

Question-Answer Pairs in Sign Language of the Netherlands

Abstract

Several sign languages of the world utilize a construction that consists of a question followed by an answer, both of which are produced by the same signer. For American Sign Language, this construction has been analyzed as a discourse-level rhetorical question construction (Hoza et al. 1997), as a single-sentence question-answer pair (Caponigro and Davidson 2011), and as *wh*-clefts (Wilbur 1996). In this article, we analyze this construction in Sign Language of the Netherlands (NGT) based on corpus data. We demonstrate that its properties show a great deal of variation, making it impossible to apply any of the previous accounts to the NGT data. In particular, we found both discourse-level combinations of questions and answers, and single sentence structures resembling *wh*-clefts. We argue that this variation is a reflex of grammaticalization of discourse-level rhetorical strategy into a single-sentence construction functionally similar to *wh*-clefts.

SEVERAL SIGN LANGUAGES of the world utilize a construction that consists of a question followed by an answer, both of which are produced by the same signer. Example 1 comes from Sign Language of the Netherlands (NGT):¹

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QAPs can be structurally and semantically analyzed as *wh*-clefts, which are also attested in spoken languages. These questions have been studied primarily for ASL, but some research is also available on Australian Sign Language (Auslan) and Italian Sign Language (LIS).

Are QAPs Single Sentences?

Although most researchers answer this question positively for ASL, Auslan, and LIS, historically QAPs in ASL were first analyzed as rhetorical questions followed by answers (Baker-Shenk 1983). Others have argued strongly against this analysis and suggested that QAPs should be analyzed as *wh*-clefts, which presupposes a single-sentence analysis (Wilbur 1996).

First, studies have shown that questions in QAPs and regular questions are different in nonmanual marking and word order (Wilbur 1994, 1996). Regular questions (importantly, also rhetorical ones) are marked with eyebrow furrowing; the *wh*-word can appear in different positions and can be doubled. Questions in QAPs are marked with raised eyebrows (*ibid.*); the *wh*-word typically appears in the clause-final position and normally cannot be doubled. Therefore, the question elements of QAPs are not questions but embedded clauses (*ibid.*).

Further arguments in favor of analyzing QAPs as single sentences address prosody and embedding. Wilbur (1996, 218) claimed that, in sequences of a rhetorical question followed by an answer, long pauses and thinking behavior are possible; however, this is not the case in the QAPs that Wilbur analyzed as *wh*-clefts (*ibid.*). In addition, the whole QAP can be embedded in a matrix predicate, as in example 2, where the QAP is an argument of the matrix predicate SEE.

EXAMPLE 2.

	_____	br			
KIM SEE	STEAL TTY WHO,	LEE.			ASL

“Kim saw that the one who stole the TTY was Lee.” (*ibid.*, 232)

An analysis of QAPs in Auslan also suggests that they are single sentences, although no arguments are provided to support this position (Johnston and Schembri 2007, 210–11). Similarly, an analysis of QAPs in LIS suggests that they are *wh*-clefts (presupposing that they con-

Are QAPs Wh-Clefts?

It seems that most researchers working on ASL and other sign languages analyze QAPs as single sentences. However, not all of them agree that QAPs are in fact *wh*-clefts. *Wh*-clefts in spoken languages are biclausal sentences consisting of a matrix clause (headed by a copula) and a relative clause (Lambrecht 2001).² For instance, “What I dislike is Lee’s tie” is an example of a *wh*-cleft. It contains the free relative clause “what I dislike,” which functions as the subject of the main clause. Lambrecht (*ibid.*) argues that, although the two clauses together express one proposition (*I dislike Lee’s tie*), the function of the biclausal structure is to separate the focus (*Lee’s tie*) from the presupposed information (*I like something*). *Wh*-clefts have been described for many spoken languages (*ibid.*; Caponigro and Heller 2007).

It has been argued that QAPs in ASL are *wh*-clefts and that they are similar to *wh*-clefts in English and other spoken languages (Wilbur 1996). The similarity is both formal and functional (*ibid.*). Functionally, the question of a QAP is an open proposition, and the answer provides the missing information. In other words, the question is presupposed, and the answer is the focus. Formally, the question is a *wh*-clause,³ which serves as a predicate in the main clause, but undergoes movement to the left periphery. Wilbur’s analysis may be applicable to Auslan as well (Johnston and Schembri 2007, 210–11), but an explicit analysis has not yet been advanced. The *wh*-cleft analysis of QAPs has additional support in LIS (Branchini 2014), and we discuss that claim later.

Some researchers, however, argue against the *wh*-cleft analysis for ASL (Hoza et al. 1997). The crucial argument is, of course, that QAPs are discourse-level combinations of sentences, as discussed earlier. However, Hoza et al. (*ibid.*) provide additional evidence. First, ASL lacks specificational pseudoclefts (“What John did was stupid”), while from spoken languages we know that, if a language has predicational pseudoclefts (“What John did was leave”), it also necessarily has specificational ones. In addition, ASL does not have free relative clauses anywhere outside the alleged *wh*-cleft construction. If one follows the common analyses of *wh*-clefts in spoken languages, the *wh*-clause must be a relative clause, but this seems unreasonable for ASL.

Furthermore, Hoza et al. (ibid.) claimed that the answer part of the QAP does not have to be a direct answer, as in example 5, and it can be a full clause or even several sentences. Finally, they noticed that the question part of the QAP can be a yes/no question, whereas this is impossible in *wh*-clefts in spoken languages (example 6).

