontaneous speech data of 59 monolingual Dutch children aged between approximately one and five. Relevant results are summarised in the following table, per age group (one- to four-year-olds), and per use (as a lexical or modal verb). Note that *hoeven* is an NPI in both uses.

Group	NPI <i>hoeven</i>		TOTAL
	As a lexical verb	As a modal verb	
1-year-olds	1 (100%)	0	1
2-year-olds	80 (80.8%)	19 (19.2%)	99
3-year-olds	56 (82.3%)	12 (17.7%)	68
4-year-olds	32 (65.3%)	17 (34.7%)	49

Table 4. Distribution of Dutch *hoeven* in child language development.

The corpus data presented in Table 4 clearly show that Dutch children are not able to produce *hoeven* in their spontaneous speech until they are two years old, suggesting that *hoeven* is acquired after the age of two. However, it is hard to tell which use of *hoeven* is acquired first, the lexical or the modal verb use, as the first *hoevens* attested in child Dutch development involve both uses – though in more than 80% of the initial utterances containing *hoeven* it is used as a lexical verb.

With respect to the absolute number of *hoeven* attested in child language, there is no increase when comparing different age groups, but rather a decrease: from 99 with the two-year-olds to 68 with the three-year-olds, which further decreases to 49 with the four-year-olds. However, this is due to the fact that the number of CHAT files available for analysis for each age group decreases when children grow older.

Despite the decrease in the absolute number of utterances containing *hoeven* attested in child Dutch development, there is a significant change in the distribution of this verb. Results of a chi-square test indicate that Dutch four-year-olds use *hoeven* significantly more often as a modal verb compared to their younger counterparts ($X^2(1, N = 216) = 5.703, p = .017$). In particular, the four-year-olds use *hoeven* as a lexical and modal verb approximately 65% and 35% of the time, respectively. Although such a distribution differs significantly from *hoeven*'s distribution in the language input ($X^2(1, N = 419) = 12.921, p = .000$) (see also Table 2), where it is used as a lexical verb about 38% of the time and as a modal verb around 62% of the time, the significant change attested in child language does represent a development towards adult-likeness.

However, what is crucial to the current research aim is when *hoeven* emerges as an NPI in child Dutch development. Since *hoeven* is an NPI independent of its use as a lexical or modal verb, the conclusion drawn here is that Dutch children have already acquired the NPI as early as two years old (see also Koster & Van der Wal 1995, Lin et al. 2015, Van der Wal 1996 for similar results).

5.2. The development of English *need*.

In order to draw a developmental pattern of English *need*, spontaneous speech data of a total of 145 monolingual English children aged between approximately one and five years old were analysed. Results of this investigation are presented in Table 5. Two categories of the appearance of *need* in child language are distinguished: non-NPI *need* (when it appears as either a lexical verb or a modal verb), and NPI *need* (when it is used as a modal auxiliary); and four age groups are divided depending on the chronological age of the children at which their speech data were recorded.

Group	Non-NPI <i>need</i>		NPI <i>need</i>	TOTAL
	As a lexical verb	As a modal verb	As a modal auxiliary	
1-year-olds	8 (100%)	0	0	8
2-year-olds	1818 (84.3%)	340 (15.7%)	0	2158
3-year-olds	707 (80.5%)	171 (19.5%)	0	878
4-year-olds	288 (55.8%)	230 (44.8%)	0	518

Table 5. Distribution of English *need* in child language development.

Before age two, only eight utterances containing English *need* are attested in child language. In all these initial utterances, *need* is used as a lexical verb, and hence is not an NPI. This means that among the three uses of English *need*, the use as a lexical verb emerges first.

From age two, children start to use *need* quite frequently in their spontaneous speech. Altogether, 2158 utterances containing *need* are used by two-year-olds, and 878 and 518 utterances containing the target verb are attested with three- and four-year-olds, respectively.⁷ Compared to the initial *needs* attested in child English, there is a substantial change in the distribution of this verb after the age of two. That is: from age two, children use *need* not merely as a lexical verb, but also as a modal verb. This means that the use of *need* as a modal verb is acquired after its lexical use.

