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Variation in Italian Sign Language (LIS): The case of wh-signs

Abstract: The position of wh-items is one of the most striking features of the syntax of sign languages (SLs). In contrast to spoken languages, where wh-words are generally found either clause-initially or in situ, SLs allow wh-signs in situ, in clause-final position (preferred for many SLs), or repeated in two different positions of the clause. Moreover, in many cases all these options coexist in the same language (and even within a single signer). Several proposals in the theoretical literature showed how grammars are able to generate such constructions; however, none of the proposals addresses the issue of what factors determine the choice of these options. We present corpus evidence showing that both linguistic and social factors constrain the distribution of wh-signs in LIS (Lingua dei Segni Italiana, Italian Sign Language). The result of multivariate analysis suggests that LIS is undergoing a grammatical change and becoming less like spoken Italian with respect to the position of wh-signs.

1 **Introduction**

This study examines variation in the position of wh-signs in LIS (Lingua dei Segni Italiana, Italian Sign Language). We first summarize the rationale for choosing LIS and this linguistic variable as the objects of study and then outline the structure of the paper.

The sociolinguistic situation of LIS is shared by many sign languages in the world: it lacks a well-established standard variety and it is rarely used in official settings;

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it exhibits considerable geographical variation; it undergoes constant pressure from spoken Italian, which in addition of being the official language and the language of the majority, enjoys all the prestige associated with spoken languages with respect to sign languages in many social environments. The sociolinguistic situation of LIS as a minority language with no official recognition will be described in Section 2.

As explained in detail in Sections 3 and 4, we chose variation in the position of wh-signs in the LIS sentence to investigate the interplay of social and linguistic factors in constraining language variation. We chose to focus on this phenomenon because wh-constructions may be an area of macrotypological variation between spoken and sign languages. This possible modality-influenced variation has prompted a lively debate in the linguistic literature. In fact, in the overwhelming majority of spoken languages, wh-phrases either occur at the left edge of the sentence or remain in situ, in the position where they are interpreted (see Adli 2013 for a sociolinguistic study on the distribution of wh-phrases in French). Cases of spoken languages in which wh-phrases systematically occur at the right edge of the sentence are extremely rare (if attested at all). According to WALS Online (cf. Dryer 2011), "a few [spoken] languages exhibit at least a weak tendency to place interrogative phrases at the end of sentences". Only one such language (Tennet, spoken in South Sudan) is indicated. Considering that the WALS Online database covers several hundred spoken languages that place wh-phrases at the left edge and several hundred languages that place wh-phrases in situ, the extreme scarcity of languages with sentence final wh-phrases appears to be well established.

However, the picture changes once sign languages are included. The possible occurrence of wh-signs at the right periphery of the sentence is reported in most of the sign languages that have been studied, although, for many, occurrence of wh-signs at the left edge or in situ is also possible. In a state-of-the-art paper about content questions in sign languages, Cecchetto (2012: 307) summarizes the existing literature by claiming that there are some languages in which the right periphery of the clause is the only natural position for wh-items. Clear cases include LIS, IPSL [Indo-Pakistani Sign Language] and HKSL [Hong-Kong Sign Language], while ISL [Israeli Sign Language], LSC [Catalan Sign Language], LSE [Spanish Sign Language], NGT [Sign Language of the Netherlands], and NS [Japanese Sign Language] are other plausible candidate. We illustrate a case of right placement with an IPSL example taken from Aboh and Pfau (2011).

(1)
$$\overline{\qquad \textit{wh}}$$
IX-3 COME   G-WH
'Who is coming?'

In other sign languages, the pattern is more complicated, since other positions for wh-signs are available as well. Finally, in only one sign language in this group (ÖGS [Austrian Sign Language]), the right periphery might not be accessible at all.[1] American

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[1]   For IPSL cf. Aboh et al. (2006), for HKSL cf. Tang (2006), for ISL cf. Meir (2004), for LSC cf. Quer et al. (2005), for LSE cf. Herrero (2009), for NGT cf. Coerts (1992), for NS cf. Morgan (2006) and for ÖGS cf. Šarac et al. (2007).

Sign Language (ASL) is not included in this list because of a serious controversy between two research groups about the possible positions in which wh-signs can occur in the sentence (cf. Neidle et al. 2000; Petronio and Lillo-Martin 1997). However, there is a consensus that the following options are allowed at least for wh-signs like WHAT[2]:

(2)
a. $\overline{\text{WHAT JOHN BUY YESTERDAY WHAT}}^{\textit{wh}}$
   'What did John buy yesterday?'

b. $\overline{\text{JOHN BUY WHAT YESTERDAY}}^{\textit{wh}}$
   'What did John buy yesterday?'

c. $\overline{\text{JOHN BUY YESTERDAY WHAT}}^{\textit{wh}}$
   'What did John buy yesterday?'

As for LIS, Cecchetto et al. (2009) report that wh-signs are always found in the right periphery of a content question, except for a few cases in which they can stay in situ (according to these authors wh-signs can never be moved to sentence-initial position).

Based on this pattern, various scholars, including Neidle et al. (2000) and Cecchetto et al. (2009), have proposed that wh-phrases in sign languages may access positions not available to wh-phrases in spoken languages in part due to a fundamental difference between languages in the oral-aural and the visual-gestural modalities in this syntactic area (see Cecchetto et al. 2009 for a detailed discussion of this point). Petronio and Lillo-Martin (1997) and Aboh and Pfau (2011) have opposed this view by arguing that the pattern from sign languages can be reconciled with what we know about wh-questions in spoken languages and that therefore it is not necessary (hence not desirable) to postulate a difference between the spoken and the signed modalities.

