WH-QUESTION FORMATION IN SOUTH AFRICAN SIGN LANGUAGE: A CASE STUDY

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Abstract

This thesis is a case study investigating wh-question formation in South African Sign Language (SASL). It provides the first *descriptive* and *syntactic* analysis of wh-question formation in this language, based on a collected sample. The evidence gathered for this study shows that SASL makes use of non-manual features to mark wh-question formation and possesses a full question word paradigm including WHAT, WHERE, WHEN, WHO and HOW.

In the methodology, I critically engage with two issues: informant selection and data elicitation. These can greatly impact data validity – specifically with respect to sign language research. Ultimately, I adopt a novel, multi-layered data collection approach to ensure a valid sample.

The data reveals SASL's almost exclusive placement of wh-question words in the right periphery. The absence of moved sentence-initial wh-elements in SASL poses problems for syntactic analysis using only leftward movement. It seems typologically unusual that a language predominantly selecting the right periphery as a position for wh-words would allow a complex syntactic derivation involving some null wh-element in a leftward Spec, CP and then allow for another 'copy' to appear in the right periphery.

On the other hand, having Spec, CP on the right allows for far less complex derivations of wh-movement. In SASL, as in spoken language, the wh-word moves to Spec, CP to check the [WH] feature in C. The difference is that this movement is rightward. Further support for a rightward analysis comes from SASL's distribution of non-manual features, and its hierarchy of negative elements and adverbials.

This research represents a first step towards filling a gap in the SASL literature concerning wh-question formation, as well as a contribution to the growing body of research surrounding sign languages. Furthermore, at a higher level, this study evaluates current linguistic theory on sign languages, challenging the current cross-linguistic generalisation that wh-movement is leftward.

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Chapter 1: *Introduction*

The ability to ask and understand questions is crucial to human language, allowing people to communicate efficiently with one another. Because question formation is a fundamental building block of human language, it has received an extensive amount of attention in the literature across all language varieties.

In this thesis, I offer a unique insight into the phenomenon of wh-question formation in South African Sign Language (SASL). I consider the key components of the syntax of wh-question formation in SASL to formulate an analysis that, ultimately, challenges the view (held by many current syntacticians) that wh-movement is always *leftward*.

A number of current linguistic themes and trends are addressed in this thesis. I begin by considering what insights SASL can offer with respect to current linguistic theories about grammar. To this end, Section 1.1 begins with a brief outline of sign language highlighting that, despite being produced differently to spoken languages, it possesses all the qualities of a natural language. Researchers can thus explore which features are fundamental to both spoken and sign languages and test whether the theories/generalisations used to describe the former can be applied to the latter.

In Section 1.2 I provide a brief introduction to the main components of question formation in SASL, these being manual signs and non-manual markers. I highlight the importance of considering not only the 'word order' (or in this case manual signs), but also the features unique to sign language (the Non-Manual Markers). I argue that no syntactic analysis of sign language is complete until it incorporates a comprehensive account of the latter.

Having considered the basic components of question formation in SASL, I introduce a key issue in the sign language literature – the debate regarding whether or not sign languages have the capability of rightward wh-movement. In Section 1.3, I introduce both sides of this debate using current theory. This study both engages with and contributes to this debate.

In Section 1.4, I address the methodological challenges one faces when collecting the kind of data necessary for syntactic sign language research. I present several unique features of my methodology which, I argue, ensure that the data I collected for this study can be considered valid and representative.

I present my research questions in Section 1.5 and an outline of the structure of my thesis in Section 1.6.

1.1. Why study question formation in sign language?

Sign languages are a largely untapped linguistic resource. It is now accepted that sign languages are fully-fledged natural languages rather than mere collections of unstructured gestures. They are acquired in the same way as spoken languages and display complex grammatical and phonological structures not unlike those of spoken languages (Ursula & Fisher, 1972; Sandler & Lillo-Martin, 2006; Aronoff, Meir & Sandler, 2005). However, sign languages do depart from the conventions of spoken languages when it comes to language production.

Spoken languages are produced using the audio/oral channel of communication, whilst sign languages are produced via the visio/spatial channel. This provides an opportunity to compare the features of language across modalities which may, in turn, enable us to distinguish features that are fundamental to human languages from features that are constrained and shaped by the production capabilities of a particular modality. Moreover, it provides an opportunity to assess the relevance, to sign language data, of structures developed to describe spoken language components. The questions that need to be addressed are: "To what extent does spoken language theory apply to sign languages?" and, "Where does spoken language theory need to be adapted to accommodate sign languages?" The answers to these questions will further our knowledge regarding the core components of human language – i.e. the set of *linguistic generalisations.* This is reiterated by Sandler & Lillo-Martin (2006, p. 6) who state: "sign language research is an instrument for refining both linguistic theory and broader theories of language as a cognitive system."

Question formation in spoken language has been extensively researched over time (e.g. Baker, 1970; Cheng, 1994; Chomsky, 1995; Kayne, 1994; Lai-Shen Cheng & Rooryck, 2000), whilst question formation in sign language remains comparatively uncharted. This is an area

where a considerable contribution to the literature can be made, especially when one considers how fundamental questions (and particularly wh-questions) are to language.

1.2. Components of wh-questions in SASL

This research aims to contribute to the literature by analysing wh-question formation in SASL. I explore both leftward and rightward movement analyses to evaluate which best captures the grammatical structures of SASL. An analysis needs to capture both *word order* and the spread of the *Non-Manual Markers (NMMs)* to be considered satisfactory.

Vermeerbergen, Van Herreweghe, Akach, & Matabane (2007) present a first attempt at capturing the *word order* of SASL. They show, based on the data they collected, that in non-reversible constructions the most common word order patterns are SOV and OSV, whilst in reversible constructions word order patterns are largely V-final with a variety of relative orders between S and O. This would suggest that SASL is a head final (V-final) language, and that it may be the case that information structure (i.e. topic and focus) may play a role in these word orders. However, in this study I found that the wh-sign consistently appeared in the clause-final position irrespective of the information structure. Even in constructions where other clause-final elements such as the verb or negation appeared, the wh-sign remained the most rightward peripheral element.

The wh-*NMM*, is a feature unique to sign languages. NMMs - key components of sign language grammar - are signs produced using the face, head and body. There is a set of NMMs that have been proven to have syntactic properties. They are generally associated with the features found in the heads of functional projections. Importantly, as these signs are produced using the face, head and body, they can occur *simultaneously* with other signs produced in the utterance.

The wh-NMM is characterised by frowning or furrowed eyebrows. It is associated with the [uWH] feature found in the head of C° and must accompany all wh-questions in SASL. The wh-NMM has two possible scope distributions in SASL - it may occur over just the manual wh-sign or it may spread over the verb and manual wh-sign (as well as any intervening signs).

1.3. Theoretical context: the debate about wh-question formation in sign languages

My work is primarily grounded in the field of generative syntax based on the Principals & Parameters framework and on Government & Binding (Chomsky, 1983; Chomsky & Lasnik, 1993). However, it does begin to make the transition into the more current syntactic theory of Minimalist Syntax (Chomsky, 1995).

These paradigms view question formation as a set of *linguistics features* that encode semantic information. This thesis is primarily concerned with the construction of the wh-question, which is ultimately a statement that requires a specific kind of response containing content. The feature associated with wh-question formation is known as the [WH] feature, and is thought to be generated in the head of the complementizer phrase. The [WH] feature in C° is uninterpretable [u-] which triggers a word with corresponding interpretable features [i-] to move. This word moves into the Specifier of the complementizer phrase where it is now in a 'Spec-Head relationship' (see **Error! Reference source not found.**).

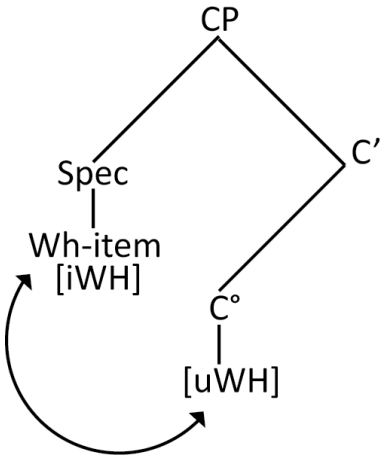


Figure 1.1: Spec-Head agreement

Once the wh-item is in this configuration, the feature can be *checked,* which results in the sentence being grammatical. If features are left unchecked, the derivation crashes, which results in the sentence being ungrammatical. Typically, wh-words such as 'who', 'what',

'when', 'why', and 'how' carry this corresponding wh-feature and are thus the elements which usually undergo wh-movement. As mentioned above, work on spoken languages generally supports the notion that these wh-words make a *leftward* movement to a *leftward* facing Spec, CP.

However, not all spoken languages make use of this *overt movement.* There is another strategy for wh-questions whereby the wh-word remains in the position where it was base generated. Languages which adopt this strategy are known as non-movement or in situ languages. The notion that these languages do not make use of movement seems counter-intuitive based on the assumption that all features need to be checked for a derivation to not crash. However, what has in fact been shown is that these in situ languages actually do make use of wh-movement, though this operation occurs at a different stage of language production. It has been suggested that such movement takes place at the Logical Form (LF) or after the words have been spoken, resulting in what is referred to as *covert movement.* Importantly, even though these in situ languages make use of this alternative timing for wh-movement the movement is still *leftward* to a *leftward* facing Spec, CP.

Thus, we appear to have a comprehensive grasp of how wh-question formation takes place in a variety of different spoken languages. However, the true robustness of the claims made in the spoken language literature can be tested using sign language datasets.

Of further interest is the ongoing debate in sign language literature sparked by Neidle, MacLaughlin, Lee, & Bahan (1998), who challenged the linguistic generalization of leftward wh-movement and posited that, in American Sign Language, rightward wh-movement is a possibility. Other researchers like Petronio & Lillo-Martin (1997) dispute this claim, and use the conventional leftward analysis to account for American Sign Language.

The study, by different researchers, of various other sign languages has not led to consensus within the literature regarding leftward and rightward movement. However, one clear consensus does emerge – both sides desperately need more data with which to validate their respective claims.

1.4. Methodological considerations

A considerable portion of this thesis is spent addressing the unique challenges that researchers face when collecting sign language data. Syntactic research traditionally relies on translation tasks and native speaker intuitions (Cornips & Jongenburger, 2001). This becomes challenging in sign language research, as most native signers are monolingual - knowing only one sign language. There are native signers who are literate, which presents the opportunity to make use of a translation task. However, there is a major concern with mixing spoken language and sign language data. When spoken language data is introduced, it tends to affect the sample in a negative way. Signers often end up producing artificial forms of signing.

In this thesis, I present a novel, multi-layered approach to collecting valid sign language data.

1.5. Research questions

1. What are the manual and non-manual markers of wh-questions in SASL?
2. How do the non-manual and manual markers of wh-questions interact in SASL? (i.e. what is the scope of the non-manual markers of wh-questions in SASL?)
3. What is the word order of wh-questions in SASL?
4. What is the most suitable analysis for wh-movement in SASL - leftward, rightward or in situ?
5. What implications does this analysis have for theories of Universal Grammar?

The motivations for these research questions appear in Chapter 2 of this thesis.

1.6. Structure of thesis

In Chapter 2 of this thesis, I present my literature review. I set up a foundation of what we currently understand about wh-question formation in spoken language. This predominantly focuses on the notion that there are two options in spoken language – to either *overtly* move the wh-word leftward to a leftward facing Spec, CP to check the [WH] feature (wh-movement) or to *covertly* move the wh-word at the Logical Form (LF) to a leftward facing Spec, CP to check the [WH] feature (in situ languages) (see Section 2.2). In Section 2.3, I show how sign language literature appears to both support and contest these claims about movement. I present several leftward analyses as well as several rightward analyses for wh-

question formation in sign language. It is clear that there is no consensus in the literature as to which method best captures the syntax of wh-question formation in sign languages. My research addresses this lacuna in the literature by providing an analysis of an understudied African sign language, SASL, to give a unique perspective to the debate.

In Chapter 3, I present my methodology, which includes a multi-layered approach to sign language data collection. The methodology applied four stages of data collection, which elicited the data necessary for syntactic research whilst being sensitive to the various unique factors that affect sign language linguistic samples.

In Chapter 4, I present my data analysis. I demonstrate that the leftward analysis is clearly inadequate for capturing wh-question formation in SASL. Instead, I present my own rightward analysis that makes use of the AgrO category. I demonstrate that this analysis is not only able to capture the patterns in SASL, but is also theoretically superior to other possible rightward analyses. Based on the information presented in this chapter, there are grounds to reconsider the supposed linguistic universal that wh-movement is leftward. Rather, there may be modality-specific factors that affect the direction of this movement.

Finally, in Chapter 5, I present a summary of my analysis. I address each of the trends and themes in this thesis and revise the greater theoretical debate in light of the SASL data. I show how my chosen methodology contributed to the validity of the data. Lastly, I discuss the key findings that emerge from this research.