EXAMPLE 5.

_____ rh/wh	
WHAT HAPPEN?	DON'T KNOW, IX-I. ASL

“What happened? I don't know.” (adapted from Hoza et al. 1997, 18)

EXAMPLE 6.

_____ rh/y-n neg	
IX-I GO TOMORROW?	NO, NEXT WEEK. ASL

“Am I going tomorrow? No, next week.” (adapted from ibid., 14)

Other evidence contests the *wh*-cleft analysis of QAPs in ASL (Caponigro and Davidson 2011). In particular, QAPs in ASL allow all *wh*-words, while, cross-linguistically, *wh*-clefts are always constrained, so a language must have some *wh*-words that can form regular questions but cannot be used in *wh*-clefts (Caponigro and Heller 2007). In addition, QAPs in ASL allow a nonreferential answer, which is impossible in *wh*-clefts cross-linguistically: Compare example 7 to its (ungrammatical) literal parallel in English. This example also illustrates that the answer in a QAP can be a full clause instead of simply providing the missing information in the question. In English, this is also possible, but highly infrequent and degraded.

EXAMPLE 7.

JOHN BUY WHAT, (HE BUY) NOTHING	ASL
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“John bought nothing.” (lit., What John bought was he bought nothing).
(adapted from Caponigro and Davidson 2011, 367)

Caponigro and Davidson (ibid.) claim that QAPs in ASL are equative clauses,⁴ in which an embedded question and an embedded answer are connected by a silent copula. This analysis explains both similarities and differences between QAPs and regular questions and answers. The

difference in nonmanuals and the lack of doubling of the *wh*-word is explained by the fact that the question in a QAP is embedded. On the other hand, the fact that all *wh*-words are possible in the question and that full answers are possible in the answer part is explained by the fact that these elements in QAPs are in fact questions and answers (and not, for instance, free relatives). The same explanation applies to the fact that the question can be a yes/no question. Semantically and pragmatically, QAPs in ASL are similar to pseudoclefts as they highlight an implicit subquestion under discussion and answer it (see *ibid.* for details).

On the other hand, it has been argued that the *wh*-clefts analysis is more suitable for analyzing QAPs in LIS (Branchini 2014). In particular, in contrast to ASL, free relative clauses in LIS can contain *wh*-signs, so the question part of QAPs can be analyzed as a relative clause. According to Branchini, the question parts of QAPs are in general syntactically and nonmanually equivalent to relative clauses, but different from real questions. It seems that, even if Caponigro and Davidson's (2011) arguments are valid for ASL, and QAPs in ASL should not be analyzed as *wh*-clefts, QAPs in other sign languages might have different properties and call for a dissimilar analysis.

Summary

Researchers working on QAPs in sign languages have proposed various analyses of these constructions. It is also clear that QAPs in a variety of sign languages have different properties (e.g., ASL vs. LIS). We do not argue for a particular analysis of QAPs in ASL, Auslan, or LIS. However, the researchers working on these languages have developed a number of tests that can be used to analyze these constructions. These tests can help determine whether QAPs are single sentences and whether they have the same structure as *wh*-clefts in spoken languages. Importantly, many of these tests can be applied to corpus data, as we discuss in the following section.

Methodology

As mentioned earlier, we decided to investigate QAPs in NGT based on corpus data because such data make it possible to analyze natural language use and variation. In addition, many of the features of QAPs

relevant to an analysis are relatively easy to extract from the corpus. Next we introduce the necessary background on NGT and the Corpus NGT and discuss our data-mining procedure and analysis.

NGT

Sign Language of the Netherlands is the language of the Deaf community of the Netherlands. It is used by approximately 7,500 people as their first or preferred language (Wheatley and Pabsch 2012).

The five different dialects of NGT are found mainly at the five different Deaf institutes in the Netherlands, which are located in Amsterdam, Eindhoven, Rotterdam, Groningen, and Voorburg. They display considerable lexical variation (Schermer 2004), but very little is known about possible grammatical variation. For our study, we collected examples from different dialects without focusing on regional variation per se. Most of our examples come from the Groningen and Amsterdam dialects.

Corpus NGT

Corpus NGT is a project established by Radboud University in Nijmegen during the period 2006–2008 (Crasborn, Zwitserlood, and Ros 2008). The corpus contains a collection of more than 2,000 video recordings of 94 different signers from five different regions representing the five dialects. It contains different types of data, including free conversations, stories based on personal experience, and retellings of cartoons and fables. It has been partially glossed in ELAN (in Dutch) by the Corpus NGT team, but a majority of the recordings still lack annotations.

Data Mining

In order to analyze the properties of QAPs in NGT, we first looked for relevant examples. We defined QAPs broadly as constructions in which a question asked by a signer was followed by an answer by the same signer. The answer could also be indirect or partial. Furthermore, a reaction by the addressee did not disqualify an example from inclusion in our dataset as long as the signer provided the answer (these cases are discussed later).

To find relevant examples, we used two methods. First, we searched for the glosses of *wh*-words in ELAN and then examined the results individually to identify potential QAPs. This, of course, limited our search to the glossed part of the corpus. We added a special tier for QAPs and created an empty annotation for each of the 59 examples we found. In addition, we created annotations for regular questions (RQs) in order to compare their properties with those of the QAPs. We included 115 examples of RQs in our dataset.