The debate about this possible macrotypological difference between spoken and signed languages might well be influenced by the fact that most studies that address the position of wh-signs rely on grammaticality judgments from "native signers", defined (often implicitly) as deaf signers with deaf parents or deaf siblings. This also applies to the previous work on questions in LIS by Cecchetto et al. (2009). However, native signers are a small minority in the community of signers. Approximately ninety-five percent of deaf children are born to hearing parents. In order to decide if the property that allegedly sets sign and spoken languages apart is really a systematic feature of sign languages, it is important to verify whether wh-signs are placed in sentence-final position in spontaneous conversation as well. Other questions concern social factors that can influence the distribution of wh-signs. Are native signers typical of the general Deaf population in their preference for the sentence final position for wh-signs (assuming that they spontaneously produce the sentences that they accept in grammaticality judgments

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[2] By convention, sign language glosses are written in capital letters. Thus, WHAT refers to the ASL sign, not to the English word. Pronominal pointing signs are glossed as IX followed by numbers marking first, second and third person morphology. The non manual markings are indicated by a gloss over the sign glosses.

tasks)? Are there age differences, possibly related to differences in educational history?

Finally, we note that standard Italian is a strong wh-initial language. As in English, wh-phrases in Italian must be placed in the left periphery of the sentence except for echo-questions such as *Hai comprato COSA*? 'you bought WHAT?'. However, Italian is more extreme than English in this respect. In multiple wh-questions, English allows some wh-phrases to remain in situ if another wh-phrase appears in clause-initial position (e.g., Who likes who?). Multiple wh-questions of this type are not productive in Italian (fixed expressions like *Chi ama chi*? 'who likes who?' are attested but they are probably a borrowing from English). This means that, if grammaticality judgments turn out to be in line with spontaneous production data, LIS and Italian are at the opposite ends of the spectrum of possibilities concerning the distribution of wh-phrases and it should thus be easier to single out possible influences of Italian on LIS. This also makes the distribution of wh-elements in LIS an ideal case for studying to what extent the syntax of a dominant language can influence the syntax of a minority language and which social factors such as age, level and type of education, being a native signer or not, can modulate this influence.

The data analyzed in this article have been extracted from a corpus of LIS collected in 2009 and 2010 in ten Italian cities. The corpus consists of videos from 165 signers (cf. Geraci et al. 2010). The remainder of the paper is organized as follows. Section 2 provides an overview of the sociolinguistic situation of LIS and the Italian Deaf community. In Section 3, we review what is known about the basic word order of LIS. In Section 4, we describe the methods used to elicit wh-signs and illustrate the coding scheme used for the analysis. In Section 5, we present the results of multivariate analysis of the distribution of wh-signs and suggest that the existing evidence supports the conclusion that a change in the position of wh-signs is in progress. Section 6 discusses the implications of the results and offers suggestions for further research. Section 7 provides some conclusions.

2 The sociolinguistic picture of LIS

LIS still lacks official recognition as a language. At the same time, more and more LIS signers are becoming proud of their Deaf identity and groups of activists asking for LIS recognition have become visible inside and also outside the community of signers.[3] Moreover, LIS exhibits considerable geographical variation and different varieties can be traced back to the residential schools for the deaf where the language developed. At the same time, more and more LIS classes are now being taught in many cities and in universities, where some sort of common LIS is necessarily transmitted.

These developments suggest that the sociolinguistic situation of LIS is particularly

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[3]   Following standard practice, we use *Deaf* to refer to people who use sign language as their primary mean of communication and that, culturally, belong to the community that shares that language. We use the term *deaf* to refer to people with hearing loss.

fluid and thus represents an ideal setting to study how social factors interact with linguistic factors in affecting actual language use. This session is devoted to a brief description of this sociolinguistic picture.

2.1 Acquisition and transmission

No official number of LIS users exists, but an estimate of 30,000 deaf signers is conservative: this number is based on the fact that in 2010, 30,000 Deaf people were enrolled in Ente Nazionale Sordi (the sign-friendly Deaf Association). In addition, a sizable number of hearing people, mostly relatives and acquaintances of deaf signers and professionals working with deaf people, are bilingual Italian/LIS users with various levels of proficiency

It is widely known that supranational institutions and organizations, like the United Nations and the European Commission, have encouraged national governments to recognize the national sign languages as the languages of their Deaf communities. Nonetheless, Italy has not yet recognized LIS. This lack of formal recognition has serious consequences for language policy and planning (Geraci 2012).[4] This is particularly true when the dynamics of language acquisition, transmission, and education are considered, as most deaf children are born into hearing families where no sign language is used. Although there are no official statistics about the number of deaf children raised by hearing parents, according to estimates this is the standard situation for 90 percent of deaf children (Caselli et al. 2006: 34). This situation is similar to what is found in many other countries of the Western world, where the percentage of deaf children born into hearing families is estimated around the 95% (Lane 1999; Mitchell and Karchmer 2004). The sign languages used in restricted communities with a high incidence of congenital deafness such as Al-Sayyid Bedouin Sign Language (Scott et al. 1995) are notable exceptions.

This means that the acquisition of a natural language by simple exposure at home is not available to the majority of the Deaf population (on the importance of early exposure to language on linguistic abilities and second language acquisition in the deaf population see Mayberry, Lock and Kazmi 2002). Policies for early access to LIS cannot be effectively developed partly because the language has no official status. For example, automatic access to funds for disabilities is not provided.

Until the late 1970s, early access was usually guaranteed by the fact that deaf children were sent to institutes for the deaf or special residential schools at a very early

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[4] The situation described in this section is not unique to LIS and the Italian Deaf community. Several other Deaf communities around the world suffer from the lack of official recognition of the linguistic status of the local sign language with negative consequences in terms of language planning (Quer and Müller de Quadros 2012). Of course, there are also notable exceptions, where the sign language is not officially recognized by the central government of the country, like in the US, but the prestige of the language and the strength of the Deaf community has nevertheless achieved important results in terms of visibility, accessibility and awareness.

age (sometimes by the age of 2 or 3). Although the use of the sign language was forbidden in class, outside class deaf children used the sign language that had yet to be named LIS. In addition to providing early access to sign language, deaf institutes also guaranteed a line of transmission to successive cohorts of children (Russo Cardona and Volterra 2007).

The situation changed radically and rapidly in the early 1980s as a consequence of State law 517/1977, which required that all children with disabilities were to be allowed to attend mainstream schools, provided that the appropriate support was given to achieve true integration. The immediate result was that parents preferred to send their children to mainstream schools because it was generally believed that they provided better education. At present, Deaf children are generally mainstreamed, and there is no guarantee that LIS will be used in their education. Interpreting, not to mention bilingual/bimodal education, is still the exception rather than the rule. LIS is rarely used in institutional settings and is primarily restricted to private exchanges and informal gatherings.