Chapter 2: *Review of Literature*

2.1. Introduction

I will begin this review by discussing the theoretical background of wh-question formation and the work done in the field so far. I will introduce the ways in which wh-questions are analysed in both spoken language and sign language syntax, and will outline the main debates which these raise concerning wh-questions in SASL. I seek to explore current literature on spoken language wh-question syntax in order to identify comparable elements in sign language. There have been numerous attempts to capture the syntax of wh-questions. Since the work of Chomsky (1967) and Ross (1967), wh-question formation has held a central place in generative grammar. This has led to important insights about transformational operations. My aim is to explore whether sign language wh-question formation can be explained using theories that are applied to spoken languages. If the spoken language literature is not applicable, the question to be raised is whether current syntactic theory for spoken languages needs to be revised in order to accommodate sign languages.

In Section 2.2 I provide a brief description of the development of generative grammar analyses, focusing primarily on their development from the analytic concepts of *deep structure (D-Structure)/surface structure (S-Structure)* to the *logical form (LF)/phonological form (PF)*. These concepts are fundamental to the two options we see regarding wh-question formation in spoken languages. These options centre on the placement of the wh-word/phrase in the sentence or in the *overt syntax*. Some languages *move* the wh-word/phrase to a sentence-initial position, whilst others allow the wh-word/phrase to stay in the position where it is generated in the sentence. The former can be categorised as *wh-movement languages*, and the latter as *in situ languages* (Chomsky, 1993) . This contrast is illustrated below in examples 1a & 1b (in situ) and example 2 (wh-movement). The way in

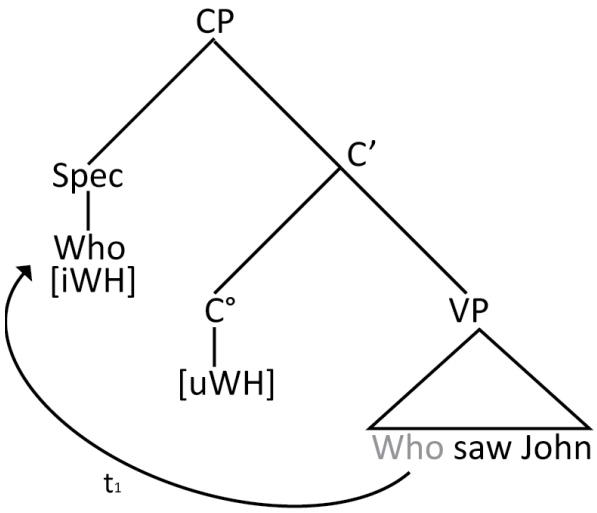
which current minimalist theory deals with the two placements of wh-word/phrases is discussed in detail.

(1) a. Who bought **what**? (English)

b. Hufei mai-le **shenme**
Hufei buy-PERF what
'What did Hufei buy? (Mandarin Chinese)
(Lai-Shen Cheng & Rooryck, 2000))

(2) **What** did John buy (what)? (English)

I examine why the wh-word/phrase has to move. This centres on a proposal put forth by Chomsky (1983) which requires *feature-checking* to take place. This feature-checking forces the movement of a wh-word, traditionally, to the Specifier of the complementizer phrase, (Spec, CP) as seen in **Error! Reference source not found.**.



'Who saw John?'

Figure 2.1: Wh-movement

Based on spoken language evidence, Spec, CP is theorised to be on the left, making any wh-movement leftward. Because of the overwhelming number of languages that make use of *leftward* wh-movement, this is seen as a linguistic universal.

I begin my explanation of spoken language wh-question formation by examining English, a language which is proposed to have *overt wh-movement*. I then explore the second option,

in situ languages, which are assumed to have movement which only takes place at a later stage in the *Logical Form (LF)* (Chomsky, 1995). Finally, I consider elements that may block this movement, namely *Islands and Subjacency* and how these provide evidence for the LF movement.

While minimalist theory explained above represents one side of the analysis of wh-questions, it is not the complete picture. There is an alternative proposal put forth by Kayne (1994). Kayne's (1994) Anti-Symmetry Theory posits that all syntactic structures are rightward branching. By this proposal, all languages have the same underlying structure but may need additional transformations to derive the correct surface order. Section (2.2), on spoken language wh-questions concludes by showing how the Anti-Symmetry Theory accounts for both movement and non-movement languages.

Next in Section (2.3), I consider the available literature on wh-question formation in other sign languages. Sign language wh-questions have received a considerable amount of attention in the literature – though in comparison to spoken language research this work is still in its infancy. Two wh-questions components have been identified in all studied sign languages:

- **Manual wh-signs**: signs produced with hands. These are comparable to wh-words in spoken languages
- **Non-Manual Markers (NMMs):** These are signs produced with the face and body. These are more than facial expressions or gestures and follow structural rules. They have been compared to intonation in spoken language and are an integral feature of wh-questions in sign language.

Next in Section (2.4), I move on to explore available SASL linguistic research. It seems that this research has tended to focus on socio-linguistic perspectives rather than formal linguistics. As a result, there is not a great deal to draw from the literature when trying to synthesize basic facts about the language. I review what little information is accessible and discuss how this study will help to fill this gap in the literature.

Section (2.5) explores how manual signs and non-manual markers are used and analysed across several sign languages. To date, American Sign Language (ASL) has been most comprehensively analysed with respect to wh-questions. Thus, I examine this sign language first and in the most detail.

There is a disagreement in the literature surrounding the position of the complementizer phrase in ASL. One set of researchers, Petronio & Lillo-Martin (1997), posit that the Spec, CP is on the left, as in spoken language. On the other hand, Neidle, MacLaughlin, Lee, & Bahan (1998) place the Spec, CP on the right, which challenges the supposed linguistic universal that the Spec, CP is on the left. Currently, there is no consensus as to which analysis captures the syntax more accurately.

In Section 2.6, the analyses of several different sign languages are examined. I consider the analysis by Cecchetto, Geraci, & Zucchi (2009), for Italian Sign Language (LIS), which posits a *rightward* Spec, CP. I then consider the *leftward analysis* by Nunes & de Quadros (2000) for Brazilian Sign Language (LSB). Both sets of researchers make convincing claims supporting their analyses of the respective sign languages. However, the resounding sentiment in the concluding paragraphs of each paper is that more evidence from other sign languages is required to validate their claims.

ASL, LIS and LSB are all relatively well-studied in comparison to SASL. Thus, I also consider two 'understudied' sign languages - Croatian Sign Language and Turkish Sign Language - to assess the contribution they make to the debate (see Section 2.7). Finally, in Section 2.8, I consider the alternative proposal offered by Indian Sign Language which makes use of wh-question particles rather than conventional wh-phrases. I show what characteristics are used to identify wh-question particles in Indian Sign Language and evaluate whether or not the wh-signs used in SASL possess similar characteristics.

2.2. Wh-question formation in spoken languages

I will begin this section by briefly describing the progression of wh-question formation analyses in generative grammar. In this section I focus primarily on syntactic theory's development from Deep-Structure & Surface Structure to Logical Form & Phonological Form, as well as on the development of the Q-Morpheme into the Wh-Feature [WH]. These

phenomena are examined using movement languages, such as English, to finally arrive at the analysis put forth by Chomsky (1995) in his Minimalist Program.

In Section 2.1.1.2, I use the same principle and analysis, this time applying it to account for non-movement languages, such as Mandarin, where the question word is found in situ. I then consider two phenomena, island effects and subjacency, which are used as evidence for the minimalist analysis of wh-questions.

2.2.1. Wh-question formation in generative grammar

Katz & Postal (1964) provided one of the first accounts of question formation in spoken language. The main contribution made by their research was on the *Question Morpheme*, which was the centre of earlier work surrounding question formation. They posited that this Question Morpheme (or Q-Morpheme) is found in the *Deep Structure* (D-Structure). The notion of D-Structure is an important concept in the development of generative grammar. In order to understand what is meant by the D-Structure, consider the following three examples (3-5) below:

(3) Tim closes the door.
(4) The door is closed by Tim.
(5) Close the door! (directed at Tim)

In the above examples, the meaning is essentially the same: the act of closing a door by Tim. However, they differ in the *syntactic form* they take in the actual sentence. Thus, each of these sentences is represented on two levels. The first is the *D-Structure*, where the semantics/meaning[1] is encoded, or the *underlying, abstract representation* of a given construction is represented. The second level is referred to as the *Surface Structure* (or S-Structure) which represents the arrangement of various constituents as they are pronounced. Thus, even though examples 3-5 have the **same** D-Structure they **differ** at the S-Structure.

According to Katz & Postal (1964), the Q-morpheme is found in the D-Structure where its role is to give the construction a *performative* reading of 'I request that you answer', as all semantic interpretation takes place in the deep structure. According to them, this is what

[1] These semantic relationships refer to information about the verbs' thematic relationships (such as the need for agent or patient), case marking for nouns and in our case wh-question marking.

allows the construction to be semantically interpreted as a question. Thus, the existence of this Q-morpheme is used to make a distinction between the underlying structures of direct questions or declaratives. By this proposal, direct questions possess the Q-morpheme in the **sentence-initial position** and have another constituent containing a ***wh-***. The exact nature of the *wh-,* as referred to by Katz & Postal (1964), is not made clear in their proposal. Essentially, *wh-* was used to capture the different responses required from the various wh-question words:

- What: *wh*-non-human
- Who: *wh*-human
- When: *wh*-time
- Where: *wh*-location
- How: *wh*-manner

Thus, these two elements (the Q-morpheme and a constituent containing a wh-) separate the D-Structure in example (6) from the D-Structure in example (7) and give it the reading 'I request that you answer with information/content that pertains to someone/something'.

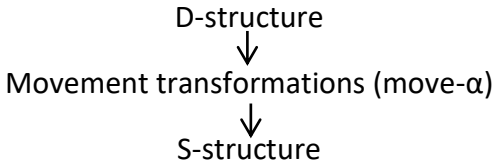
(6) a. I saw John *S-Structure*
b. (I-subject) (saw-present tense verb) (John-direct object) *D-Structure*

(7) a. Who saw John? *S-Structure*
b. Q (*wh-s*omeone) (saw-present tense verb) (John-direct object) *D-Structure*

The two major developments in this theory of wh-questions revolve around the adaption of the Q-morpheme and the expansion of the levels of syntactic representations. I will explain the latter first.

A change in the model of grammar led to the reanalysis of D-Structure and S-Structure. One of the concerns was that up until this point, the analyses described above relied on *deep structure* to determine meaning rather than *transformations* or *movement* (Carnie, 2001). The result of this was that the D-Structures with respect to different languages did not reflect any kind of comparable or common underlying structure. By making use of transformations or movement we can assume that languages all have the same underlying D-structure and, through the moving of constituents, we can arrive at a particular S-Structure. Haegeman (1991) summarises this as follows:

The two levels of syntactic representation are related to each other by means of movement transformations: elements, which originate in some position at D-Structure are moved elsewhere at S-structure. Schematically, our grammar thus looks as follows:



(Haegeman, 1991, p. 281)

These *movement transformations* are categorised by operations such as I-to-C movement, NP-movement, and wh-movement. Generally speaking, we refer to these movements where one element moves to somewhere else in the sentence as *move alpha* or *move-α* (Haegeman, 1991).

These levels of syntactic representation were further redefined by Chomsky. Two additional levels were introduced: the logical form (LF) which captures the logico-semantic properties and the phonological form (PF) which encodes the surface properties of the sentence. These additional categories are illustrated in *Figure 2.2* Minimalism does away with D-structure and S-structure, and introduces the concept of SPELL OUT. SPELL OUT refers to the "point at which some portion of a derivation is sent to PF, so it is similar to the pre-minimalist notion of S-structure" (Sandler & Lillo-Martin, 2006, p. 311).

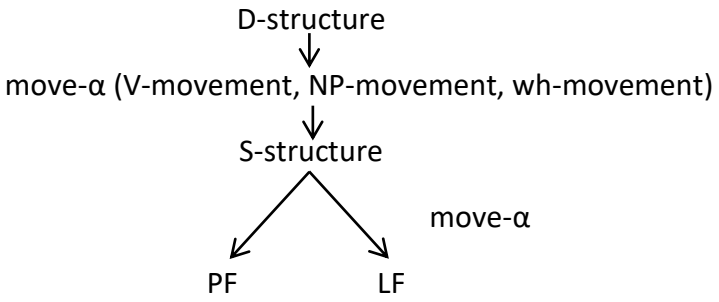


Figure 2.2: Levels of language production

This change in the levels of syntactic representation gradually had several effects on the nature of the Q-morpheme. Baker (1970) made one of the most important theoretical innovations by replacing the Q-morpheme with a Q-*operator.* The function of an *operato*r is

to *bind* a variable from its original position in D-structure through movement. Thus, a Q-operator could 'bind' one or more question words.