Second, we looked at some of the nonglossed video files. In the corpus, each signer participated in retelling the *Canary Row* cartoon clips (Freleng 1950). One of the clips (the last one) regularly caused the signers to use a QAP. In this episode a cat is being chased by a tram, which is being driven by a canary and an old woman (GRANNY) (see example 9, as well as other examples in the section on the properties of QAPs in NGT and in the discussion section). Once we noticed this, we identified all of the retellings of this cartoon and examined the way the signers described the relevant episode. By doing so, we found 16 additional examples of QAPs.

One problem with both of these methods is that they did not reveal yes/no QAPs, as such QAPs that do not contain *wh*-words and do not occur in retellings of any particular episode of the *Canary Row* cartoon. Fortunately, in our previous research (Kimmelman 2014) we found a number of examples of yes/no QAPs while investigating a different topic, and we have included them in this article.

Analysis. Based on the previous research discussed earlier, we established a list of features relevant to our analysis of QAPs. For each example found in the corpus we annotated every feature on the list:

1. *Wh*-word (i.e., which *wh*-word was used in the question)
2. Nonmanual marking (eyebrow movement and head tilts, for which we annotated both the type and the scope of the marker)
3. Position of the *wh*-word (e.g., clause initial, clause final, in situ). Quite often the position was ambiguous: For instance, *wh*-words in the subject position can be classified as clause initial or in situ in the absence of sentential adverbs. In such cases we used a double label: clause initial/in situ.

4. Doubling of the *wh*-word (if present, the position in which the *wh*-word occurred was noted)
5. Type of answer (e.g., full clause vs. only the focus part; direct vs. indirect; a quantifier given as an answer)
6. Embedding (whether the whole QAP was an argument of a matrix predicate)
7. Pauses (we measured the duration of the pause between the question and the answer in each QAP)
8. Interventions (whether any parenthetical material intervened between the question and the answer)

For regular questions, we also annotated some of these properties (namely, properties 1–4, 6, and 7) and measured the duration of pauses between the matrix clause and the question (in the case of embedded questions). For the few examples of yes/no QAPs, features 1, 3, and 4 were not relevant, but the other features were annotated.

All of the features on our list can be annotated based on corpus data, as they concern surface-level properties of the construction. Sometimes the interpretation of findings can be complicated, as is the case with the position of *wh*-words, which can be ambiguous. Other properties of QAPs, such as their semantics, are more difficult to investigate using corpus data. We thus do not discuss exhaustivity or other semantic properties of QAPs in NGT (see Caponigro and Davidson [2011] for such a discussion of ASL). Finally, a general problem of corpus studies, especially with smaller corpora, is the lack of negative evidence. If we do not find a particular pattern, it does not mean that this pattern is never used in NGT. In the following sections we develop an analysis that is general enough to account for the data that we did find but is also not overly restrictive. We thus never claim that other patterns not found in the corpus are impossible.

Properties of QAPs in NGT

We analyzed 75 examples of QAPs and 115 examples of RQs found in the corpus. Using our findings, we describe the syntactic and prosodic properties of QAPs in NGT. First, we discuss general properties, such as word order and nonmanual marking in QAPs, and compare them to those features in RQs. We then turn to the properties relevant to the possible *wh*-cleft analysis of QAPs. Finally, we address the ques-

TABLE 4. Marking of Backward Head Tilt in QAPs and RQs

	Head Tilt Present	No Head Tilt
question-answer pairs	46 (63%)	27 (37%)
regular questions	47 (40%)	68 (60%)

EXAMPLE 12.

_____bf

PT: I THINK IMPORTANT WHAT? MANY SIGN PT MUST TAKE NGT
 “What do I think is important? To borrow many signs.” (CNGT0539, S26)

Another common nonmanual marker of both QAPs and RQs is a backward head tilt (see examples 8–11). Quite often it accompanies only the *wh*-word, whereas the eyebrow raise accompanies the whole question (see example 9). This marker is not obligatory in either QAPs or RQs, but it is significantly more frequent in QAPs (table 4, $\chi^2 = 7.8843$, $df = 1$, $p = 0.005$, Cramer's $V = 0.22$).

Answers in QAPs look very similar to regular answers. There are no specific markers (nonmanual or word-order related) of answers in general, so we have little to compare here. Answers can be positive or negative in polarity (cf. example 9 and example 8 respectively). As we discuss in the next section, QAPs also allow full answers.

To sum up, with respect to word order and nonmanual marking, RQs and QAPs are quantitatively different: Questions in QAPs are more likely to be marked with eyebrow raise (in contrast to eyebrow furrowing) and backward head tilt, and the *wh*-word is slightly more likely to occur in the clause-final position and less likely to be doubled. However, RQs and QAPs exhibit no categorical differences, as all nonmanual markers and word orders are attested in both constructions.

Properties of Wh-Clefts

Some properties of QAPs in NGT allow us to conclude that they do not look like typical *wh*-clefts in spoken languages. For instance, many different *wh*-words can be used in QAPs in NGT, namely, WHO,

WHAT (see examples 8–12), WHERE (example 13), WHY (example 14), HOW (example 15), and HOW.MANY (example 16). The only *wh*-word that did not occur in QAPs in our data is WHEN, but this is probably due to the limited size of our dataset; this has to be verified in future.⁶

EXAMPLE 13.