2.2 Language contact and variation

From the point of view of language development and variation, the sociolinguistic picture of LIS is quite intricate: as we just discussed, many members of the younger generations of signers (up to 30 years) attend(ed) mainstream schools and rarely had access to LIS; signers between 31 to 54 years attended school during the transition period between residential schools and mainstream education; only older signers (over 55) attended residential schools for deaf children and had early access to sign language. In addition to this picture, there is a methodology that is often used to educate deaf children that involves the combination of Italian with (some of) the corresponding signs of LIS. This technique, known as "Signed Italian", was widely used in the past by teachers, speech therapists and hearing parents (Caselli and Massoni 1987; Massoni and Maragna 1997). Although no data is available to quantify the effect of Signed Italian on the grammar of LIS, this technique of communication may have had a direct impact on the results we present in this study[5] because Signed Italian uses the word order of the spoken language associated with the lexicon of the signed language. Therefore Signed Italian was (and in some cases still is) a source of strong "asymmetric contact" between the dominant language and the minority language. Contact between LIS and Italian is not just asymmetrical because it is unidirectional, but because the pressure of the dominant language applies both in official environments (e.g., in schools), where spoken Italian is the clear target for all linguistic exchanges, and in domestic situations (e.g., with hearing parents) where the minority language is expected to be in its more natural environment. Unfortunately, the concrete effect of the use of Signed Italian in the history of LIS still awaits investigation. Indeed, as an educational method, it might have affected signers in the transition period. However, we suspect that some forms of Signed Italian were present long before it was officially recognized as a form of communication between deaf

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[5]   Notice that in principle the impact on the grammar of LIS of this technique of communication might be even heavier than educational methodologies based uniquely on the spoken language, the so-called 'oralist' methodology.

individuals and the hearing world, as also acknowledged in Caselli et al. (2006).

Finally, an increasing number of deaf children are given cochlear implants (a surgically implanted electronic device that allows deaf people to perceive sounds) at an early age, and, given the fact that most Italian cochlear implant surgeons oppose sign language, these individuals are prevented from any contact with LIS, at least until they reach adulthood.[6]

Nevertheless, there is also evidence that the community of LIS users is active and determined to keep its language alive. This can be shown by the strong reaction of the Deaf community to an attempt made by the Italian Parliament in 2012 to change the name of *Lingua dei Segni Italiana* into *Linguaggio mimico-gestuale* (literally 'mimic-gesture language'), which the community perceived as blatantly offensive. The Deaf community is also quite active in making LIS visible and accessible to the hearing community. Indeed, the local branches of the national Deaf association offer structured courses of LIS taught by Deaf teachers. Parallel to this, LIS is acquiring more and more visibility in the national media, where news in LIS is offered daily on the national broadcast media. LIS has also received special interest within universities, where LIS is taught in various programs and the number of students and researchers who focus on the language is increasing each year. LIS signers, especially the younger generation, are now more and more aware of the fact that LIS is a full-fledged language with its own grammatical rules that differ from those of Italian. There is some indication that this younger generation of self-conscious signers and the increased access to LIS in major media are triggering a process of standardization, especially in the lexicon (Geraci et al. 2011).

The special dynamics of transmission of LIS, strongly connected with Deaf schools, created relatively isolated signing communities because children in Deaf schools rarely had contact with children from other Deaf schools. The relative isolation of these young signing communities is the source of a very rich dialectal variation (especially at the lexical level), although it did not prevent the development of a mutually intelligible language. Currently, there is no standardized form of LIS. Signers are (more or less consciously) proud of their dialect, although the variety of LIS used in Rome is slowly acquiring more prestige than the other local dialects (for a potential case of standardization at the lexical level, see Geraci et al. 2011 and Battaglia 2011). The reason

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[6]   There is no official estimate about the numbers of children in Italy who received a cochlear implant but indirect evidence suggests that their number dramatically increased in a very short time span. For example, Trovato (2009) collected 1181 questionnaires from educators in nursery schools in Milan, the second most populous city in Italy (the vast majority of nursery schools in the city were covered by this survey). In this survey, conducted in 2006–2007, 19 educators reported working with a deaf child with a cochlear implant, six educators reported working with a deaf child exposed to LIS and 21 reported working with a child with no access to LIS and no cochlear implant either (these children were "oralist" with some kind of hearing aid). It is worth noting that in the same survey only 14 educators reported having had a child with cochlear implant in the five preceding school years. In the years after 2007, the percentage of children receiving cochlear implants is likely to have further increased and it is likely that nowadays these children largely outnumber those exposed to LIS.

for this is not entirely clear; Geraci et al. (2011) propose that one cause might be the fact that most TV news stories translated into LIS are broadcast from Rome and the interpreters use the Roman variety of LIS. Hence, the variety of Rome is becoming the one for high register situations and is therefore seen as more prestigious than other varieties.

It is precisely in order to investigate all the facets of this intricate sociolinguistic picture that a corpus project on the varieties of LIS has been brought about by the Universities of Rome-La Sapienza, Milano-Bicocca and Ca' Foscari-Venice. The core aspects of this project are discussed in Geraci et al. 2011. In Section 4, we focus on the part of the corpus specifically designed to collect content questions. These data are the basis of the study presented here. Before we move to the core of our research, however, let us briefly present some background on linguistic features of LIS related to word order.

3 Basic word order and the position of wh-signs in LIS

Research on LIS can count on only a relatively young tradition of studies providing some background for the analysis of the data examined here. While LIS has been studied for more than 30 years, most analyses have focused on lexical phenomena (e.g., iconicity), on very basic features concerning its organization (e.g., phonological structure), or its transmission and cultural values (cf. Volterra 2011 for a survey of the studies on LIS).

As for syntax, an important issue that has attracted some interest in the field of research on LIS and even raised some debate (Geraci 2002; Laudanna and Volterra 1991) is that of its word order typology. This is a classical topic for typological studies. Languages of the world are known to vary widely in the order of the major clausal constituents (Subject, Verb, Object) that they favor and this is also true for sign languages (see Leeson and Saeed [2012] for a review).