Another important development in the distribution of English *need* in child language concerns a significant increase attested for how often English children use *need* as a modal verb: from

⁷ The decrease in the absolute number of utterances containing *need* is explained by the fact that the number of CHAT files available for analysis decreases when children grow older. See also the Dutch results presented in subsection 5.1.

15.7% at age two, to 19.5% at age three, and further increasing to 44.8% at age four. Results of a chi-square test confirm that this increase is significant ($X^2(2, N = 3554) = 209.052, p = .000$). This suggests that when they grow older, English children become more and more adult-like in how they use *need*. This is because *need* is also more often attested in the language input as a lexical verb (i.e. 67.63%) than as a modal verb (i.e. 32.33%) (see further Table 2).

However, the significant development discussed above does not guarantee the emergence of *need* in child language as an NPI (i.e. when it is used as a modal auxiliary). At least until the age of five, no single utterance containing *need* used as an NPI is attested. Thus, the corpus results presented in Table 2 does not provide any evidence for English children's acquisition of *need* as an NPI – at least not before the age of five.

5.3. The development of German *brauchen*.

Spontaneous speech data of a total of 41 monolingual German children were analysed to study the development of their knowledge of the target verb *brauchen*. Since eleven of the investigated children were longitudinally recorded until the age of twelve, the age range of the German children reported in this subsection is larger, compared to that of the Dutch and English children presented in sections 5.1 and 5.2, respectively. As a result, two extra age groups are investigated for the German children in the current study: five-year-olds, and those aged six and older. Two main categories are defined to describe the appearance of German *brauchen*: non-NPI *brauchen* (when it appears as a lexical verb) and NPI-*brauchen* (when it appears as either a modal verb or a modal auxiliary). Relevant corpus results are summarised in the table below.

Group	Non-NPI <i>brauchen</i>	NPI <i>brauchen</i>		TOTAL
	As a lexical verb	As a modal verb	As a modal auxiliary	
1-year-olds	4 (100%)	0	0	4
2-year-olds	163 (97%)	2 (1.2%)	3 (1.8%)	168
3-year-olds	129 (94.9%)	2 (1.5%)	5 (3.6%)	136
4-year-olds	27 (90%)	3 (10%)	0	30
5-year-olds	30 (96.8%)	1 (3.2%)	0	31
≥6-year-olds	79 (73.8%)	16 (14.9%)	12 (11.3%)	107

Table 6. Distribution of German *brauchen* in child language development.

German one-year-olds do not seem to have acquired the target verb, as merely four utterances containing *brauchen* are attested with these young children. It is clear, however, that German children start to use *brauchen* more and more frequently after the age of two. This strongly suggests that the acquisition of the verb *brauchen* takes place around two years old.

But the first *brauchens* uttered by the two-year-olds are virtually all lexical ones (i.e. 97%), thus non-NPIs. This distributional pattern remains the same until the age of six. A Fisher's exact test confirms this observation: there is no significant difference in how German children below

the age of six distribute *brauchen* ($p = .255$). On average, *brauchen* appears around 96% of the time as a non-NPI, whereas it is used as an NPI only 4% of the time. These results suggest that *brauchen* is first acquired as a lexical verb. Moreover, children do not seem to have acquired the modal or the auxiliary use of *brauchen* until the age of six – since the average percentage of *brauchen* appearing as a modal or an auxiliary verb below age six is too marginal.

The distribution of *brauchen* in child German development shows a significant change when children turn six years of age ($X^2(2, N = 472) = 46.731, p = .000$). In particular, children above age six start to use *brauchen* as an NPI – either as a modal verb or an auxiliary modal – significantly more frequently than their younger counterparts. Hence, the NPI-use of German *brauchen* does not emerge until the age of six. On top of this, we also see that the distribution of *brauchen* in late child German displays a similar trend as observed with the parents. In both late child German and the language input, *brauchen* is most often attested as a lexical verb, and least often used as an auxiliary modal, although there is a significant difference between *brauchen*'s distribution in late child language and the input ($X^2(2, N = 1472) = 13.581, p = .001$) (see also Table 2).