	<u>bf</u>	
WHERE?	PT:I KNOW APPROXIMATELY	NGT
“Where [should I look for my bike]? I know it approximately.”		
(CNGT0516, S26)		

EXAMPLE 14.

<u>bht+br</u>	<u>neg</u>	
WHY	BEAR KNOW PT PO	NGT
“Why? Because the bear doesn’t know it.” (CNGT0207, S12)		

EXAMPLE 15.

<u>br</u>	<u>bht+br</u>	
PT:I BACK	HOW?	PT:I OBLIGATORY PT:I TAXI
NGT		
“How can I get back? I have to take a taxi.” (CNGT0208, S11)		

EXAMPLE 16.

	<u>bf</u>	
HOW.MANY PEOPLE PT?	EIGHT	NGT
“How many people were there? Eight.” (CNGT0518, S25)		

Unsurprisingly, the same *wh*-words occur in RQs, including embedded RQs, but only one also occurs in relative clauses, namely, WHO (example 17). As mentioned earlier, this is an argument against analyzing QAPs as clefts, as clefts typically show a restrictive use of *wh*-words, and the question part has to be a relative clause.

EXAMPLE 17.

	<u>neg</u>	
PT WHO BLIND BROKEN,	PT SELF CAN SEE	NGT
“Who is blind cannot see.” (CNGT0253, S14)		

Another clear argument against analyzing QAPs in NGT as *wh*-clefts is the fact that, as in ASL, the question part can be a yes/no question (example 18), not just a *wh*-question. If we want to analyze such cases together with the *wh*-question QAPs, the *wh*-cleft analysis is not feasible.

EXAMPLE 18.

	<u> </u> br	<u>neg</u>	
PT: I	HOUSE	CAR?	NO
			NGT

“Will I go home by car? No!” (CNGT0208, S11)

Finally, QAPs are different from *wh*-clefts if we look at the answer part. First, as in ASL, QAPs in NGT allow full answers (see example 9). In addition, indirect answers such as “I do not know” are also quite common in the QAPs found in our data (example 19). Finally, quantifiers are possible as answers in QAPs, as in example 8, unlike in *wh*-clefts in spoken languages.

EXAMPLE 19.

	<u> </u> bht		
HOW	PU?	KNOW	PT: I NOT
			NGT

“How can this be? I do not know.” (CNGT0064, S06)

One or Two Sentences?

Although it appears that the *wh*-cleft analysis is not easily applicable to QAPs in NGT, we are still left with two possibilities: We can analyze QAPs as question-answer clauses, as Caponigro and Davidson (2011) did for ASL, or we can analyze them as discourse-level question-answer sequences, as Hoza et al. (1997) did for ASL. However, it appears that QAPs in NGT do not lend themselves easily to either of the two analyses, at least if we want to propose a unified account for all cases.

Some instances of QAPs consist of two clearly independent sentences. Evidence comes from several directions. First we consider the reaction of the addressee. In RQs, the addressee is the person who gives the answer. In typical QAPs, by definition it is the signer who

EXAMPLE 23.

I saw Ed—he was my teacher in primary school—yesterday.

The third and crucial piece of evidence comes from looking at the duration of pauses between the question and the answer. We measured the pauses for all of the examples of QAPs we found and compared them with those between the matrix and embedded clauses in clear cases of embedded questions (example 24) and embedded QAPs (example 25 below). The cases of embedded questions and QAPs may be indications of typical pauses that are allowed between clauses in complex sentences that are clearly connected.

EXAMPLE 24.

<u> </u> neg	<u> </u> br	
PU KNOW	WHY	NGT

“I don’t know why.” (CNGT0847, S39)

We analyzed the duration of pauses in both QAPs and embedded questions statistically. Clear outliers appear in both groups, so for the statistical analysis we removed three outliers in QAPs (with durations of 1370, 1760, and 4080 ms) and one outlier in the embedded questions (with a duration of 690 ms).⁹ The durations are not normally distributed in either group, so we compared median durations. The median duration of pauses in QAPs is 210 ms (IQR = 230), and in embedded questions it is 130 ms (IQR = 74). According to the Mann-Whitney U test, the difference between groups is highly significant ($W = 1424.5$, $p_{one-sided} = 0.0004$).

This statistical analysis shows that QAPs as a group have longer pauses between the question and the answer than occurs between the main and the embedded clauses in cases of complex sentences. We have also seen that the range in the QAP group is much larger, which means that the QAP group is more varied.

This leads us to the arguments in favor of analyzing at least some of the cases of QAPs as syntactically connected. First, as we have just mentioned, in several cases the pauses between the question and the answer were very short or even nonexistent, as is for instance the case in example 9.

QAPs is reflective of the ongoing process of grammaticalization of this construction.

Sociolinguistic Variables

Sociolinguistic factors can influence the phonology, lexicon, and grammar of sign languages (see Schembri and Johnston 2012 and Lucas and Schembri 2015 for overviews). For instance, one of the first large-scale investigations of sociolinguistic variation in ASL (Lucas et al. 2001) found that the phonological form of DEAF in ASL depended not only on linguistic factors (e.g., whether the sign was a part of a compound) but also on social factors (e.g., region, age). Lexical regional variation has even been reported for NGT (Schermer 2004). Grammatical variation has been investigated to a lesser extent, but it is nonetheless clear that some grammatical features vary across different subjects and that age plays an important role (McKee et al. 2011). The most important sociolinguistic factors that can influence various phenomena in sign languages are region, age, gender,¹⁰ and age of acquisition of the sign language (Stamp et al. 2014). We therefore decided to determine whether the variation in our data can be partially accounted for by any of these factors.