This dimension of variability is relevant for the interpretation of the distribution of wh-elements in a given language. As an illustration of how the word order typology of a given language can affect our analysis, consider that an object wh-element in a postverbal position can be considered in situ in an SVO language like English or Italian (i.e., it occupies the same position where non wh-objects sit, as shown in 3), but cannot be in situ in SOV languages, as in German, illustrated in (4):

(3)   a. S V WH-obj   (cf. You eat what?)

        b. S V O   (cf. You eat pizza)

(4)   a. S V WH-obj-   (cf. Sie essen was)

        b. S O V   (cf. … dass sie Pizza essen)

As for LIS, no definitive result as to which order is basic (or unmarked) in a simple declarative clause has been reached. Two studies, both based on qualitative data (spontaneous conversations of a small number of signers or grammaticality judgments),

diverge in their conclusions. Both acknowledge that LIS allows for wide variation in word order, in line with most sign languages,[7] but the two studies diverge in what they claim to be the preferred, unmarked, word order. Laudanna and Volterra (1991) claim that the preferred word order is SVO (cf. 5); Geraci (2002) identifies SOV as the prevailing word order (cf. 6).

(5)   GIANNI BUILD HOUSE
        'Gianni is building a house'
(6)   GIANNI HOUSE BUILD
        'Gianni is building a house'

Since the two studies consider very partial data and diverge both in their elicitation techniques and in the geographical origin of the population they study (Laudanna and Volterra's study is mainly based on signers from Rome; Geraci's study is mainly based on signers from Milan), we recently started a study based on quantitative data extracted from the LIS Corpus, and hence controlled for a number of social and linguistic variables. The preliminary results, based on the analysis of a small fragment of the corpus, suggest that (S) OV and (S) VO sequences are attested with a comparable frequency, but the two orders are related to a number of linguistic and sociolinguistic constraints (see Branchini and Geraci 2011 for details).

        This state of affairs has interesting implications for the study presented here. In particular, when a wh-sign has an object function, we do not know whether the postverbal position shown in (7) corresponds to the base (in situ) position or to a derived position due to its wh-nature: an example instantiating this situation is provided in (8).

(7)   V   WH-obj

(8)   GIANNI BUILD WHAT

        'What does Gianni build?'

On the other hand, we can be sure that final wh-subjects, as in (9), are cases of movement, since we know that the base position of the subject in LIS is preverbal. An actual example is given in (10).

(9)   V   WH-subj

(10)   HOUSE BUILD WHO
        'Who is building the house?'

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[7]   Most sign languages are known to be quite permissive. This liberality of sign languages, probably to be connected to some peculiarities of the visual modality, such as the use of non-manual components and the possibility of producing more than one constituent simultaneously, led a minority of researchers (cf. Bouchard and Dubuisson 1995) to conclude that sign languages are non configurational (i.e., they do not have any preference for any word order) and even that they lack any underlying hierarchical structure. The rich and robust evidence gathered by the researchers quoted in this paper conclusively contradicts these claims.

As discussed by Cecchetto et al. (2009), there are ways to ascertain whether the wh-object on the right of the verb is in situ or is found in a specialized position (for example, by looking at its position with respect to negation, aspectual markers and modal verbs). However, this kind of control is possible only when these specific elements are present in the clause and is therefore not suitable for large-scale quantitative studies like the one we report in this article.

4 Methodology

In this section we describe the methodology that we adopted for collecting and coding the data that we needed in order to investigate the dimensions of variation concerning wh-signs. We first introduce the corpus we relied on; we then illustrate the specific elicitation strategy we used; finally we detail the methodology we adopted in coding the data.

4.1 The LIS corpus

The data for this study come from the LIS Corpus, a corpus of video recordings built by capitalizing on the methodology used in building similar corpora for other sign languages: ASL (Lucas et al. 2001; McCaskill et al. 2011) and Auslan (Johnston and Schembri 2007), in particular.

Here we briefly present its main structure and then focus on the data relevant to this study. The corpus consists of production data from 165 signers from 10 Italian cities spread throughout the country and it includes for each signer: a sample of free conversation, an individual narration, a picture-naming task and a question-answer session (described in detail in Section 4.2). The total amount of recording is approximately 165 hours (one hour for each signer). The metadata of the participants have been collected through a questionnaire. They include both biographical and social information (age, gender, education etc.), and information about the circumstances of acquisition of LIS and other aspects connected to the Deaf and signing background (whether there are other deaf members in the family, the role in the Deaf community, whether the recorded signer has Deaf colleagues at work place, etc.).[8]

4.2 Data collection

Quantitative analysis of linguistic variation must meet two crucial criteria: the phenomenon under investigation must be frequent in the corpus, and it must show a

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[8] Participants were recruited with 'the friend of a friend' technique (Milroy 1980:47): For each city, a local contact was asked to recruit the participants (see Geraci et al. 2011 for the details). Each participant signed a consent form before being video recorded.

certain amount of variation. However, wh-constructions are used relatively infrequently in spontaneous conversations. For this reason, a corpus of spontaneous production (narratives or conversations) is not the ideal place to investigate variation in wh-constructions. The data we present in this study are based on the question-answer session, which was specifically designed to elicit wh-questions. Let us first illustrate the specific strategy we used to elicit them.

Two pairs of pictures dealing with everyday situations were created. The first pair represents a car accident scene (fig. 1a) and a car insurance form (fig. 1b); the second one represents a domestic accident scene (fig. 2a) and a medical form (fig. 2b).

[PLEASE INSERT FIGURES 1a & 1 b HERE SIDE BY SIDE]

Fig. 1a: Car-accident scene   **Fig. 1b:** Insurance form

[PLEASE INSERT FIGURES 2a & 2b HERE SIDE BY SIDE]

Fig. 2a: Domestic accident scene   **Fig. 2b:** Domestic accident form

Pairs of signers from the same age group addressed these conversational tasks, playing in turn the role of the person involved in the accident or the person in charge of filling out the form. Since the person in charge of filling out the form did not have access to the picture representing the accident scene, the only way to complete the form was by asking questions. The task ended when all the fields on the form were be filled in. In order to have questions produced by both signers involved in the tasks, the signers who answered the questions in the first conversation task asked questions in the second one.