Another addition to the theory was the introduction of *features.* Every word carries a set of features that are responsible for every syntactic operation (Chomsky, 1995). These features are found to be either interpretable [i] or uninterpretable [u]. In the case of wh-questions we would say that an integrative word or wh-element carries a feature [uWH]. This wh-element may be the *head* of the moved phrase (see **Error! Reference source not found.Error! Reference source not found.**).

Functional heads that have *uninterpretable features* will force the movement of a category with *matching features*. Through feature-checking, the grammaticality or ungrammaticality of a clause can be determined. Thus, feature-checking is a powerful tool for determining the particular rules of a language. In the case of wh-questions, the prediction is that the landing site for the moved wh-phrases will be the Specifier of the complementizer phrase. As stated by Haegeman (1991, p. 348), "considering that wh-movement moves phrasal projections of different categories, it is not reasonable to claim that all these categorically distinct constituents move to a position that is labelled for one specific category". The Spec, CP offers a solution to this as a non-filled CP can receive phrasal constituents of any syntactic category: NP, AP, etc. (Haegeman, 1991). The role of the CP has been criticised by researchers such as Rizzi (1997) as being too broad. His work has centred on expanding the CP. However, I will continue to use the generalised complementizer phrase as this is what is typically used in the sign language literature.

To summarise thus far, there were originally four levels of syntactic representation - D-structure, S-structure, LF and PF. However, post-minimalism, these were reduced to just the interface levels (phonological components = Phonological Form (PF) and semantic/interpretive components = Logical Form (LF)). Up until this point in the theory discussed, we know that move-α operations, such as wh-movement, happened at the LF (pre-minimalism this would be between the D-structure and the S-structure). Wh-phrases are forced to move because of the [uWH] feature. The wh-phrase moves to Spec, CP where it can be in a Spec-Head configuration to check the [uWH] feature as seen in **Error! Reference source not found.Error! Reference source not found.** below:

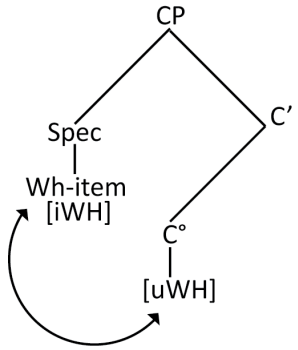
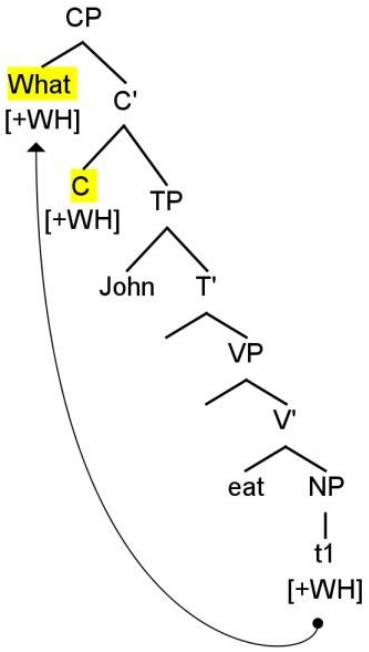


Figure 2.3: Spec-Head agreement in wh-questions

2.1.1.1. Wh-movement

Now let us consider an example of how this process works in a language like English. In **Error! Reference source not found.**, the [uWH] feature triggers the movement of the wh-phrase, which in this case is generated in the NP. The wh-phrase moves to the specifier of CP. By moving into this Spec-Head position, the [uWH] feature can be checked. This results in the sentence being grammatical, and being interpreted as a question. In English we assume that Spec, CP is on the left. Thus, the wh-movement is leftward and allows the wh-phrase to be sentence-initial, resulting in the correct SPELL OUT.



'What did John eat?'

Figure 2.4: Wh-movement (do-support omitted from derivation for simplicity)

In languages such as English this feature-checking is licensed through *overt movement*. According to Chomsky (1995) this is the result of languages such as English having a STRONG [uWH], which requires that the features must be checked prior to SPELL OUT.

2.1.1.2. In situ constructions

Languages such as Japanese and Chinese do not seem to make use of movement in wh-constructions (Watanabe, 2001). Instead of the wh-phrase moving it appears to stay in the position where it was generated, i.e. in situ. According to our feature-checking requirements, this should result in the construction's being ungrammatical. The following section deals with in situ placement of wh-phrases and their feature-checking requirements. What we will see is that feature-checking movement happens in every single language. However, the differences between languages lie in *when* that movement occurs - before you start to say the sentence (LF), or after (PF).

Whilst overt wh-movement represents one side of wh-constructions, several languages make use of a different strategy for question formation. Languages such as Chinese and Japanese, for example, appear to leave the wh-phrase in the base (i.e. theta θ) position. This is illustrated below. Example (8) is grammatical, whilst example (9) is not.

(8) Ni xiang chi **sheme**?
You want eat **what**
'What do you want to eat?

(9) ***Sheme** ni xiang chi?
what you want eat
'What do you want to eat?' (Mandarin Chinese)
(Carnie, 2001, p. 318)

The question is why the wh-feature in the wh-phrase does not violate our feature-checking requirements. The technical term for this 'supposed violation' is the *Principle of Full Interpretation*. This principle forces movement to occur and requires that all the elements needed for semantic interpretation be present at the LF. Full interpretation (FI) also requires that all features be checked in a local configuration at the LF[2] (as seen in **Error! Reference source not found.**).

[2] rather than at the S-Structure in previous models

Thus, according to Full Interpretation, the wh-phrase should be in a local configuration with C; however, we see that this is not the case in instances such as example (8). Chomsky (1993) handles this by considering the *levels of interpretation*. You will recall that Chomsky (1993) reduced the levels of interpretation to the phonological components = Phonological Form (PF), and semantic/interpretive components = Logical Form (LF). He proposed that the *level at which movement takes place* is key to understanding what licences in situ constructions.

Movement is classified into two types. The first is *overt movement*, which is what we have dealt with in the English examined earlier in Section 2.2 This movement takes place before SPELL OUT. The second kind of movement - *covert movement* - takes place after SPELL OUT. Because covert movement happens at the point where the Phonological Form component branches off, one is unable to 'hear' the form. What Chomsky proposes is that languages differ with regards to where they time the movement operation. As I have mentioned, for English, [uWH] features are checked in overt syntax, or before SPELL OUT.

Huang (1982) extended this theory to Chinese and proposed that in that language, wh-phrases undergo LF movement *after* mapping to the PF. Thus, languages such as Chinese check these features after SPELL OUT using *covert movement* (illustrated in **Error! Reference source not found.**). Thus, it is clear that whilst languages differ at the S-Structure they are the same at the LF because at this stage, according to Full Interpretation, all the features need to be checked. Thus, the level of movement for wh-questions becomes a language parameter that is switched on/off depending on the language.

D Structure:	did John see who?	/	Ni xiang chi sheme?
			You want eat what
S Structure:	who did John see?	/	Ni xiang chi sheme?
LF:	who did john see?	/	Sheme ni xiang chi?
			What you want eat

Overt Movement

SPELL OUT

Covert Movement

(Chinese Mandarin)
(adapted from Carnie, 2001, p. 320)

Figure 2.5: overt movement versus covert movement

Chomsky (1993) posits that the property of the wh-word's *feature* triggers either overt or covert movement. What differs between languages is the *strength* of the Q-feature. For languages such as English the Q-feature is STRONG and therefore needs to be checked in overt syntax. On the other hand, for languages such as Chinese and Japanese the Q-feature is WEAK, meaning that it does not need to be checked in overt syntax but rather covertly.

The power of this proposal is evident in the way that languages with different S-Structures can easily be derived between the D-Structure and the LF. Initially, one may be apprehensive due to the very abstract nature of these claims. However, evidence from embedded questions and wh-islands makes a convincing argument for this proposal. These embedded questions and wh-islands are explored in detail in the next section.

2.1.1.3. Island effects & subjacency

Wh-movement does not come without limitations. There are constraints on what can *move out of* the category that contains the wh-word. These are known as *extraction islands* or just *islands*. First explored by Ross (1967), islands are aptly named. An island restricts movement between itself and another place, but not within itself. We see a similar phenomenon occurring in languages where certain constituents are not allowed to cross certain boundaries within the sentence, but may move within particular boundaries. I will consider two examples of such islands below: NP islands and Wh- islands.

NP Islands

Consider the following examples[3]:

(10) What$_i$ did Bill claim [$_{CP}$ that he read t_i in the syntax book?]

(11) *What did Bill make [$_{NP}$ the claim [$_{CP}$ that he read t_i in the syntax book?]]

(Carnie, 2001, p. 292)

In (10), 'what' is extracted from the *complement clause*[4] and the sentence is grammatical. However, in (11), an almost identical sentence with a *relative clause* is found to be ungrammatical. This is because *NPs are islands*. The wh-phrase cannot be extracted from a

[3] *t* shows the trace of the wh-phrase, i.e. the position where it was base-generated before it moved

[4] A complement clause is a clause introduced by a complementizer like 'that' or 'whether'.

CP contained within an NP (or island), or the sentence becomes ungrammatical. This is known as a complex NP island (Carnie, 2001).

Wh-Island

Consider the examples below:

(12) I wonder [$_{CP}$ what [$_{TP}$ Bill bought *t*]]

(13) [$_{CP}$ How do [$_{TP}$ you wonder [Bill bought the gift *t*]]]

I wonder how Bill bought the gift

Sentence (12) is an indirect question where we see the wh-phrase extracted from an embedded clause. In sentence (13) we see another extraction from the embedded clause, this time to the CP in the front of sentence. In both of these instances, the movement is grammatical. However, trying to perform both of these operations, which work on their own, in the same sentence leads to ungrammaticality, as seen in sentence (14) below.

(14) *How$_i$ do you wonder what$_j$ Bill t_i bought t_i

The reason for the ungrammaticality of (14) is linked to wh-islands. Once you move a wh-phrase to a CP, that phrase becomes a wh-island, as seen by the underlined phrase in sentence (15):

(15) I asked [$_{CP}$ what$_j$ John bought t_j] = WH Island

To account for both of these island types (i.e. NP islands & wh-islands), *Bounding Theory* was developed. It stated that certain nodes act as boundaries to movement. TP and NP were identified as the bounding nodes. However, the using just the bounding nodes as boundaries to movement is not that simple. It is clear from both sentences (12) and (13) that the wh-phrase moves across a TP. To clarify this movement Chomsky (1983) devised the *Subjacency Condition*, which states that wh-movement may not cross more than one bounding node, but it may cross one.

The other implication of subjacency is that more than one bounding node can be crossed if the moved phrase is able to 'stop off' at a specifier on the way to a higher CP (Carnie, 2001). Movement is also restricted when a trace is left in one of the 'stop-off' specifiers and that specifier may not be filled with another phrase (Carnie, 2001).

The Bounding Condition has since been revised, and is now referred to as the *Minimal Link Condition*. Within the Minimalist Framework, Chomsky (1995) posits that ungrammaticality results when an element tries to move to a landing site higher than the closest *potential* one. Thus, the Minimal Link Condition states that movement must target the closest potential landing site. We see that the Minimal Link Condition can be applied to wh-islands as seen in (16) below. 'What' must target the closet landing site Spec, CP. However, because that position had already been filled by 'how' the sentence is not grammatical.

(16) *[$_{CP}$ How$_i$ do [$_{TP}$ you wonder [$_{CP}$ what$_j$ Bill t_i bought t_j]]]

First potential landing

The existence of islands has interesting effects on the LF movement. We have seen that certain wh-movements violate either the Minimal Link Condition or subjacency. It is because of *movement* that these conditions are violated. However, it is unclear whether the same kind of violation takes place in *in situ* languages, because they technically do not involve overt movement. There are two proposals that attempt to explain the apparent lack of movement; the first is that, because there is no movement, nothing can be violated. However, the question then arises whether covert movement, in languages such as Chinese, can violate subjacency.

Huang (1982) showed that Chinese does have wh-Islands and is sensitive to subjacency. Consider the examples below:

(17) Zhangsan yiwei Lisi mai-le **shenme**?
Zhangsan think Lisi bought **what**
'What does Zhangsan think Lisi bought?'