Since the variation concerns the degree to which the question and the answer in QAPs can be considered one sentence, we chose the duration of the pause between the question and the answer as the dependent variable for our analysis. We conducted several tests to find out whether this variable correlates with any of the sociolinguistic variables. It turned out that the variation in the duration of pauses between questions and answers is not significantly influenced by any of the sociolinguistic factors. The reader should, however, be aware of the fact that our data sample is quite small, so the results should be considered only preliminary at this stage.

Region was a likely candidate to influence variation, as Schermer (2004) has demonstrated that regional variation in NGT is substantial. Our dataset contains QAPs from all regions; however, except for the data from Amsterdam and Groningen, we have very few examples, so we were able to compare these two regions only to each other. The median values for pause duration for the two regions are 210 and

190 ms, respectively, and the difference is not statistically significant according to the Mann-Whitney U test ($W = 492, p = 0.6$).

Very similarly, no significant difference in pause duration occurs between genders. The median value for males is 210 ms, and for females 240 ms, and the difference is not statistically significant according to the Mann-Whitney U test ($W = 606, p = 0.99$). Note also that we did not expect to find significant gender differences in NGT, as the schools are not separated by gender.

We hypothesized that age might have an effect on pause duration, as older signers might in general sign more slowly. As for the age of acquisition, late learners might show a greater influence from Dutch, which has *wh*-clefts and, therefore, shorter pauses. To determine whether age or age of acquisition influences the duration of pauses, we computed correlations between these variables and duration, but the correlations in both cases were very low and not significant.

To sum up, no sociolinguistic factors can account for the variation in the properties of QAPs in NGT (specifically, the duration of pauses between the question and the answer). We conclude that this variation is a general property of NGT, and we thus have to explain it.

Not a Single Construction?

As demonstrated earlier, one can take a variety of approaches when examining the variable properties of a construction. For instance, for ASL, it seems, even researchers arguing for a single-sentence analysis of QAPs (Wilbur 1996; Caponigro and Davidson 2011) are aware of the cases in which the question and the answer cannot be analyzed as one sentence. However, in order to analyze the latter as either *wh*-clefts or question-answer clauses, they choose not to group such cases together with the single-sentence examples.

If we follow this approach when analyzing QAPs in NGT, we could decide to exclude examples with reactions by the addressee, with interventions, and with indirect answers from consideration. We could then analyze the remaining examples as question-answer clauses following Caponigro and Davidson's (2011) analysis for ASL.¹¹ However, we find this approach unsatisfactory because it leaves open the following question: If single-sentence QAPs and discourse-level QAPs in NGT are separate phenomena, why do they have so much

in common? In particular, nonmanual marking, word order, and the use of question words are all shared between clearly single-sentence and clearly discourse-level QAPs. Despite the differences in the degree of integration between questions and answers in various examples, obvious similarities also appear, and these have to be accounted for.

Grammaticalization

We suggest that, instead of looking for a unified analysis of all instances of QAPs in the NGT corpus, or excluding some instances and analyzing a subset of the data, a grammaticalization-based account of variation could be formulated.

Grammaticalization is a process of emergence of grammatical elements. Typically, it means that a word (or a combination of words) loses its concrete lexical meaning and acquires a grammatical one instead (Hopper and Traugott 2003; Lehmann 2015). For instance, in English, the verb *going* (from the infinitive *to go*) in the sentence “I am going to see you tomorrow” does not literally refer to movement but instead expresses future tense. An important property of this process is that different stages of grammaticalization can coexist: For instance, the infinitive *to go* in English can be used both lexically and grammatically. Another important property is that semantic change is often accompanied by phonological change: For example, in informal situations, “going to” is almost always pronounced as “gonna,” except when the literal meaning is intended.

This type of grammaticalization, whereby a lexical item acquires a grammatical meaning and changes phonologically, is also attested in sign languages (see Pfau and Steinbach [2006] for an overview). For instance, it has been argued that the ASL modal verb **CAN** originated from the lexical sign **STRONG**, and the future marker **FUTURE** from the lexical verb **GO** (Shaffer and Janzen 2000). Similar grammaticalization paths have been reported for spoken languages. Grammaticalization in sign languages can also be different from spoken languages because gestures can also grammaticalize. For example, the modal auxiliary **MUST** originated as a deictic (i.e., pointing) gesture meaning monetary debt; over time, the gesture became the lexical sign **DEBT**; later on, the lexical sign underwent grammaticalization and became a modal verb (ibid.). Thus, grammaticalization in sign languages can start

with gesture. As we discuss later on, the gesture can also be nonmanual, in which case it can grammaticalize into a grammatical nonmanual marker, bypassing the lexical stage.