The data for this study come from the entire corpus, namely from the production of the 165 signers involved, from 10 cities. It is worth noticing that the elicitation procedure was generally effective, since it provided about 1400 utterances containing a variety of *wh*-signs in a variety of functions and positions. However, many of these could not be included in the data set for the reasons we detail in the next section. Nevertheless, we were still left with sufficient data for analysis (precisely 646 tokens).

4.3 Data coding

The annotation procedure followed three steps: 1) identification of the utterances

containing wh-signs; 2) annotation of the linguistic information concerning the wh-sign and the wh-construction; 3) annotation of the social factors corresponding to each signer.

4.3.1 Utterances segmentation

In the first step, each occurrence of a wh-item was identified and the utterance containing the wh-item isolated and transcribed with ELAN software (Johnston and Crasborn 2006). Two Deaf native signers of LIS annotated the data and a linguist, who is also a native signer of LIS, supervised the annotations.

As previously mentioned, the question task yielded approximately 1400 utterances containing wh-signs. However, for this study, several categories of tokens had to be excluded from the statistical analysis. The main reasons for exclusion were the following:

– the utterance was interrupted;

– the utterance did not contain a predicate and therefore it was not possible to determine its syntactic position with respect to a predicate;

– the utterance was a content question but it did not contain a wh-element and the interrogative character of the clause was signaled only by wh non-manual marking (roughly, furrowed eyebrows). An example of this type of utterances is given in (11);

(11)   ARRIVE TIME

'At what time do you arrive?'

When two utterances were repeated, as in the Example (12), only the first token was included.

 (12)   ARRIVE WHO, ARRIVE WHO

'Who has arrived?'

From a total number of about 1400 utterances coded in the first step of the procedure, we were left with 646 tokens for the statistical analysis.

4.3.2 Linguistic coding

In the second step, the following linguistic information was coded: (a) the position of the wh-sign with respect to the predicate; (b) the type of clause containing the wh-sign; (c) the type of wh-sign; and (d) the grammatical function of the wh-sign. The first code represents the dependent variable, namely it records the distribution of wh-signs within

LIS sentences, while the other three factors are independent variables.[9]

The position of wh-signs with respect to the predicate may assume three values: (a) after the predicate, (b) before the predicate, or (c) repeated before and after the predicate.[10]

(13) a. V (…) WH

b. WH (…) V

c. WH (…) V (…) WH

Although the elicitation procedure aimed at obtaining questions and more specifically wh-questions, the variety of wh-constructions produced was much richer. In particular we found that wh-signs were used in five types of clauses: direct questions (14a); indirect questions (14b); echo (and rhetorical) questions (14c); non-interrogative clauses (124); wh-cleft constructions functionally analogous to English pseudoclefts (14e).

(14) a. HAPPEN WHERE
          'Where did it happen?'
     b. WELL, KNOW IX-2 ACCIDENT WHERE
          'Well, do you know where you had the accident?'
     c. WHO GUILTY WHO? IX-2!
          'Who is guilty? You are!'
     d. WHEN MEET, (IX-3) COME
          'When I meet him, he will come'
     e. IX-1 FORCE WHICH IX-1 WALK STRUGGLE
          'What I was forced to do was struggle to walk'

Therefore each token of a wh-sign was coded for the type of clause in which it occurred.

LIS has a rich system of wh-signs, so we provided a lexical code for each type of wh-sign: WHO, WHAT, WHERE, WHICH, etc. In coding this variable, we did not consider lexical variation as an instance of independent wh-signs. For example, the handshape of the sign for 'where' used in Turin is different from the handshape used in the rest of the country. Each token of the Turin variant for 'where' was annotated with the special tag wh-DOVE-2, but was then conflated with all the other tokens of WHERE. Furthermore, the tokens for WHAT and HOW were combined as a single factor because the two signs often seemed to be used in free distribution, not just across the

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[9]   One important aspect of wh-questions in SLs is the presence of specific non-manual markers co-occurring with manual signs. In the case of LIS, the main feature of this component is a lowering of the eyebrows. This property of wh-questions has been documented in the literature of LIS (Cecchetto et al. 2009). Unfortunately, due to technical problems (e.g., the camera was sometimes too far to capture fine grained details like eyebrows position) this information could not be accessed systematically enough to become a useful predictor of the position of wh-signs.

[10]   When a wh-sign occurred both before and after the predicate in the same clause we counted it as a single instance of the 'repeated' type.

various communities but even by the same signer. Their grammatical function was recoverable from the preceding context, from the answer, or, in some other cases, from the mouthing going with the sign (e.g., the spelling of the Italian wh-word *come* 'how' while producing the sign for WHAT and vice versa), and was coded separately.

We also coded for the grammatical function of every wh-sign, i.e., whether it was a subject, as in (15a), an object (as in (15b)), or neither a subject nor an object (for concreteness "an adjunct"), as in (15c).

(11) a. CALL WHO
        'Who called?'

      b. BUILD HANDMADE WHAT
        'What did he build with his hands?'

      c. COME HOW
        'How did you come?'

4.3.3 Sociolinguistic factors

As for the social factors, we coded for the following information:

(a) geographical provenance (the ten cities):

(b) residence status (urban vs. rural);

(c) gender (female vs. male);

(d) occupation (blue collar, white collar, professional, student, etc.);

(e) education (primary school, middle school or higher education);

(f) age (18-30, 31-54 and over 55);

(g) presence of Deaf member in the family (Deaf parent, Deaf relative, hearing family).

While the first five variables are well-known factors in sociolinguistics, the last two deserve further comment because they help us to characterize the Italian Deaf community better from a social viewpoint. As for the age group, the partition is due to the historical evolution in the educational policies for the deaf in Italy (see Section 2). Accordingly, our youngest signers (30 percent of the total sample recruited) attended mainstream education; signers in the intermediate group (36 percent of the total sample recruited) attended school during the transition period between residential schools and mainstream education, while the last age group are signers who exclusively attended residential schools for the deaf (34 percent of the total sample recruited). Given the peculiar way in which LIS is transmitted (see also Section 2), coding for the presence of other Deaf members in the family provides crucial information about the acquisition status of our sample.