(18) Zhangsan xiang-zhidao Lisi mai-le **shenme**.
Zhangsan wonder Lisi bought what
'Zhangsan wonders what Lisi bought.' (Chinese Mandarin)
(Watanabe, Wh-in-situ Languages, 2001, p. 203)

In (17) the question is interpreted as a direct question, and in (18) as an indirect question. This is the same picture seen in English. Below are examples of cases where the sentences above have undergone LF movement in Chinese:

(19) [CP shenmei [IP Zhangsan yiwei [CP [IP Lisi mai-le *t*i]]]]

what Zhangsan think Lisi bought

(20) *Zhangsan yiwei [CP shenmei [IP Lisi mai-le *t*i]]
Zhangsan think what Lisi bought

(21) Zhangsan xiang-zhidao [CP shenmei [IP Lisi mai-le *t*i]]
Zhangsan wonder what Lisi bought

(22) *[CP shenmei [IP Zhangsan xiang-zhidao [CP [IP Lisi mai-le *t*i]]]]
what Zhangsan wonder Lisi bought

(Chinese Mandarin)
(Watanabe, Wh-in-situ Languages, 2001, p. 204)

The LF representations in (19) and (21) are grammatical for the same reasons explained above with respect to English. On the other hand, (20) and (22) are ungrammatical because of subjacency - again for the same reasons as in English. This is because 'think' selects a declarative clause and needs a wh-phrase in the Spec of its compliment CP, whilst 'wonder' takes an interrogative clause and requires a wh-phrase in the Spec of its compliment CP.

What this serves to prove is that sentences (20) & (22) are ungrammatical because LF movement is applied. This is due to the Minimal Link Condition. Islands are an important tool in recognising different language parameters as well as evidence of the LF movement proposal.

2.2.2. Conclusion

In this Section 2.2, I have examined past and current literature on the syntax of spoken languages, focusing on the minimalist approach and how it is used to account for wh-questions. Specifically, I examined the overt movement found in English and the in situ placement found in Chinese.

Compared to spoken language literature, sign language literature is still in the early stages of its development. Most syntactic studies of sign languages do not appear to go into the level of detail that can be expected of well-studied spoken language studies. Instead, most analyses make use of basic feature-checking to explain interrogative construction. In this thesis, I aim to use both the basic assumptions of feature-checking as well as the principles of movement to account for wh-question formation in SASL.

2.3. Wh-Question formation in sign languages

2.3.1. Introduction

Wh-question formation has received a considerable amount of attention in Sign Language research. There are two main components that all studied sign languages make use of in wh-question formation; the first is a manual wh-sign, and the second is a wh-Non Manual Marker (wh-NMM) (Sandler & Lillo-Martin, 2006). Wh-signs are comparable to wh-words that are used in spoken language e.g. WHO, WHAT, WHEN, or HOW. Sign languages may make use of a range of wh-question words or in some cases just one (Sandler & Lillo-Martin, 2006). NMMs are facial features, but they represent much more than simple facial expressions. NMMs have been proven to be grammatical and are governed by syntactic rules. The most closely comparable feature (to NMMs) in spoken language is intonation. This is because NMMs regularly occur simultaneously with manual signs in the same way intonation occurs with spoken words. Whilst it appears that all studied sign languages make use of these two devices, there is variation across sign language varieties with respect to both the position of wh-signs in sentences and the distribution of NMMs. In this section, I explore the various manual signs and NMMs used by different sign languages. I then consider the interactions between these two components across sign language varieties. The interaction or *scope* is defined by distribution of NMMs over the manual signs (Sandler & Lillo-Martin, 2006). This scope is a critical component that needs to be captured in the syntax.

One feature that makes sign language wh-question formation particularly interesting is an unusual trend found in its typology. In Zeshan's (2004) typological study of over 30 sign languages, she found that whilst sign languages can make use of the both the clause initial and clause final placement for wh-signs, no sign language made use of the clause initial position as the sole position for the wh-sign. On the other hand, there were sign languages that did make use of the clause final placement as the sole position for the wh-sign. This suggested that the right periphery has some significance in sign languages. This is in contrast to spoken languages where either the sentence-initial placement or the in situ placement of

wh-phrases is predominantly preferred. This has raised a challenge for sign language researchers. Do sign languages conform to the presupposed Kaynean generalization that wh-movement is leftward to a leftward Spec, CP (see Section **Error! Reference source not found.**), or do sign languages use a novel device that allows them to make use of rightward movement[5]? Different researchers posit different answers to this question. Several researchers make use of the leftward analysis; however, there are also several researchers that posit alternative rightward analyses. Even within the most well-studied sign language in the world, ASL, there are disagreements about whether a leftward or rightward analysis should be used.

This section explores various analyses used in different sign languages, beginning with ASL. The fact that ASL is so well studied makes it a good starting point for the analysis of wh-questions. Petronio & Lillo-Martin (1997) are the main advocates for leftward movement analysis while Neidle, McLaughlin, Lee, Bahan & Kegl (1998) advocate rightward movement analysis. The two sets of researchers give very different accounts of wh-movement in ASL (discussed below). This is mainly due to disagreements about the grammaticality of specific constructions.

I also examine two additional sign languages for which a leftward and a rightward analysis are posited, respectively. Both have received considerable attention in the literature - specifically in the area of wh-question formation. The first additional language worth considering is Brazilian Sign Language (LSB) studied by Nunes & de Quadros (2006). They posit a leftward analysis for LSB, though they differ from Petronio & Lillo-Martin (1997) in that they use the leftward branching Kaynean (1994) structure (see Section 2.2). However, with respect to the second additional language I consider here, Italian Sign Language (LIS), Cecchetto et al. (2009) posit that Spec, CP is on the right. They argue that in LIS, NMMs can mark wh-dependencies, i.e. NMMs are an overt realisation of feature-checking (see Section 2.1.1.1). Because of this feature and the nature of NMMs, they reason, it is logical to expect Spec, CP to be on the right.

By way of contrast with the hitherto well-researched sign languages selected for consideration, Section 2.7 considers two more sign languages - Turkish Sign Language (TID)

[5] There is also the possibility for some constructions to be in situ.

and Croatian Sign Language (HJZ) - that are comparatively understudied. These sign languages provide additional information to be considered in the cross-linguistic debate over whether wh-movement in sign language can be rightward.

Lastly in Section 2.8, I consider Indian Sign Language (IndSL) which appears to make use of wh-particles rather than wh-phrases. This provides an alternative perspective on wh-question formation in sign language.

2.3.2. Manual wh-signs

Manual wh-signs are the first of two components that I consider in my exploration of wh-question formation in sign language. As mentioned above, these manual wh-signs have the same function as wh-question words (i.e. who, what when, why and how) in spoken language. I begin by examining the range of manual wh-signs that various sign languages employ. I then consider the positions that these signs typically target in sign language sentences.

2.3.2.1. Wh-sign paradigm

There is considerable variation with respect to the size of the question word paradigm in different sign languages. Some sign languages, such as Indo-Pakistani Sign Language (IPSL), have a minimal wh-sign paradigm which makes use of a single, non-compositional wh-sign (Pfau, 2006). This wh-sign, referred to as G-WH, is able to 'cover the entire range of interrogative meanings and may translate into any specific question word depending on the context' (Zeshan, 2006, p. 54), as can be seen in the examples below.

(23) CHILD ANGRY **G-WH** wh
'why is the child angry?

(24) INDEX AGE **G-WH** wh
'What's your child's age?'

(25) INDEX COME **G-WH** wh
'Who is coming?'

(26) INDEX FRIEND SLEEP WHERE **G-WH** wh
Where does your friend sleep?' (IPSL)
(Pfau, 2006, p. 8)

On the other hand, sign languages such as ASL fall on the other end of the spectrum making use of over a dozen question words (Zeshan, 2006).

Sign languages can also make use of question particles. For instance, sign language in the Netherlands (NGT) uses a sentence-final question particle glossed as PU (palms up) (Pfau, 2006). NGT has a full paradigm of wh-sign and the question particle may appear either in conjunction with a wh-sign (27) or on its own (28).

(27) INDEX SAY WHAT **PU** wh
'What did s/he say?'

(28) YESTERDAY INDEX BUY **PU** wh
'What did you buy yesterday?' (NGT)
(Pfau, 2006, pp. 6-9)

In the vast majority of sign languages, a wh-sign must be present in typical constructions, though it is not always obligatory. In some sign languages, however, there are instances where only the NMM[6] can be used to indicate that it is wh-question, as seen in the examples below:

(29) INDEX SUITCASE wh
'Where is my suitcase?' (NGT)

(30) JOHN BUY YESTERDAY wh
'What did John buy yesterday?' (ASL)
(Petronio & Lillo-Martin, 1997, p. 36)

(31) COLOUR LIKE wh
'What colour do you like?' (Japanese SL)
(Fischer, 2005)

(32) GO PURPOSE GO wh
'For what purpose are you going?' (Russian SL)
(Zeshan 2004, p. 30)

However, constructions without a wh-sign or question particle are only permitted when the element of what would have been replaced by the wh-sign is retrievable from the context. This appears to be the case for all sign languages where this type of construction is used

2.3.2.2. Position of the wh-sign

[6] Non-manual marking is dealt with in following section (2.3.3).

The position of question words has proven to be an area of interest in much sign language linguistic research. Zeshan's (2006, p.63) study showed that 'for question words, both clause-initial and clause-final positions are pervasive in the data'. The data is summarised in **Error! Reference source not found.** below:

Position	**SL's that make use of the position**
Clause initial	20
Clause-final	26
Doubling of the Question Word	19
In situ	4

Adapted from (Zeshan, 2006)

Figure 2.6: Position of wh-signs across sign languages

Although one might interpret that the three patterns of clause-initial, clause-final and doubling are relatively equal across sign languages, Zeshan points out that 'several sign languages in the data allow *only clause-final placement* of interrogatives, and others allow both clause-final placement and doubling [see section 2.5.2.2 for more on doubling] in both peripheral positions' (Zeshan, 2006, p. 64). Furthermore, no sign language allowed for only clause-initial placement of the wh-sign in its interrogative constructions (Zeshan, 2006). This suggests that clause-initial placement may not have the same significance as clause-final placement in sign languages.

Wh-signs play an important role in the syntax of wh-questions in sign languages. They are used to check the [uWH] feature through movement to Spec, CP (see Section 2.5.2). As we will see, analyses are often shaped by the positions where wh-signs are found – particularly for sign languages that only allow for clause-final/right periphery placement.

2.3.2.3. Summary

In this section, we have seen that sign languages make use of manual wh-signs and question particles, both of which are comparable to components found in numerous spoken languages. Both of these components are produced in a sequential[7] fashion, which allows us to consider their position relative to other signs in the sentence. As for spoken language,

[7] That is each sign is produced sequentially - or- one after the other in relation to other manual signs.

we are interested in how these wh-signs arrive in their (linear) positions in the overt syntax[8]. According to Zeshan (2006), sign languages most frequently select the sentence-initial position or sentence-final position for wh-signs. In Section 2.5.2 I will explore how wh-signs arrive in these various positions.

2.3.3. Non-manual markers

Non-Manual Markers are unique to sign languages, and used by all studied sign languages (Zeshan, 2006). Simply put, they are linguistic features *not* produced by the hands. Typically, NMMs comprise either of facial expressions, body/head movements, eye gaze, or a combination of these (Zeshan, 2006; Bahan, 1996). Thus, unlike wh-signs which are produced sequentially, NMMs can be produced *simultaneously* with manual signs, which is a very important aspect of sign language grammar.

There are two types of NMMs (Baker-Shenk, 1983; Liddell, 1980). The first type comprises NMMs that have a lexical function. For example, the adjective BIG/LARGE in SASL is formed by blowing/puffing up the cheeks. When a noun, such as MAN, is signed simultaneously with the 'blown up cheeks' NMM, the sentence will have the meaning 'the large man' as in example (33).

(33) MAN Blown up cheeks NMM
'The large man'

The second type, which I will focus on, comprises NMMs that have a grammatical function. These abstract features have been proven to be an integral part of sign language syntax and fulfil a number of grammatical functions across sign languages, such as the marking of polar questions, topics, agreement negation and wh-questions (Sandler & Lillo-Martin, 2006). Linguistic differences between the languages arise with respect to the *form*, s*cope* and *intensity* of these NMMs.

2.3.3.1. Form

The *form* refers to the physical realization of the NMM. According to Zeshan (2006) the different forms associated with wh-question formation are frowning, furrowed eyebrows,

[8] We also use comparable operations from spoken language wh-words, such as A-Bar movement, to the positions in overt syntax. This is dealt with in the following section but is worth mentioning here to show the similar way in which we understand wh-signs and wh-words.

protruding lips, forward head tilt, and forward body lean. Interestingly, Zeshan (2006, p.41) comments that for 'most Western sign languages, lowering the eyebrows is reported as a major feature of canonical non-manual marking in this question type'. On the other hand, Indo-Pakistani Sign Language uses a brow raise in combination with a backward head tilt, and in Turkish Sign Language (TİD) the wh-marking is signified by a headshake (Zeshan, 2006). Unfortunately, African sign languages have yet to be well researched. Whether or not they display a pattern in the form of their NMMs is not yet clear.