Importantly, grammaticalization can work with larger syntactic units. The grammaticalization of complex sentences has been described for spoken languages (Ohori 2011), but some research also exists for sign languages. Kimmelman (2014) proposed that syntactic doubling in NGT and Russian Sign Language developed from discourse-level repetition of clauses via grammaticalization. Complex sentences can also arise in this manner from a discourse-level combination of independent sentences (Herrmann, Pfau, and Steinbach 2016). In several sign languages, grammaticalization apparently leads to the emergence of complex sentences with subordination and involving conjunctions and specialized nonmanual markers (*ibid.*). Most relevant to this article, it has been argued that the nonmanual yes/no question marker in ASL grammaticalized into topic marking (Janzen 1999, 2007; Shaffer and Janzen 2000). Since our account of the grammaticalization of QAPs in NGT is quite similar to Janzen's (*ibid.*) interpretation of the grammaticalization of topics in ASL, we first discuss his line of argumentation.¹²

Janzen (1999) argued that topic marking in ASL (specifically, the nonmanual marking consisting of raised eyebrows and backward head tilt) has undergone a process of grammaticalization from a communicative question gesture to grammatical topic marking and, even further, to marking connectives (example 26).¹³

EXAMPLE 26.

communicative questioning gesture → yes/no question → topic constituent
→ connectives

The original source of topic marking in ASL is a gesture that hearing people also use, namely, raised eyebrows and a forward head tilt in anticipation of a response to a question. ASL, similar to many other sign languages, has borrowed this gesture and uses it as the marker of yes/no questions. That this marker is grammatical can be seen by the fact that it is obligatory in ASL. The next step of grammaticalization

is that the yes/no question marking becomes topic marking. Note that this development is possible because there is a functional overlap between yes/no questions and topics. According to Janzen (1999), the meaning of topic marking can be rephrased in terms of a question: If X is a topic of a sentence, the signer is basically asking “Do you know X?” Consider the following:

EXAMPLE 27.

top		
POSS-I BROTHER	DEAF	ASL
“My brother is Deaf.” (ibid., 285)		

The first constituent, POSS-I BROTHER, is clearly not a yes/no question because the addressee is not expected to answer, but it still has a partially questioning function: checking whether the information mentioned by the signer is shared by the addressee. Janzen (1999) also states that topic marking develops further and is also used for topics that are less functionally like questions, which is what is to be expected during grammaticalization. Finally, according to Janzen, topic marking can be used to mark connectives which are no longer topics functionally (ibid.). For instance, BE.FINISHED, when accompanied by the same nonmanual, functions as a connective by linking two clauses and expressing a meaning comparable to English *then*.

Note two important features of the grammaticalization of topics in ASL that mirror the properties of grammaticalization in spoken languages. First, different stages of grammaticalization may coexist: Topic marking and yes/no question marking are both active in ASL. Second, while undergoing the functional change, the marker also changed formally: The yes/no nonmanual actually includes a forward head tilt (and raised eyebrows), whereas in the topic marking, the head is tilted backward.

We propose that, similarly, the variation observed in QAPs’ properties in the NGT corpus can be explained if we take different instances of this construction as representing different stages of grammaticalization. The grammaticalization of QAPs in NGT follows the path illustrated in example 28:

EXAMPLE 28.

(regular question →) rhetorical question → discourse-level question-answer combination → question-answer clause

The starting point of the pathway is probably a regular information-seeking question. However, we are not sure that rhetorical questions are more grammatical or abstract than the information-seeking questions. Intuitively, the primary function of question is inquiry, and rhetorical questions are thus less typical questions. We have not specifically analyzed rhetorical questions without answers in NGT, but we suspect that they might also be formally different from information-seeking questions with respect to word order and nonmanual marking.

The next stage of grammaticalization is the emergence of the discourse-level question-answer combination. This discourse-level strategy itself is to some extent grammatical (ritualized), as it involves a regular form (a question followed by an answer) and a regular function (separating the background information from the new and important information).¹⁴ However, the question and the answer are still independent sentences. Thus examples in which an intervention between the question and the answer (example 22) and in which the answer is indirect (example 19) are representative of this stage of grammaticalization. So are examples in which it is clear that the question and the answer are prosodically independent. Examples 20 and 21, where the addressee reacts, probably fall in between this and the previous stages of grammaticalization: In those instances, the question-answer sequence is produced by the speaker, but it is interrupted by the actions of the addressee.

Finally, as a result of frequent use, this discourse strategy undergoes syntacticization and becomes a single sentence consisting of an embedded question and an embedded answer. Examples in which the whole QAP is embedded (example 25) and no pause occurs between the question and the answer are representative of this stage of grammaticalization.

One could ask whether the next step would be the emergence of *wh*-clefts. However, this seems unlikely, as even the clearly grammaticalized QAPs show some properties that are incompatible with the *wh*-cleft analysis, as discussed earlier.



FIGURE 1. WHY: full lexical form (left) and reduced form (right).

Nevertheless, grammaticalization of QAPs does not stop there. Our data reveal that QAPs containing the *wh*-word WHY have some special properties. In general, QAPs with WHY are quite frequent. Quite often the question consists of just the *wh*-word itself (as in example 29). Furthermore, WHY often occurs in a reduced form: The full form is a two-handed sign with path movement and mouthing of the Dutch word *waarom* [why], whereas the reduced form is a one-handed sign with almost no visible movement and no mouthing (figure 1). Finally, as figure 1 also shows, there might even be no nonmanual marker accompanying the reduced form of WHY.

EXAMPLE 29.