5. Results

The first result that we can report is that we did find quite an amount of variation concerning the position of the wh-signs in the clause. Interestingly, such variation was observed both across signers and within the signing of individuals. Just to illustrate, a signer from Trani produced the three options shown in (16).

(16)   a.   HAPPEN WHERE

         'Where did that happen?'

        b.   IX-2 WHERE BUMP-cl

         'Which part of the car did you bump into?'

        c.   IX-2 WHERE CRASH WHERE

         'Where did the accident happen?'

All the linguistic and social factors illustrated in the previous section entered the statistical analyses as independent variables, but not all of them turned out to be significant. In some cases, social factors unevenly cut the dataset, resulting in relatively high level of overlap. For instance, this is what happened for education and age, as we shall see below in Section 5.2. In other cases, the factors in a factor group were simply too many to show a statistical effect on the distribution of wh-signs. This is the case of geographical origin, where the ten cities were initially coded as separate factors. We tried to deal with this problem by grouping the factors of the variable according to broader geographical criteria (North-South or East-West) but the factor did not reach significance at the .05 level either.[11] We had the same problem with "type of clause" factors, which we then combined: in this case, as we shall see, we did obtain a significant predictor of the distribution of wh-signs. The details of the statistical analysis are presented in the next section.

5.1 The position of wh-signs: linguistic factors

The overall distribution of *wh*-signs indicates that the position of wh-signs after the predicate is preferred (60%), with wh-signs before the predicate (27%) or repeated (13%) as secondary options. Despite this clear preference for wh-signs to appear after the predicate, the results of multivariate analysis with GoldVarb (Sankoff et al. 2005), a

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[11]   In ASL the distribution of phonological variables is constrained by geographical factors (Lucas et al. 2001). In the case of ASL, the impact of this factor was explained by looking at historical connections among the various Deaf residential schools. Although we coded in the metadata the type of school attended by participants, we do not have enough information on possible connections among the various Deaf schools in the country in order to propose a grouping that follows this criterion. Further study on historical relations among Deaf schools in Italy may shed light on this issue.

current version of Varbrul,[12] show that both linguistic and social factors significantly constrain signers' choices. We adopted a step-up step-down procedure to model our data (Young and Bayley 1996; Tagliamonte 2006). Factor groups are added and retained in the statistical model only if they reach significance (p < .05). The results we present here only consider factor groups that turned out significant in the multivariate analysis. Table 1 reports the results for significant linguistic factors (clause-type and grammatical function.). Factor weights indicate the direction of the influence of specific factors within each factor group, favoring or disfavoring the application value.[13] In this study, the choice of a wh-sign before the predicate has been selected as the application value.

Table 1: Linguistic Constraints (application value = *wh*-sign before the predicate)

Factor group	Factor	N	%	Weight
Clause-type	Direct questions	468	17.7	.395
	Non-direct questions	178	50.0	.755
Grammatical function	Object	147	19.7	.375
	Adjunct	375	26.1	.502
	Subject	124	36.3	.640
Total	Input	646	26.6	.237

Note: Chi-square/cell = 1.189; log-likelihood = – 328.784, p < .05.

Clause-type is a two-level variable where all types of constructions that are not direct wh-questions are combined in the non-direct questions factor. This factor includes echo-questions, indirect questions, and subordinated adjuncts introduced by wh-signs like *when*-clauses and *because*-clauses. The non-direct questions group does not include constructions that Branchini (2007) and Geraci et al. (2008) classified as wh-cleft, which are functionally similar to English pseudoclefts. An example of this construction is given in (17).

(17)   GIANNI TELL WHAT PIERO BIKE FELL

        'What Gianni told is that Piero fell from the bike'

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[12]   Although mixed models, including Rbrul (Johnson 2009), which allow for the consideration of individual signers as a random effect, have become more common in studies of language variation, given the relatively small number of tokens produced by each signer in our elicitation tasks, it was not feasible to include individual signers as a random variable.

[13]   The application value is the level of the dependent variable used by statistical model as the baseline against which the effect of factor groups is evaluated.

We excluded this construction for two reasons: a) it was quite infrequent (only 9 tokens) and b) it showed no variation at all (the *wh*-sign systematically occurred at the right periphery of the clause). *Because*-clauses, on the other hand, were included because they are produced with the sign MOTIVO ('why/because') in its interrogative use.

Direct wh-questions strongly disfavor the position before the predicate (weight =.395), while non-direct questions favor it (weight =.755).

The factor group grammatical function encodes the syntactic function of the wh-sign. The variable is organized in three levels: subject, object, and adjunct.[14] Wh-signs that have the syntactic role of subjects clearly favor the position before the predicate (weight =.640); wh-signs that are in object position disfavor that position (weight =.375); wh-signs in adjunct position showed no effect (weight =.502).

5.2 The position of wh-signs: social factors

As for the social factors constraining signers' choices, we found that educational level and age interacted. This is because older participants also have lower levels of education, while younger signers are also those with higher levels. This pattern is quite common in quantitative studies like the one presented here and forced us to recode the two factor groups into a combined (education by age) one. Table 2 shows the results for this complex sociolinguistic variable (also see Geraci and Bayley 2011).

Table 2: Social constraints: Age by education (application value = wh-sign before the predicate)

Age by Education	N	%	Weight
Young, middle aged, with higher education	322	20.8	.429
Young, middle aged, without higher education	116	25.9	.511
Older, with higher education	66	25.8	.536
Older, without higher education	122	41.9	.653
Total/input	646	26.6	.237

Notes: Chi-square/cell = 1.189; log-likelihood = – 328.784, p < .05.

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[14]   In the original coding, we also coded for wh-type (who, what, which, etc.). However, this variable had too many levels (one for each wh-sign) and any reasonable combination would have reproduced the partition of the syntactic function factor group, although less precisely.

The combined factor group was the only social group to reach statistical significance at the .05 level. In this factor group, a gradient pattern emerges, with older signer without higher education (primary and middle school) favoring wh-signs before the predicate (weight =.653) on one side; and young and middle aged signers with higher education who disfavor this pattern (weight=.429) on the other side. Older signers with high education mildly favor *wh*-signs before the predicate (weight =.536), while younger and middle-aged signers with lower level of education are basically neutral (weight =.511).