2.3.3.2. Scope

Scope refers to 'the extent of a string of manual signs co-occurring with the non-manual marker' (Zeshan, 2006, p. 39). The scope of an NMM can range from one sign to an entire clause. Scope becomes an important parameter for comparison between sign languages as 'it extends over precisely defined syntactic domains' (Neidle et al., 1998, pg. 2). Moreover, there is an assumption that non-manual material is a prerequisite for most interrogatives to be well-formed, though this is an area where there is significant variation across sign languages (Liddell, 1980).

2.3.3.3. Intensity

The final important component to be considered with respect to NMMs is *intensity.* Bahan (1996, 2006) states that 'the maximal intensity of the non-manual signal occurs over the node with which it is associated, and diminishes as distance from the source increases in the scope' (Bahan, 2006, pg. 69). The intensity of NMMs is an important element of the rightward movement proposal that is advanced in detail in Section 2.5.3.

According to Bahan (2006), past research has generally been descriptive, with researchers being tentative 'to make claims about the intricate syntactic roles that NMMs play' (Bahan, 2006, pg. 61).

One of the most widely accepted sets of assumptions about the status of NMMs has developed from the work by Aarons (1994), Bahan (1996), Bahan et al. (2000) and Neidle et al. (1998, 2000)[9]. These assumptions are summarised as follows:

[9] It should be noted that these assumptions have been based on data from ASL.

- Non-manual syntactic markings are frequently associated with syntactic features residing in the heads of functional projections;
- The NMM may spread over the c-command domain of the node to which it is associated (reflecting the relations at SPELL OUT);
- Spread of the NMM is optional if manual material is available locally. However, in the absence of such manual material, the marking spreads obligatorily so that it may be co-articulated with manual material;
- The intensity of the NMM is greatest at the node of origin and decreases gradually as the distance from the source increases[10];
- As in the manual channel, perseveration (maintenance of a particular articulation that will recur later) is found with non-manual expressions.

(Neidle et al., 2000, p. 43-45)

Let us consider how these assumptions apply to wh-questions. Based on spoken language theory we assume that there is a [uWH] feature located in the head (C°) of the functional projection [Spec, CP]. If a manual sign is available locally, that is in C° position, then the wh-Non-Manual Marker (wh-NMM) will occur simultaneously with that manual sign and optionally spread over the c-command domain of the node with which it is associated, CP.

Along with these assumptions, which have been applied to a variety of sign languages and syntactic NMMs[11], there are additional theories which have been developed to account for NMMs. There are theories that focus on NMMs as similar to intonation in spoken language (Sandler & Lillo-Martin, 2006). They consider the relevance of intonational properties to syntactic structure (Sandler & Lillo-Martin, 2006). Cecchetto et al. (2009) posit that NMMs could mark a syntactic dependency in wh-questions by using their scope (see Section 2.6.2.3). This theory has yet to be tested in other sign languages. The SASL data supports the notion that NMMs could be considered as overt relations of syntactic dependencies.

Manual and non-manual components are both integral to the syntax of sign languages and play an important role in interrogative constructions. Sign languages differ in terms of the

[10] There is a controversy (see 2.5) surrounding this claim that comes from evidence from wh-questions in ASL provided by Petronio and Lillo-Martin (1997) and Petronio (1993).
[11] Syntactic NMMs refer to NMM that have grammatical function as opposed to a lexical function

manual signs and NMMs used, where these particular elements are placed in the clause, and how the manual signs and NMMs interact. Section 2.54 begins to move on from a descriptive approach and tackle the task of uncovering the possible syntactic processes at play in SASL.

2.4. Overview of South African Sign Language

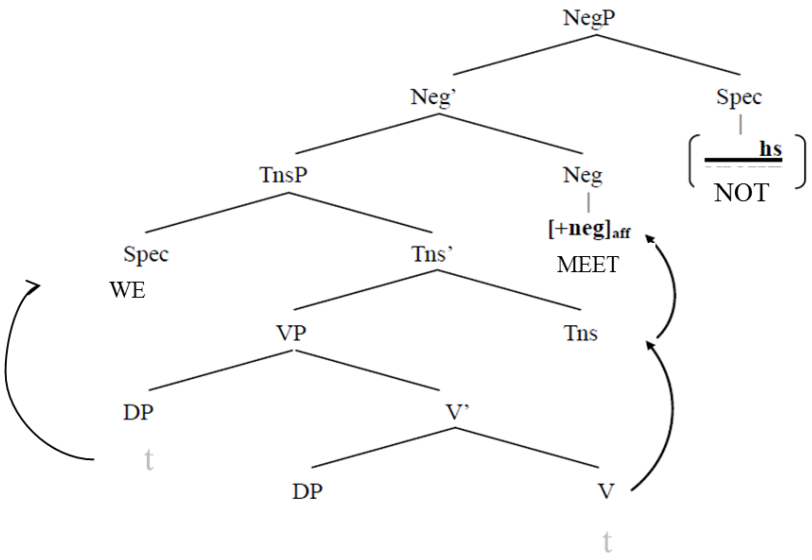
SASL has not received much attention in formal linguistic studies. Currently in South Africa most of the research surrounding SASL has been concerned with language policy (Aarons & Akach, 1998; Reagan, Penn, & Ogilvy, 2006; Reagan, 2008; Penn, 1990), with formal linguistic features receiving far less attention.

2.4.1. Constituent order

Aarons & Morgan (2003) were the first to attempt a formal linguistic anayslsis of SASL. Their paper discusses the interaction of classifiers in SASL. Vermeerbergen et al. (2007) provide a more relevant study investigating the constituent order between SASL and Flemish Sign Language. They look specifically at the order of the verb and its arguments with the aim of offering more information on the similarities of two unrelated sign languages. Their study provided a starting point for the study of SASL syntax by positing a basic constituent order. According to their data, in SASL, non-locative sentences show a preference for the V to be in the final position, resulting in OSV and SOV orders.

2.4.2. Sentential negation

A more recent syntactic study of SASL attempts to address the phenomenon of sentential negation. De Barros (2013) showed that SASL employs both manual and non-manual signs to form negative constructions. Manual negation signs are found in the clause-final position and the negative NMM is described as a *featural* affix. Figure 2.7 illustrates the constituent order and phrase structure proposed by De Barros (2013):



INDEX MEET $\underline{\text{NOT}}_{\underline{\text{neg}}}$
"We did not meet"

Figure 2.7: Negation in SASL

The proposed structure for SASL makes use of a split-headed model. By split-headed, I refer to an X-bar structure where the specifier is on the left and the head is on the right. Functional categories[12] are head-initial while lexical categories[13] are proposed to have split heads. According to De Barros (2013) V-to-Neg raising takes place, which allows for the verb to receive the negative affix as well as allowing the negation to remain clause-final. To date, this is the most comprehensive attempt to describe a syntactic operation in SASL. However, more investigation is required to test the robustness of this analysis.

This analysis proposed by De Barros (2013) represents a first attempt at providing a syntactic account of wh-questions in SASL. It also serves to evaluate the structure proposed by De Barros (2013), by examining whether it is able to account for wh-questions in SASL. Furthermore, this investigation of wh-questions provides information on the relationships between other hierarchical structures in SASL i.e. functional projections. Considering the paucity of literature on SASL, the findings of this research will hopefully serve as a platform for further research. Finally, where African sign languages have been severely under-represented, this research will seek to fill the gap in typological studies of African sign language syntax.

[12] Functional categories host items that carry the grammatical content of a sentence.
[13] A lexical category hosts elements that are part of the lexicon of a language.

2.5. Syntax of wh-question formation in sign languages: the leftward/rightward debate

There is an interesting trend in sign language typology, which can be summarised as follows:

- The left periphery, that is a leftward facing Spec, CP, is an option for sign languages; however, it is never used as the sole option for the placement of wh-elements.
- Wh-elements may be found in situ.
- The right periphery of the clause is overwhelmingly selected in several sign languages.
- There is also the option of doubling a question word in particular sign languages.
- There are several ranges that the scope of NMMs can take. They may spread minimally over the wh-element or extend as far as the whole clause.

In a bid to make sense of the patterns found in sign languages, Section 2.5.1 considers the sign language most represented in the literature, ASL. In terms of wh-question formation, two very different and comprehensive accounts of its syntax are presented: The *leftward analysis* of Petronio and Lillo-Martin (1997), and the *rightward analysis* of Neidle et al[14]. Both have formed significant foundations for subsequent studies.

Section 2.6 considers two other relatively well-studied sign languages, Italian Sign Language (LIS) and Brazilian Sign Language (LSB). Cecchetto et al. (2009) use the same principles as in the rightward analysis of Neidle et al. (1998) when examining LIS, while Nunes & de Quadros (2006) apply an analysis similar to the leftward analysis of Petronio & Lillo-Martin (1997) to LSB. However, Nunes & de Quadros take a slightly different leftward movement approach as they use a right-branching Kaynean (1994) tree. This is different from Petronio & Lillo-Martin's (1997) account as Nunes & de Quadros have a clause-final C°. These languages show the way in which leftward/rightward analyses are applied in other sign languages.

There is a significant amount of literature available on both LIS and LSB, which is not the case for SASL. Thus, Section 2.7 considers three currently under-researched sign languages: Croatian Sign language (WJZ), Turkish Sign Language (TID) and Indian Sign Language (IndSL).

[14] It should be noted that much of the controversy around the ASL literature is due to the fact there are disagreements about the interpretation of data. Neidle et al. (2008) and Petronio & Lillo-Martin (1997) each have informants which have differing opinions on what they find to be acceptable in ASL. It is often the case that varying opinions are cited as counter-examples against the opposing argument. These discrepancies will be investigated in the following section as well as in the methodology chapter.

This places these sign languages in a similar category to SASL. Considering these analyses illustrates the kind of assumptions that can be made regarding the leftward/rightward debate with respect to sign languages for which limited information is available.

2.5.1. The leftward vs rightward analyses in ASL

ASL has a predominantly SVO word order (Fischer, 1974; Liddell, 1980; Padden, 1988) though, as is the case for most sign languages, this can vary. Neidle et al. (1998) and Petronio & Lillo-Martin (1997) both examine ASL, but make very different claims about the nature of wh-constructions in the language. The main points of the two analyses are discussed below.

Neidle et al. (1998) are the main advocates for rightward analyses, using basic word order facts and the distribution/intensity of non-manuals to support their view. They posit that in ASL the Spec, CP is found on the right. ASL behaves like other movement languages and moves the wh-word (in this case the manual wh-sign) to check the corresponding [uWH] features found in C. As [Spec, CP] is on the right, the result is that the movement is *rightward*.

To account for the syntactic NMMs associated with wh-questions (e.g. furrowed eyebrows) Neidle et al. (1998) work with the assumption that they occur in the heads of functional projections. The distribution on these NMMs is described as optionally spreading over the c-command domain of the node with which they are associated.

To handle wh-signs that appear in the leftward periphery along with double wh-constituents, Neidle et al. (1998) argue for the existence of *base-generated wh*-topics, which are similar to other base-generated topics[15] found in ASL. This is illustrated in .

[15] Refers to the position in the tree the word was originally generated in i.e. the word did not undergo movement to arrive at that position.

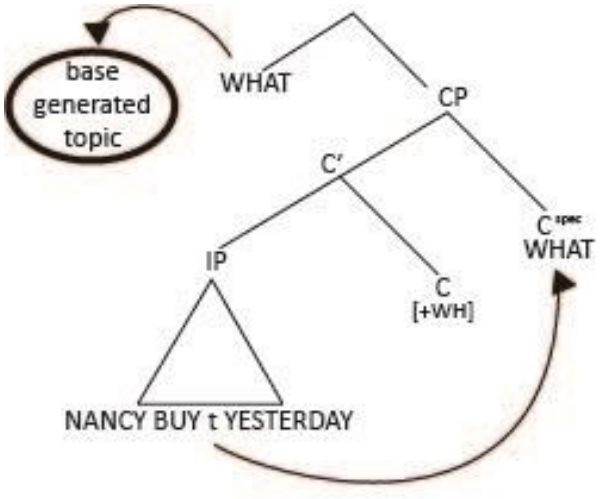


Figure 2.8: Rightward Movement in ASL

Petronio & Lillo-Martin (1997) take a different stance and claim that ASL follows the linguistic generalisation that true wh-movement is leftward. The landing site for the wh-sign is again [Spec, CP], however following the universal, [Spec, CP] is found on the left. To explain left peripheral elements, they claim that the wh-words move again to check the [WH] features in C° and, as the [Spec, CP] is on the left; the result is that the *movement is leftward*. Other devices, such as syntactic and discourse-related factors, are used to explain the right peripheral wh-elements (see Section 4.2).

To account for doubled constituents, Petronio & Lillo-Martin (1997) posit that there is a *base generated double* found in C in specific contexts. When there is a single element in the right periphery they claim that there is a null wh-element in the [Spec, CP] and the base-generated double is all that remains. However, they argue that this kind of construction is only allowed in a very specific context - where the null operator is retrieved from the context. See below.