<u>bf</u>		NGT
WHY	BETTER LEARN SPEAK	
“Why? To learn to speak better.” (CNGT1791, S74)		

It appears that WHY is undergoing grammaticalization and becoming a conjunction meaning “because, in order to” as a result of its frequent use in QAPs. Apart from the change in its function, it also clearly becomes phonologically eroded. Note that in BSL and Auslan the conjunction BECAUSE has also developed from WHY (B. Woll and T. Johnston, pers. comm.), so this grammaticalization path is not atypical.

Interestingly, the same phenomenon appears in ASL, where the question words *WHY* and *HOW* often function as connectives (Janzen 1999). In example 30 *HOW* is marked with raised eyebrows and functions as the connective *by* (ibid., 295), which is an example of a later stage of the grammaticalization of topic marking. However, since these question words are used in QAPs in ASL as well, and with the same nonmanual marking, one might argue that they originate as QAPs and belong to the QAP grammaticalization path, similar to the one we developed here for NGT and distinct from the grammaticalization path for topics. An argument in favor of such an analysis is the fact that it is unusual to find topic marking with question words, as they are typically the focus components of questions.

EXAMPLE 30.

top

IX-I MEMORIZE.HOLD THINK, MULL.OVER IX-I **HOW**, ASL
MUST PRACTICE SKILL

“You (are able to) take in the message and process it **by** practicing the necessary skills.”

Returning to NGT, different stages of grammaticalization of QAPs clearly coexist in the corpus data. They explain both the varying syntactic properties and the high variability in the duration of pauses between questions and answers that we discussed earlier.

Importantly, the grammaticalization of question-answer sequences into single sentences is also attested in spoken languages (Herring 1991).¹⁵ Tamil, a language spoken primarily in India, utilizes a rhetorical strategy in ritual singing: A storyteller (S1) asks a question, the audience (S2) repeats it, and the storyteller then answers the question (example 31). One can compare this strategy to that demonstrated in examples 20 and 21 in NGT, although in NGT the addressee gives an answer but does not repeat the question. This technique has also entered the nonritual language in the form of QAPs that are functionally similar to *wh*-clefts (see example 32) but consist of two independent sentences. This is comparable, for instance, to example 19 in NGT. Finally, this construction has further grammaticalized into a clause-combining strategy in which the question word *ēn* [why] has undergone phonological change and become the grammatical con-

junction *ēṇṇā* [because] (example 33). This is directly comparable to the process in NGT (example 29).

EXAMPLE 31.

S1: Akkā taṅkai ēḷupērum eppaṭi nīrātukirār?

S2: Eppaṭi?

S1: Avar kuḷuttaḷavu nalla taṇṇirilē.

Tamil

S1: “How do the seven sisters bathe?”

S2: “How?”

S3: “Up to their necks in the good water” (Herring 1991, 262)

EXAMPLE 32.

Avaṅka ēṇ piṭuṅki cāppiṭāṅka ṇṇā?

Avaṅkaḷukku cāppiṭaratukku oṇṇum ille.

Tamil

“Why do they snatch up and eat it?

(Because) they do not have anything to eat.” (ibid., 268)

EXAMPLE 33.

Avan	iṅkē	illai	ēṇṇā	avan	ūrukku	pōṇāṇ	Tamil
he	here	NEG	CONJ	he	town.DAT	go.3 PMS	

“He is not here because he went to his village.” (ibid., 272)

To sum up, the grammaticalization approach to QAPs in NGT accounts for the variability of syntactic and prosodic properties of this construction in the corpus data.¹⁶ We are not trying to offer a unified analysis and to suggest that all instances of QAPs are discourse-level combinations because this would not explain the cases of embedding and prosodic connectedness. We are also not trying to claim that all QAPs are question-answer clauses because this would not explain many of the cases that are neither syntactically nor prosodically connected. Representing different stages of grammaticalization, QAPs with different degrees of connectedness coexist in the corpus.

Conclusion

In this article we investigate several syntactic properties of QAPs in NGT based on corpus data. A comparison of these properties to those of regular questions reveals a number of differences with respect to

word order and nonmanual marking: In QAPs, the *wh*-word is slightly more likely to occur clause finally, and QAPs are more likely to be marked with eyebrow raise and backward head tilt. However, in contrast to ASL, we find that in NGT all word orders and nonmanual markers that occur in RQs are also attested in QAPs.

Furthermore, we discuss the question of whether the QAPs can be analyzed as *wh*-clefts (see Wilbur 1996). This does not seem to apply for NGT, as all of the *wh*-words (with the exception of *WHEN*; see the section on properties of QAPs in NGT) can occur in QAPs and RQs, but only one (i.e., *WHO*) also occurs in relative clauses. The question elements of QAPs in NGT are thus not relative clauses. Moreover, the question component can be a yes/no question, and the answer can be a full sentence or an indirect answer.

Second, we discuss the question of whether QAPs (1) consist of two clauses embedded in a single sentence or (2) are discourse-level question-answer sequences. We conclude that NGT QAPs can be either: Several instances of QAPs clearly consist of two independent sentences, whereas others seem to be syntactically connected. Thus no unified analysis of QAPs in NGT is possible.

We discuss the possibility that variation might be attributed to sociolinguistic factors, such as regional distinctions, age, age of acquisition, and gender. However, none of these appear to be significant. Another possibility that we briefly consider is the claim that discourse-level QAPs and single-sentence QAPs are two different phenomena. The drawback of this analysis is that it does not account for the similarities between different QAPs.