6. Discussion

Although in principle indirect questions may be equally or even more revealing about the nature of *wh*-constructions, most of the research about wh-signs in SLs has concerned the position of wh-signs in direct questions (Cecchetto et al. 2009; Neidle 2002; Petronio and Lillo-Martin 1997). Variation in the position of wh-signs has been documented for several SLs (Cecchetto 2012; Zeshan 2006). In some cases, the attested variation correlates with strict linguistic constraints, like focus in ASL (Neidle 2002). In our study, we extended the terms of the discussion in two ways: by including a wider range of wh-constructions, and by accessing a larger set of data coming from elicited interaction between pairs of signers in dialogue games. The results showed that variation in the position of wh-signs is not limited to direct questions but holds at an even larger degree in other types of constructions, with the notable exception of wh-clefts.

The overall tendency to place wh-signs after the predicate (60% of the cases) can be taken as evidence for the emergence of a grammatical rule that displaces wh-items to a syntactic position in the right periphery of the clause. The rule is fully established only with wh-clefts, but it is operating effectively also in the case of direct questions and to a lesser degree in other constructions. A complex social factor affects the application of the rule, showing the combination of a diachronic effect and an effect of education. Cases of wh-signs before the predicate are more likely to appear in the production of older and less educated signers, while younger and more educated signers are less likely to produce wh-signs before the predicate.

On the one hand, the diachronic pattern indicates that the process of rule formation is not yet complete (although it is at an advanced stage); on the other hand, the educational pattern suggests that more educated signers are more aware of language diversity and are better able to tease apart spoken Italian rules from LIS rules. In other words, we observe that an ongoing trend that makes LIS more different from Italian is boosted rather than slowed down by higher levels of education and language awareness. The result is a tendency to increasing the distance between the dominant and the minority language.

All in all, younger generations of signers with a higher level of education are teasing apart the process of question formation in LIS and in Italian, possibly due to an increased level of awareness of the status of their own language. It remains to be seen if this process of "teasing apart" Italian and LIS is limited to this aspect of LIS/Italian syntax or whether it is attested more generally.

Having said that, we acknowledge that the effect of the combined education and age factor is somewhat surprising. In particular, one might have expected older signers to be *less* influenced by spoken Italian, since most of them had been educated in residential schools where they grew up with deaf peers. We speculate that a process of standardization might be boosted by the fact that LIS classes became systematically available only in the last two decades. In LIS classes, which are mostly taught by deaf teachers, one of the few "rules" that is explicitly mentioned is that wh-signs go at the end of the clause. Knowledge of this explicit rule might have had an indirect effect on younger generations of signers with a higher level of education.

Also, the participants in this study were all fluent signers of LIS. This means that the likely effect of mainstream education on younger signers was that of increasing their competence in Italian without weakening their competence in LIS. If this guess is correct, these results would be a confirmation of what we know more generally about bilingualism: namely, that the more balanced a bilingual is in his/her competence of the two languages, the less interference and confusion in production (Meisel 1994). The tendency we observed among younger signers to keep LIS more distinct from Italian could then be seen as the consequence of their more balanced and secure bilingualism. In a more general picture, this kind of effect confirms once more that interferences and other mixing phenomena are not the simple and mechanical products of language contact, but they are deeply influenced by factors such as awareness, linguistic competence and linguistic ideology.

As a side comment on the social variables that we tested as potential predictors, it is worth noticing that the presence of Deaf members in the family of the signers did not reach statistical significance. This means that the presence of Deaf signers in the family had less effect than the combination of age and educational level, if indeed it had any effect. Although further research is clearly necessary to achieve a definite result for this factor as well as for other factors that did not reach significance, this case is notable because it suggests that the linguistic production of native signers may not have a special status as far as variation in the position of wh-signs is concerned. A similar observation holds for the geographical provenance variable. As briefly mentioned in Section 3 and 5, the variety of LIS used in Rome is probably affecting the ongoing process of standardization of the lexicon of LIS (Geraci et al. 2011). However this geographic influence does not seem to emerge in the case of the position of wh-signs.

Finally, our research shows that the preference for a right placement of wh-signs observed in the previous literature on content questions is not limited to the variety used by native signers, but is more general across the community, although with interesting modulations.

Linguistic constraints are also operative in determining the observed variation. Wh-signs before the predicate are more likely to be the grammatical subject of the clause. The interesting aspect of the grammatical function factor is that it affects the position of wh-signs according to the three major syntactic functions: subject, object and adjunct. This indicates a relatively fine-grained distinction of syntactic roles in LIS, not just a bare distinction between arguments and non-arguments. However, further investigation is needed to better understand the role of grammatical function as a linguistic factor. Indeed,

sign order is relatively flexible in LIS with SOV and SVO as the most frequent patterns (see Section 3). So, for the wh-signs that play the grammatical function of subject, it is possible that when they are found before the predicate the signer is using the option of leaving them in situ. In fact, in many languages that have a rule of question formation that involves displacement of a wh-item, including English, the in situ option is not banned, especially if the sentence has a special intonational contour. While, as explained in Section 3, the canonical (= in situ) position of the subject in LIS is before the predicate, the canonical (= in situ) position of the object is more flexible and can be either before or after the predicate. Thus, the existence of the in situ option might explain why, although the position after the predicate is preferred no matter what the function of the wh-sign is (arguably due to the existence of a rule of question formation), the strength of this preference is different for subjects and objects.

7 Conclusion

In this paper we showed that the clause-final position of wh-signs is the preferred option for LIS signers, although other positions are available. Results for the social factors suggest that a syntactic change is in progress, which is shifting the position of wh-signs from before the predicate to after the predicate. This change is more advanced in younger and better-educated signers (as expected under a diachronic perspective) and in direct questions, where it is currently perceived as the norm for asking questions. The trend documented here contributes to differentiating LIS grammar from that of spoken Italian, a possible consequence of the growing status of LIS in the Italian Deaf community.

The methodology of our research did not allow us to provide a fine-grained structural analysis of the data. The basic partition we adopted for annotating wh-signs as being repeated or occurring before or after the predicate was not precise enough to allow us to determine their specific structural positions. More research, integrating corpus data with qualitative data, are needed to arrive at a structural analysis of content questions in LIS which integrate data from the LIS Corpus. This is also true for the issue of whether the observed position for wh-signs are derived or base positions, especially when postverbal object questions are concerned.