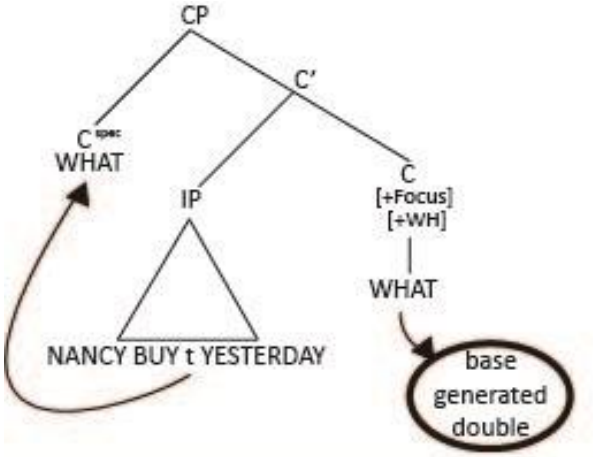


Figure 2.9: Leftward Movement in ASL

In the following section, each of these analyses are examined in detail.

2.5.2. Manual wh-signs in ASL

Leftward and rightward analyses differ on whether certain placements of wh-elements are grammatical.

2.5.2.1. Constituent order

Each analysis makes a slightly different prediction when it comes to the constituent order of wh-signs. Although ASL is an SVO language, the rightward analysis predicts that when the wh-sign is replacing the *subject argument,* the wh-sign can occur in the *sentence-final position* as in sentence (34). Conversely, the leftward analysis predicts that the wh-sign, which questions the *object argument,* is able to occur in the *sentence-initial position* – as in sentence (35):

(34) ?HATE JOHN WHO (who hates John)

(35) ?WHO JOHN HATE (Who does John hate) (ASL)

(Neidle et al, 1998, pg. 8)

According to Neidle et al. (1998), their native signer consistently rejected (35) whilst allowing (34). On the other hand, the informants used by Lillo-Martin (1990) and Lillo-Martin & Fischer (1992) rejected examples such as (34), saying that they needed more context and stating that they preferred constructions such as (35). Interestingly, in an earlier Petronio (1991) paper their native signers produced data consistent with the findings of Neidle et al. (1998).

Neidle et al. (1998) criticise Petronio & Lillo-Martin (1997), claiming that the varying judgements arose because of the mixed signers[16] used in the study. However, Petronio & Lillo-Martin (1997) maintain that the judgments made by their informants are accurate and reflect the true nature of ASL. The issue of context for Petronio & Lillo-Martin (1997) is explored further in Section 2.5.2.4.

These types of arguments highlight the importance of data integrity, and of ensuring that datasets are not affected by accommodation. This is much more of an issue in sign language than in spoken language, because signers interact with hearing people on such a regular basis. It for precisely this reason that, in Chapter 3, I present and adopt my multi-layer approach to data collection for SASL.

According to Neidle et al. (1998), should (35) be found to be grammatical it would be incompatible with leftward analysis. The *subject argument* is not in situ and therefore *has moved*. On the other hand, using the basic word order (SVO), either there is leftward movement or the wh-word is in situ; if the wh-word is a subject, then it would appear in the same position given both options. Thus, (35) cannot be used as a diagnostic for whether leftward movement occurs or not. However, Petronio & Lillo-Martin (1997) claim that it is, in fact, a case of in situ placement.

Perlmutter (1991) provides a means of testing wh-in situ objects. In ASL, "in situ wh-objects precede IP-final adverbials such as YESTERDAY, while rightward moved wh-phrases occur sentence-finally" (Neidle et al., 1998, p. 8). This is illustrated in (36) – (38):

(36) *JOHN SEE WHO YESTERDAY

(37) JOHN SEE YESTERDAY WHO

(38) [JOHN BUY t_i YESTERDAY]$_{IP}$ [WHICH COMPUTER] (ASL)

(Neidle et al., 1998, p.8)

Sentence (37) is a major point of controversy. For the rightward analysis, it clearly shows that there has been a movement of the wh-phrase. However, Petronio & Lillo-Martin (1997) insist that according to their informants this sentence is in no way grammatical.

[16] 'Mixed signers' refers to the use of both informants who were exposed to native signers at birth as well as those that were exposed to signing later on in life, i.e. at school

The above examples provide evidence that a constituent has in fact moved, as opposed to staying in situ. Furthermore, example (38) shows that it is also possible for entire wh-phrases (not just single wh-elements) to move.

Further support for this movement is shown in that wh-phrases do not have the same distribution as normal noun phrases, seen in sentences (39) and (40) below:

(39) JOHN SEE MARY YESTERDAY

(40) *JOHN SEE YESTERDAY MARY

(Neidle et al., 1998, p.8)

In these sentences, the rightward analysis concludes, the wh-phrase has moved rightward to check the [uWH] in clause-final [Spec, CP].

Based on basic word order facts, the rightward analysis appears to be more convincing than the leftward analysis. However, due to the discrepancies regarding what is grammatical in ASL it is difficult to draw a firm conclusion. Again Neidle et al. (1998) make a convincing argument that the use of mixed signers is what has led to the variation in Petronio & Lillo-Martin's (1997) data. Furthermore, an earlier Petronio (1991) paper provides the same evidence as Neidle et al. (1998) when it comes to the grammaticality of those particular sentences where the wh-sign is clause final.

The next section examines doubled constructions in ASL. The analyses of both Neidle et al. (1998) and Petronio & Lillo-Martin (1997) interpret these doubles very differently, and they are used to explain the placement of leftward elements in the rightward analysis and rightward elements in the leftward analysis.

2.5.2.2. Doubling

The doubling of more than one wh-phrase, which represents a *single argument*[17], is not uncommon in sign languages but is used in varying degrees. ASL is a sign language which commonly allows for this doubling, which is used by the rightward analysis to explain the placement of wh-elements in the left periphery and by the leftward analysis to explain elements occurring in the right periphery.

[17] i.e. once the wh-phrase is doubled both the doubled wh-phrases represent the same argument.

2.5.2.3. Left peripheral wh-elements in the rightward analysis

In the rightward analysis, doubling is explained in two ways: the doubled constituent is either analysed as a "final tag"[18] and the second in as *'initial topics'*. Focusing on the latter, Neidle et al. (1998) claim that the initial wh-phrase, as seen in (41), is a *base-generated topic*, and that the wh-element on the right is simply the moved or in situ phrase as is typically seen. This is illustrated in *Figure 2.10.*

(41) WHO LIKE JOHN WHO
'Who likes John, who?' (ASL)
(Neidle et al., 1998, p. 11)

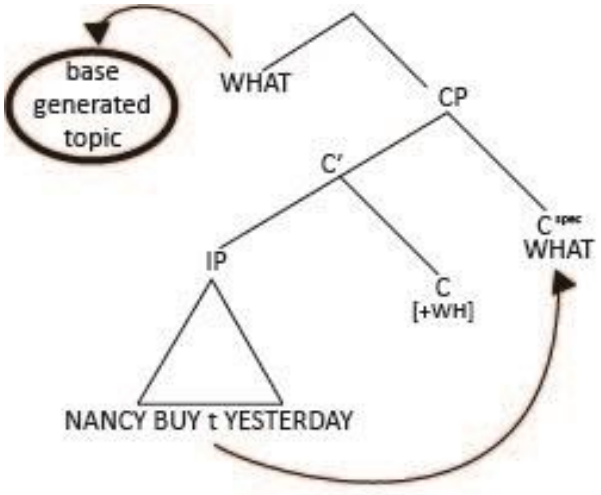


Figure 2.10: Rightward movement in ASL

Neidle et al. (1998) provide evidence to show that these base-generated wh-topics have similar characteristics to other base-generated topics in ASL. They examine the NMMs and the distributional properties as well as the relationship between the wh-topics. They predict the following example (42) to be grammatical:

(42) ?[WHICH COMPUTER] JOHN BUY t_i YESTERDAY]IP [WHICH]$_i$
(ASL)
(Neidle et al., 1998, p. 14)

However, Petronio & Lillo-Martin (1997) have two major concerns with analysing these wh-phrases as topics. The first is that they suggest it to be cross-linguistically implausible to

[18] I will not look at final tags in this section, for more information see Neidle et al. (1998).

have wh-phrases as topics. They base this on Epstein (1992) and Bresnan & Mchombo (1987) who state that wh-phrases are, by nature, *focused elements*. This is because a topicalised element must be presupposed, but "an interrogative element, since it does not refer to a specific entity cannot be presupposed" (Petronio & Lillo-Martin, 1997, p. 23). Furthermore, Epstein (1992) states that wh-phrases cannot be topicalised because of the syntactic principle of economy (topicalisation + LF movement is less economical than a single movement to Spec, CP). Cross-linguistic research supports the view that wh-items cannot be topicalised as they are inherently focused. Neidle et al. (1998) do cite Xu & Langendoen (1985), who found a wh-phrase in the topic position in Chinese. However, there is only a single example in the paper and the authors state that the construction requires more investigation. The scarcity of languages that allow wh-elements to be topics would suggest that, according to the rightward analysis, ASL would again be an exception to the common trends.

The second concern to Petronio & Lillo-Martin (1997) the prediction by the rightward analysis that sentences with full wh-phrases in the sentence-initial and sentence-final positions (43) are grammatical and on par with example (44):

(43) ?*[WHICH COMPUTER] [JOHN BUY$_{t_i}$ YESTERDAY] [WHICH COMPUTER]$_i$

(44) WHAT JOHN BUY YESTERDAY WHAT (ASL)
(Petronio & Lillo-Martin, 1997, p. 37)

In a rebuttal Neidle et al. (1998) provide evidence from the behaviour of other topics in ASL to explain constructions like example (43). In (45) the entity JOHN is expressed twice but using two different forms. The first is the sign for JOHN and the second is an indexed classifier which effectively functions as a pronoun. However, in (46) the same sentence is expanded but this time without the classifier pronoun. Neidle et al. (1998) consider it to be redundant, but not ungrammatical, to use the pronominal JOHN, if JOHN is in the topic position. Thus, Neidle et al. (1998) claim that this same redundancy applies if the wh-phrase is in the topic position.

(45) JOHN$_i$ IX$_i$ LIKE MARY

(46) ?JOHN$_i$ JOHN$_i$ LIKE MARY (ASL)

(Neidle et al., 1998, p. 14)

2.5.2.4. Right peripheral wh-elements in the leftward analysis

Petronio & Lillo-Martin (1997) argue that the final word in a double construction is a *base-generated double* that is used for *focus* or *emphasis*. They base this analysis on other instances in ASL where certain constituents are doubled for these same reasons. There are restrictions on these doubles. The first is that the final double cannot be a phrase.

The final double is base-generated in the head of a Spec, CP, which has [+FOCUS]. The wh-element in IP/TP that is doubled is referred to as the TWIN. The twin is also marked with a [+FOCUS] and acts as a *focus operator*. According to Petronio & Lillo-Martin (1997), as an operator the twin undergoes LF raising to Spec, CP. Once in this position it can undergo Spec-Head agreement to check the [+FOCUS] of the final double in C (through c-command). This is represented in **Error! Reference source not found.**.

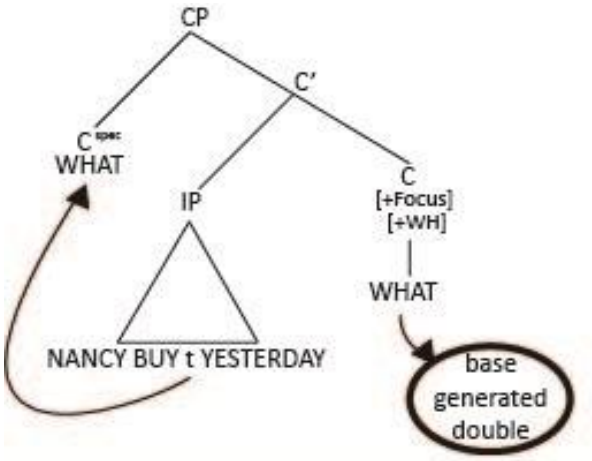


Figure 2.11: Leftward Movement in ASL

Petronio & Lillo-Martin's (1997) analysis is able to predict the ungrammaticality of example (44) discussed above as, in their analysis, phrases cannot occur in the head position. The one difference between non-wh-doubles and wh-doubles is that in C° there is not only a [+FOCUS] feature but also a [uWH]. This analysis also supports the assumption that wh-elements are inherently focused.

Petronio & Lillo-Martin (1997) use *null arguments and double constructions* to account for wh-elements appearing solely in the right periphery. Sign languages overwhelmingly make use of a class of verbs known as agreement verbs (Sandler & Lillo-Martin, 2006). Within this class of verbs, it is very common for an argument with which the verb agrees to be null. However, the restriction placed on the null argument is that the element must be retrievable from the context. The same argument has been applied by Lillo-Martin & Fisher (1992) to allow the use of null wh-words. Consider examples (47) and (48) below:

(47) NAME$_{WH}$
'What is your name?'