We argue that all of the instances of QAPs in NGT can be explained by the process of grammaticalization. On this view, the variation of the QAP properties can be accounted for as representing different stages of grammaticalization (depicted in example 28). This process likely starts with a regular information-seeking question structure, which can then be used rhetorically as well. The next stage is the more grammatical discourse-level strategy, in which the QAP has a regular form, but the question-and-answer parts are still independent sentences. Finally, as the construction undergoes syntacticization, it becomes a single sentence consisting of an embedded question and an embedded answer. However, the process does not necessarily stop there: We also present examples of *WHY* in which this *wh*-word seems

to undergo phonological erosion, a process that is also attested in the grammaticalization processes of spoken languages. This path can account for the variation in the QAPs in NGT.

Since small-scale, corpus-based research has certain limitations, a continuation of research on QAPs in NGT is desirable. In particular, we did not investigate the semantic and pragmatic properties of QAPs, so we cannot determine whether QAPs in NGT are exhaustive (similar to QAPs in ASL or clefts in spoken languages). In addition, although we conclude that sociolinguistic factors do not account for the variation, our conclusions are preliminary due to the small size of our dataset. Another direction of future research could be cross-linguistic, corpus-based investigation of QAPs and comparable constructions in other signed and spoken languages.

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Notes

1. Glossing conventions: Signs are glossed in small caps. PT:1 indicates pointing to the signer, PU indicates a palms-up gesture. Nonmanuals are placed above the glosses, and their scope is represented as underlining. In addition, br = raised brow, bf = furrowed brow, bht = backward head tilt, neg = negation, hn = head nod. For ASL examples, the following additional abbreviations are used: 1x indicates pointing signs, rh/wh = a rhetorical *wh*-question, rh/y-n = a rhetorical yes-no question. Each example from Sign Language of the Netherlands is followed by the filename (e.g., CNGT0094) and the signer code (e.g., S001) to ensure reproducibility.

2. Not all researchers agree that the first clause in a *wh*-cleft is a relative clause, but this is the most commonly accepted analysis. According to some researchers at least some *wh*-clefts, the first clause is actually a question, and the second part is the answer (Dikken, Meinunger, and Wilder 2000), which is very similar to an analysis suggested for QAPs in ASL (Caponigro and Davidson 2011). However, the question-answer analysis of *wh*-clefts might not be plausible, as the first clause is not a question either syntactically or semantically, but rather a relative clause (Caponigro and Heller 2007).

3. The term *wh*-clause is introduced by Wilbur, and it is not clear whether she believes that a *wh*-clause is a relative clause. However, since in spoken

languages *wh*-clefts necessarily contain relative clauses, a similar assumption has to be made for sign languages if we want to analyze QAPs as *wh*-clefts. Otherwise, the use of the term *wh*-cleft becomes vacuous.

4. They use the term *clause* to refer to both simple clauses and complex sentences. Here we use the term *sentence* to refer to syntactic units that might contain one (simple sentence) or more (complex sentence) clauses, but we continue to use Caponigro and Davidson's (2011) terminology when citing them.

5. Because of space limitations, we give examples only of QAPs, not of RQs.

6. In addition, the *wh*-word WHICH was found in only two RQs and one possible QAP. We suspect that this sign is not really a part of the NGT lexicon but rather an instance of code switching to Signed Dutch. Further research is needed.

7. Because of space limitations, nonmanuals are omitted in this and the following example.

8. We thank R. Wilbur (pers. comm.) for pointing this out to us.

9. However, if we do not remove the outliers, a highly significant difference between the medians in the same direction is still present.

10. Gender variation has been reported mainly for languages such as Irish Sign Language, in situations in which deaf boys and girls attended separate schools. However, several gender differences were also found in ASL (Lucas, Bayley, and Valli 2001).

11. It is also possible to exclude QAPs with yes/no questions and indirect answers and attempt an analysis of *wh*-clefts (Wilbur 1996), but this analysis is very far-fetched because, as we have shown, the question elements of QAPs in NGT are not relative clauses.

12. Note that Janzen uses slightly different terminology for the steps of topic grammaticalization in ASL (cf. Janzen 1999 and Shaffer and Janzen 2000), but the essence of the process is the same.

13. Janzen (1999) also places conditionals as a step on this grammaticalization path (parallel to connectives), but we do not discuss it further. We also do not discuss the different types of topics in ASL.

14. See Wilbur (1996) and Caponigro and Davidson (2011) for a discussion of QAP functions in ASL. Although this topic is outside the scope of this article, it appears that the function of QAPs in NGT is very similar not only to what has been described for ASL but also to the function of *wh*-clefts in spoken languages.

15. Janzen (1999) also discusses Herring's analysis of Tamil as similar to his own account of topic grammaticalization in ASL. However, the parallel with the grammaticalization of QAPs is even more striking since Tamil illustrates the grammaticalization of rhetorical *wh*-questions.

16. One may ask whether our account of grammaticalization predicts that older signers use more discourse-level QAPs than younger signers and

that younger signers use more grammaticalized syntactic QAPs than older signers. For instance, the grammaticalization of relative clauses in Israeli Sign Language (ISL) is suggested by differences between older and younger signers (Dachkovsky and Sandler 2016). However, ISL is a very young sign language (approx. 70 years old), so one expects to find overt evidence of grammaticalization. On the other hand, NGT is much older, so the initial stages of grammaticalization would likely have come about in the nineteenth century, and younger and older signers are thus expected to demonstrate similar patterns nowadays.

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