Our work opens also new theoretical questions that may be addressed by a qualitative inspection of the data and further fieldwork. For instance, a good proportion of the cases observed (13 percent) showed repetition of the wh-sign before and after the predicate. It is not clear yet what the constraints are for the choice of this option. This aspect of the grammar of LIS cannot be investigated by looking at its frequency of distribution, but requires careful and deep analysis of linguistic and conversational contexts where the construction emerges: we leave this for further investigation.[15]

Once applied to signed languages, the study of sociolinguistic variation proved

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[15] However, we have already made a first attempt at describing the syntax of wh-reduplication, both from a quantitative and from a qualitative point of view in Branchini et al. (2013).

extremely productive in highlighting regional and social variation. However research groups mostly focused on the phonological and the lexical levels, while research on syntactic variation is quite limited (see Lucas and Bayley 2011 for a review). Our research addressed a typical syntactic phenomenon like question formation and the position of wh-signs in a variationist perspective. While the theoretical issue is still vivid in the sign language literature, mostly debating on the fined grained analysis of question formation and on which is the most accurate syntactic model, no substantial attention has been payed to non-linguistic factors that might play a role in constrain interlinguistic variation. This last aspect has been extensively addressed in this paper, showing that both structural and social factors are playing a key role and opening, we think, the ground for similar studies on other sign languages.

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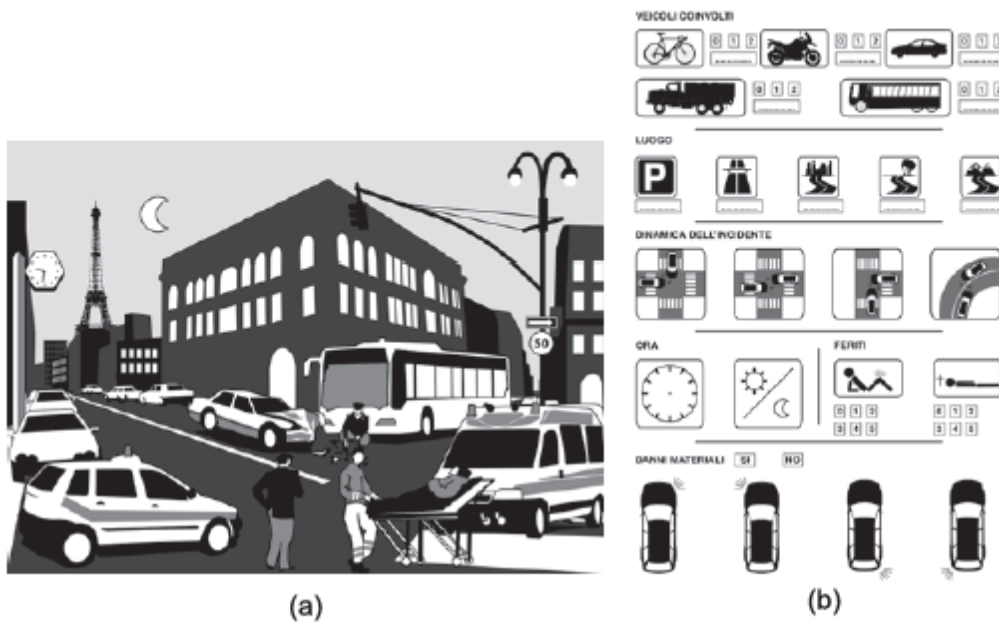
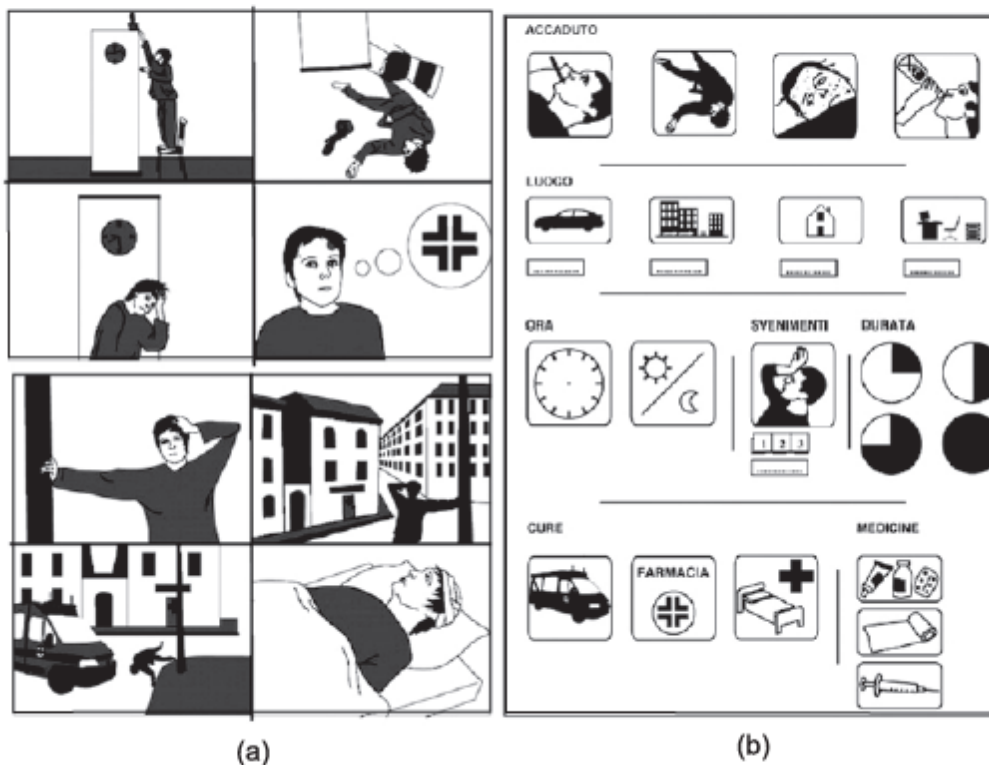**Fig. 1:** (a) Car-accident scene. (b) Insurance form

Fig. 2: (a) Domestic accident scene. (b) Domestic accident form

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