(48) TIME$_{WH}$
'What time is it?' (ASL)
(Petronio & Lillo-Martin, 1997, p. 35)

In each of these examples, Lillo-Martin & Fisher (1992) posit that there is a null wh-element that may move leftward to Spec, CP. They cite more complex examples where the context has been provided, as in (49) below:

Possible context: speaker knows the addressee is not feeling well, possibly due to something they ate.

(49) BREAKFAST (null wh) EAT$_{WH}$
'as for breakfast, what did you eat?' (ASL)
(Petronio & Lillo-Martin, 1997, p. 36)

Thus, in order to account for examples such as (35) which, you will recall from the previous section (2.5.1), is a sentence which received mixed judgements from Petronio & Lillo-Martin's (1997) informants. Petronio & Lillo-Martin (1997) argue that there is a final wh-double and there is a covert null wh-double, as in (50), below:

(50) (null wh) BUY CAR WHO$_{WH}$
Who bought the car? (ASL)
(Petronio & Lillo-Martin, 1997, p. 36)

Petronio & Lillo-Martin (1997) claim that the variation in judgments can be accounted for in their analysis, as some signers who judged these sentences as ungrammatical in isolation

found them to be grammatical when an appropriate context was given. For (50), the possible context which they provided was that, the speaker and addressee are discussing the addressee's car which has just been sold. Petronio & Lillo-Martin (1997) claim this is because this context is a typical requirement of null arguments, as we have previously seen. Neidle et al (1998) criticise the 'context argument' as they believe that in normal/natural conversation it would not be unusual to have this context; in fact, they believe that given the nature of sign language this would be the typical case.

2.5.3. Wh-NMM in ASL

The distribution of NMM plays an important part in both analyses. In the rightward analysis, Neidle et al (1998) claim that the scope of the wh-NMM may be over the entire question, however the NMM may 'occur solely over the wh-phrase in a more limited set of cases: specifically, those cases where the wh-phrase has moved to the clause-final Spec, CP position' (Neidle et al, 1998, p. 9). They state that if the wh-phrase has moved then the spreading of the NMM over the entire clause (c-command domain of the node) is optional. The minimal scope of the NMM must be over the moved manual wh-sign Spec, CP.

If the wh-phrase is in situ then spreading must occur over the whole clause (51a & 52a). This is because there is no IP-external material that the wh-NMM in C° can be co-articulated with. If wh-sign is in situ and the NMM does not spread over the whole clause then the sentence becomes ungrammatical (51b & 52b). Thus, if there is moved material it will always be co-articulated with the NMM (51c & 52c)[19].

(51)	a. WHO HATE JOHN	[subject in situ]
	b. *WHO HATE JOHN	[subject in situ]
	c. t_i HATE JOHN, WHO	[subject moved]
	'Who hates John?'	
(52)	a. JOHN SEE WHO YESTERDAY	[object in situ]
	b. *JOHN SEE WHO YESTERDAY	[object in situ]
	c. JOHN SEE t_i YESTERDAY WHO	[object moved]
	'Who did John see yesterday?'	

[19] The dashed lines indicate that spreading is optional over these constituents.

In the leftward analysis, the wh-NMM is a realisation of a [+FOCUS] and [uWH] feature which are found in the head of CP. Petronio & Lillo-Martin (1997) also posit that the wh-NMM obligatorily spreads over its c-command domain, however their use of c-command differs from that of Neidle et al (1998). In the leftward analysis if there is an initial wh-subject then the wh-NMM must co-occur with that manual sign.

Returning to sentence (52a) where there is a wh-subject in the initial position and the spread of the wh-NMM is over the whole clause. Petronio & Lillo-Martin (1997) state that in sentences such as these the wh-NMM is associated with [+FOCUS] and [uWH] features found in C and then obligatorily spreads over the domain of the CP.

Petronio & Lillo-Martin (1997) suggest that the rightward analysis incorrectly predicts the following sentence to be grammatical:

(53) *WHAT JOHN BUY YESTERDAY WHAT

(Petronio & Lillo-Martin, 1997, p. 40)

According to the rightward analysis, the initial wh-element is considered to be a topic with its own [uWH] and wh-NMM and the final element is a moved wh-phrase. Therefore, according to this analysis, there is lexical material in Spec, CP (from the moved wh-phrase) and so the spreading should be optional which results in the ungrammaticality of (54) above. Neidle et al (1998) address the problem by suggesting that the non-manuals display some sort of 'harmony' where if a NMM is engaged and will be engaged again, there will be some sort of perseverance.

2.5.4. Conclusion

In this section, I have discussed the two analyses for ASL wh-questions in ASL: the rightward analysis of Neidle et al (1998) and the leftward analysis of Petronio & Lillo-Martin (1997). I have aimed to illustrate the main points for and against each of the two arguments. One noteworthy aspect is the differing opinions over the grammaticality of certain key constructions and how these drive the different analyses. With results in ASL being inconclusive, the following section explores research into two other sign languages: Italian sign language and Brazilian Sign Language.

2.6. Adding to the debate: Italian Sign Language & Brazilian Sign Language

This section aims to add to the debate on whether sign languages follow the linguistic generalisation that 'leftward wh-movement' or are some sign languages typologically unique in wh-question formation by making use of 'rightward wh-movement'. Investigations into other sign languages provided evidence for both sides of the argument. Cecchetto, Geraci, & Zucchi (2009) provide a comprehensive look at question formation in Italian Sign Language (LIS). They conclude that wh-movement in LIS is rightward, agreeing with Neidle et al (1998) that rightward movement is possible in sign languages. Furthermore, they give an account as to *why* sign languages make use of this structure where spoken languages do not, by considering the role that NMMs play in wh-question formation. On the other hand, Nunes & de Quadros (2006) give an account for Brazilian Sign Language using a similar leftward analysis to Petronio & Lillo-Martin (1997). The following section explores how the leftward/rightward movement analysis has applied to these additional sign languages.

2.6.1. Moving Leftward: Brazilian Sign Language

Nunes & de Quadros (2006) examine wh-question formation in Brazilian Sign Language (LSB). LSB, like ASL, is an SVO language that allows for in situ placement (54), and sentence-initial questioned object arguments (56). The question word may be doubled for emphatic purposes (56 & 57) and finally the question word may also appear on the right (58). The scope of the NMMs in LSB must spread obligatorily over the whole clause.

(54) WHO MARY LIKE$_{WH}$ (Sentence-initial in situ)
'Who likes Mary?'

(55) WHO JOHN LIKE$_{WH}$ (Sentence-initial moved object)
'Who does john like?'

(56) WHO LIKE MARY WHO$_{WH}$ (Doubling)
'Who exactly likes Mary?'

(57) JOHN BUY WHAT YESTERDAY WHAT$_{Wh}$ (Doubling)
'What exactly did John buy yesterday?'

(58) LIKE MARY WHO$_{WH}$ (Sentence-final subject argument)
'Who likes Mary?'

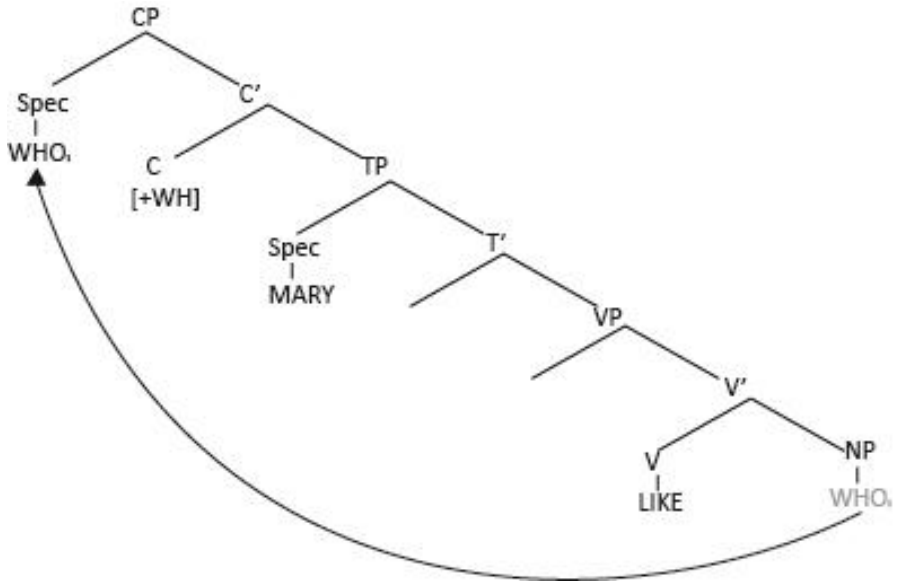
Examples (54-58) shows a similar pattern to what Petronio & Lillo-Martin (1997) report in ASL and as a result, the analysis is similar. The main difference between Nunes & de

Quadros (2006) and Petronio & Lillo-Martin (1997) is that Nunes & de Quadros (2006) use the Kaynean all right branching tree (Kayne, 1994) (see **Error! Reference source not found.**).

2.6.1.1. Left peripheral wh-elements in LSB

To account for sentence-initial wh-elements, the wh-phrases in LSB move leftward to Spec, CP as they do in Petronio & Lillo-Martin's (1997) ASL analysis. Once in the specifier position, they fall into a local checking configuration with the [uWH] features found in C°. This checks the feature and the sentence is grammatical as illustrated in

.



WHO MARY LIKE$_{WH}$
'Who does Mary like?'

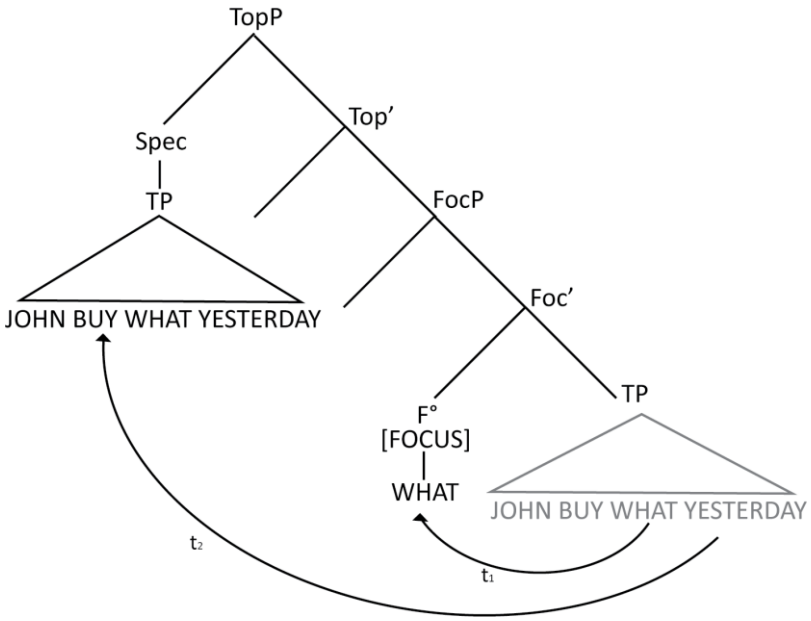
Figure 2.12: WH-movement in LSB

2.6.1.2. Doubling in LSB

De Quadros (1999) agrees with Petronio & Lillo-Martin (1997) that sentence-final wh-elements in LSB are used in *emphatic contexts* and are *focused*. Where the two analyses differ slightly is in their representation.

In keeping with the Kaynean (1994) right branching tree, Nunes & de Quadros (2006) use a Focus Phrase[20] (FocP), with a base generated [+FOCUS] found in the head (Foc°). A number of steps are taken in order to derive (58), as represented in **Error! Reference source not found.**.

[20] In Nunes & de Quadros (2006) this category is labelled as EFoc – but is simplified in this account and referred to it as FocP



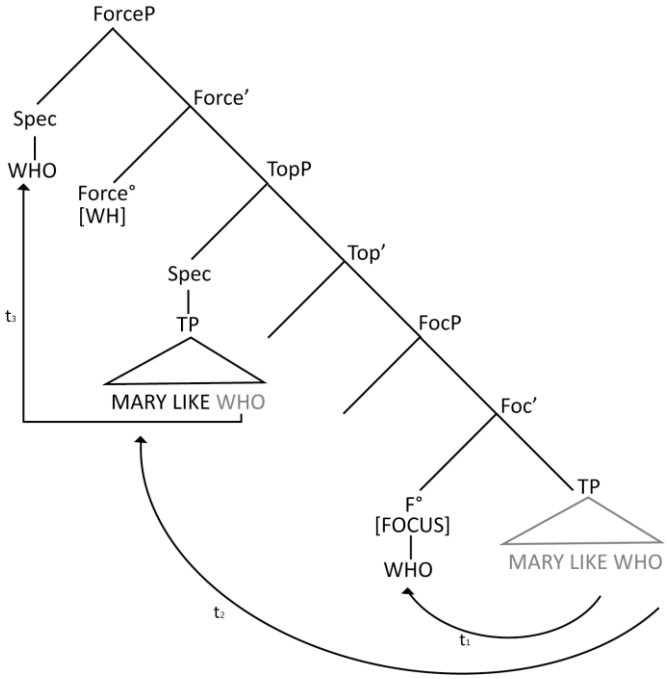
JOHN BUY WHAT YESTERDAY WHAT$_{Wh}$
'What exactly did John buy yesterday?