5.4 Summary.

Results presented in this section clearly show that the average age of emergence of all three NEEDS is around two years old. The NEEDS that are initially uttered by language-acquiring children are all lexical ones, which means that the first use of Dutch *hoeven*, English *need*, and German *brauchen* acquired by children is the lexical use (illustrated in 5a, 6a, and 7a and b).

When looking at the development of the NPI-use of the West Germanic NEEDS, however, the average age of emergence differs from language to language. There is strong evidence that Dutch children have already acquired *hoeven* as an NPI around the age of two (cf. Table 4). Although German children are able to utter *brauchen* as an NPI between age two and six, they only seem to have acquired the NPI-use of the West Germanic NEED when they turn six years old (cf. Table 6). English *need*, finally, is never attested as an NPI in child language development – at least until the age of five (cf. Table 5). These relative corpus results lead to the following scale, with respect to the acquisition pace of the Germanic NEEDS. On this scale, '>' stands for 'earlier acquired than'. We see that the German NPI *brauchen* holds the in-between position again.

- (10) The acquisition pace scale of the West Germanic NEEDS
Dutch *hoeven* > German *brauchen* > English *need*

6. Conclusion and discussion.

This paper investigated the distribution and acquisition of Dutch *hoeven*, English *need*, and German *brauchen* – three verbs expressing necessity. These verbs – historically and etymologically unrelated (cf. Van der Wouden 2001) – all exhibit distributions restricted to certain negative environments only, and are therefore categorised as NPIs. However, this paper

presented some distributional differences among these West Germanic NEEDS when they appear as NPIs, which gives rise to a pattern of German *brauchen* in between English *need* and Dutch *hoeven*. By discussing two factors that may influence language acquisition, namely lexical opacity and input frequency, this paper moreover predicted a similar pattern for the acquisition. In particular, the Dutch NPI *hoeven* emerges earlier in child language development than the German NPI *brauchen*, which in turn arises earlier than the English NPI *need*.

This order of emergence is confirmed by child data from CHILDES. The Dutch NPI already emerges around age two – in both its lexical and modal use. NPI-*need* (i.e. the auxiliary one), however, is never attested in child English development – at least until the age of five. The first *brauchens* attested in early child German are virtually all lexical ones, thus non-NPIs; and there is no strong evidence for the acquisition of NPI-*brauchen* (i.e. the modal and the auxiliary ones) before age six. However, since the factors lexical opacity and input frequency made exactly the same prediction, with respect to the acquisition pace of the West Germanic NEEDS, it was impossible to tease apart the influence of each factor during the acquisition. Nonetheless, the exploration of the development of children's knowledge of the NEEDS in this paper shows that absence of robust input evidence – due to either lexical opacity and/or insufficient input frequency – delays acquisition.

The results presented in this paper, with respect to the different ages at which the West Germanic NEEDS are acquired as NPIs, have an implication for language change. Assuming that language acquisition requires different learning mechanisms, which are sensitive to different factors, such as lexical opacity, and/or input frequency, the pattern attested for the acquisition of the West Germanic NEEDS may give rise to the following predictions for language change. As Dutch *hoeven* is acquired as an NPI quite early on, which is around age two, we may expect this NPI to be stable in the language. On the other hand, since the German NPI *brauchen* is acquired much later, namely around the age of six, we may expect this NPI to be less stable in the language; for example, it may only appear in fixed constructions such as *Du brauchst keine Angst (zu) hebben*. 'You need not fear.'. Finally, the English *need* may turn out to be vulnerable for change as it does not seem to be acquired during childhood. We may expect it to disappear from the language. And as one of the anonymous reviewers points out, *need* is not an NPI (anymore) for most cotemporary speakers of the language, of which the NPI-use appears to be restricted to formal speech only – a typical consequence of late acquisition.

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