Figure 2.13: In situ Doubling in LSB

First, the *WHO* moves from the TP to Foc° leaving a copy behind in the TP. Next, the whole TP is moved, using remnant movement, to the specifier of TopP, also leaving a copy in place. Nunes & de Quadros (2006) then stipulate that the morphological component WHO and Foc° *fuse,* making it invisible to The Linear Correspondence Axiom (LCA)[21] and therefore immune to *chain reduction*. Chain reduction refers to the deletion of lower copies in a derivation. Finally, the lower copy of TP is deleted and the order is derived.

To account for the duplication seen in (57), represented in **Error! Reference source not found.**, the same derivation takes place. However, in order to get the sentence-initial wh-element, Nunes & de Quadros (2006) introduce a functional head with a strong [WH] feature, labelled as ForceP.

[21] Let T be the set of terminals in a given phrase marker P. Let A be the maximal set of pairs of non-terminals X and Y in P such that X asymmetrically c-commands Y



WHO LIKE MARY WHO$_{WH}$
'Who exactly does Mary like?

Figure 2.14: Sentence-initial doubling in LSB

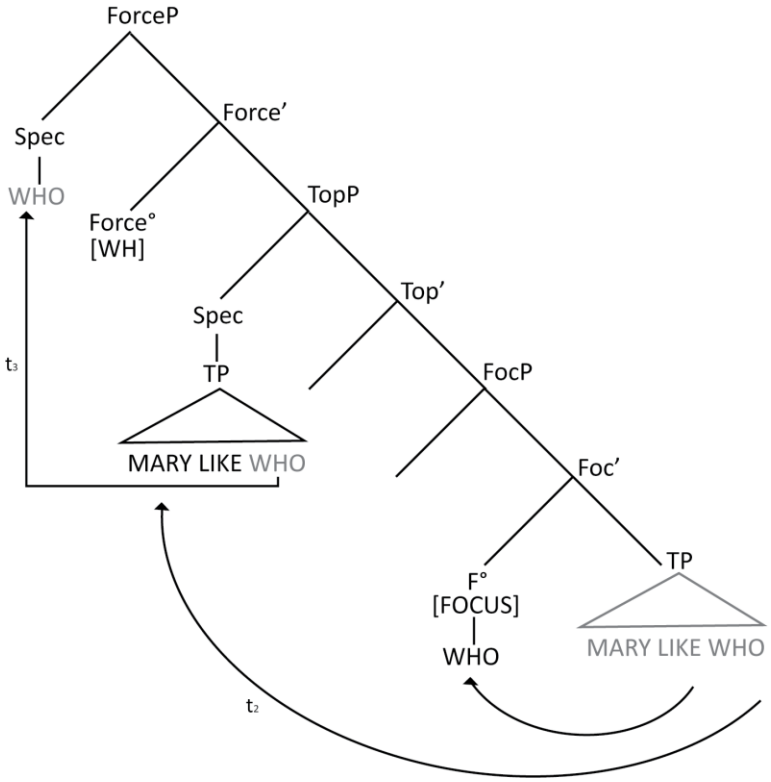
As in the previous derivation, the *WHO* moves to the Foc°, where it undergoes morphological fusion with Foc°. Next, the entire TP moves to Spec, TopP. The strong [WH] feature triggers overt wh-movement of WHO in the remnant TP in Spec, TopP to Spec, ForceP to check the [WH] feature in Force°. Once chain reduction is applied, the lowest copies in Spec, TopP and in Spec, TP are deleted leaving only the sentence-initial copy in Spec, ForceP. The copy in the Foc° is invisible to chain reduction because of the morphological fusion and remains sentence-final. This account correctly predicts construction (59) as ungrammatical in LSB.

(59) *[WHO JOHN SEE WHO YESTERDAY]$_{wh}$ [WHO]$_{wh}$
'Who exactly did John see yesterday?'

2.6.1.3. Right peripheral elements

Lillo-Martin & de Quadros (2006) state that double and final wh-elements are related, 'with the final constructions simply missing an element which is overt in the double constructions' (Lillo-Martin & de Quadros, 2006, p. 168). That is, they both assume the null hypothesis for

the rightward elements seen in **Error! Reference source not found.**. The null hypothesis assumes that there is a null element, or covert element, that isn't phonologically realised in the Spec, CP.



(WHO) LIKE MARY WHO$_{WH}$
'Who exactly does Mary like?'

Figure 2.15: Doubling in LSB with a null, sentence-initial element

Quadros & de Nunes (2006) put forward a convincing case for the leftward analysis of LSB. What is particularly appealing about their analysis is the application of Kayne's (1994) Universal Asymmetry. Furthermore, while the analysis is able to capture the similarities between LSB and ASL, it is also able to capture the differences between them[22].

However, there are some concerns about this analysis. The first is that Nunes & de Quadros (2006) give very little attention to the distribution of the NMM, which is a crucial part of sign language syntax. The second concern relates to the null argument hypothesis accounting for these examples. The worry is that we would have to assume that for *all rightward wh-*

[22] This is exemplified in the difference in indirect questions between ASL and LSB – which is beyond the scope of this discussion - see Quadros & de Nunes (2006).

elements the sentence must carry the emphatic meaning. However, in the data provided by Nunes & de Quadros (2006), this is not always made clear.

2.6.2. Moving rightward: Italian Sign Language

As we have seen, the leftward movement analysis has been used to account for wh-constructions in LSB, a sign language that has a similar pattern to ASL (as recorded by Petronio & Lillo-Martin, 1997). This section explores Italian Sign Language (LIS) whose wh-constructions differ from those of LSB and ASL.

Cecchetto, Geraci & Zucchi (2009) report that LIS has a flexible word order which is predominantly SOV. They consider LIS to be a head-final language where "functional heads host aspectual markers, negation, and modals follow the verb" (Cecchetto et al., 2009, p.283). Wh-elements as well as wh-phrases are found predominantly in the right periphery and are preceded by elements such as adverbs and negation, which are usually found to be on the right edge as in examples (60)–(68). LIS also allows for in situ placement of wh-phrases as in (67). However, the entire wh-phrase is allowed to remain in situ in certain *discourse-linked contexts* where the entities are contextually salient. In these cases, the *entire phrase* must be under the scope of the wh-NMM in order to be grammatical. However, under no circumstances did a wh-phrase appear in situ in the sentence-initial position as in (66).

(60) GIANNI BUY WHAT$_{WH}$
'What did Gianni buy?'

(61) CAKE EAT NOT WHO$_{WH}$
'Who did not eat the cake?'

(62) HOUSE BUILD DONE WHO$_{WH}$
'Who built the house?'

(63) GIANNI BOOK$_i$ WHICH$_i$ STEAL$_{WH}$
'Which book did Gianni steal?'

(64) * BOOK WHICH GIANNI STEAL
'Which book did Gianni steal?' (LIS)
(Cecchetto et al., 2009, pg. 283)

Cecchetto et al. (2009) present the hierarchical relations in these constructions as follows (**Error! Reference source not found.**):

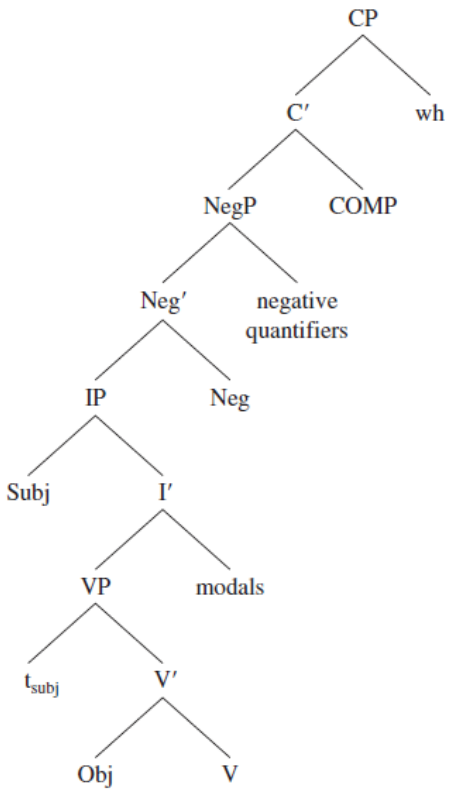


Figure 2.16: Hierarchical relations in LIS

(LIS)
(Cecchetto et al., 2009, pg. 283)

Originally, in Cecchetto et al. (2009) and Branchini et al. (2013), instances of doubling (which are widely attested in other sign languages) were not found. Only recently, in a corpus-based study, did sentence-initial/sentence-final non-distinct forms of doubling arise (65) (Branchini et al., 2009).

(65) WHAT SEE DONE WHAT
'What did you see?'

To account for the wh-constructions in LIS, Cecchetto et al. (2009) rely heavily on the importance of NMMs. Cecchetto et al. (2009) note that when the wh-phrases are at the

right edge, the NMM is usually restricted to the wh-phrase, though it may also spread over a wider part of the clause, as seen in examples (66a) – (66d)[23].

(66) a. PAOLO STEAL BOOKi WHICH$_{i\ wh}$
'Which book did Paolo steal?'

b. BOOK STEAL BOYi WHICH$_{i\ wh}$
'Which boy stole the book?'

c. PAOLO STEAL BOOKi WHICH$_{i\ wh}$
'Which book did Paolo steal?'

d. BOOK STEAL BOYi WHICH$_{i\ wh}$
'Which boy stole the book?'

(LIS)
(Cecchetto et al., 2009, pg. 286)

However, when the wh-phrase remains in situ the spreading of the NMM is *obligatory* over the wh-phrase and continues to spread rightward (67a) & (67b).

(67) a. PAOLO BOOKi WHICHi STEAL$_{wh}$
'Which book did Paolo steal?'

b. BOYi WHICHi BOOK STEAL$_{wh}$
'Which boy stole the book?'

(LIS)
(Cecchetto et al., 2009, pg. 286)

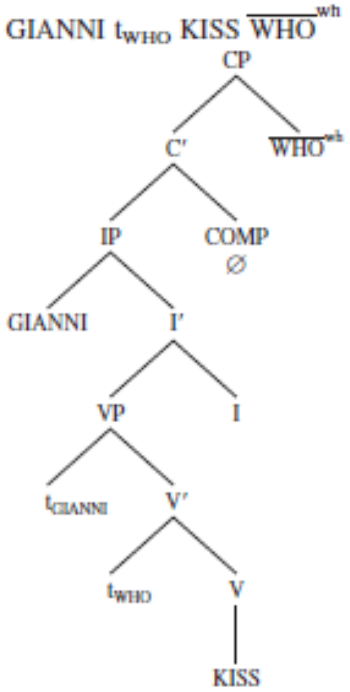
A final observation here is that when the wh-phrase was the object argument (see 67c), the NMM spread over the verb but not the subject. However, when the subject argument is questioned the NMM is able to spread over the entire sentence (see 67b).

2.6.2.1. Right peripheral and in situ wh-elements in LIS

Cecchetto et al. (2009) posit the same rightward Spec, CP that we saw in Neidle et al. (1998). They, too, assume that there is a [WH] feature in the head of CP, which requires checking through overt movement. In **Error! Reference source not found.**, the right peripheral element is accounted for by moving WHO to Spec, CP. It is now in a local

[23] The dashed lines indicate that the NMM my optionally spread over that domain.

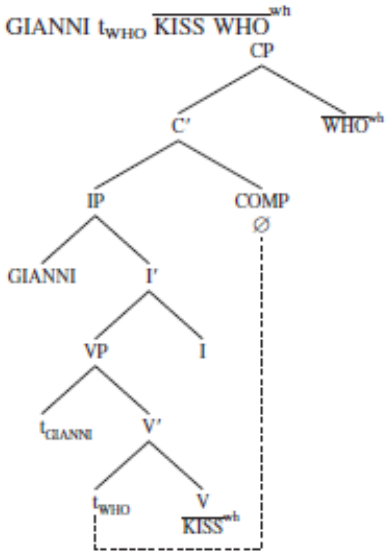
configuration where the [WH] feature is checked. The manual constituents in **Error! Reference source not found.** are accounted for in the same way.



GIANNI KISS WHO$_{WH}$
'Who did Gianni kiss?'

Figure 2.17: Rightward wh-movement in LIS - NMM scope over wh-sign

(LIS)
(Cecchetto et al., 2009, pg. 297)

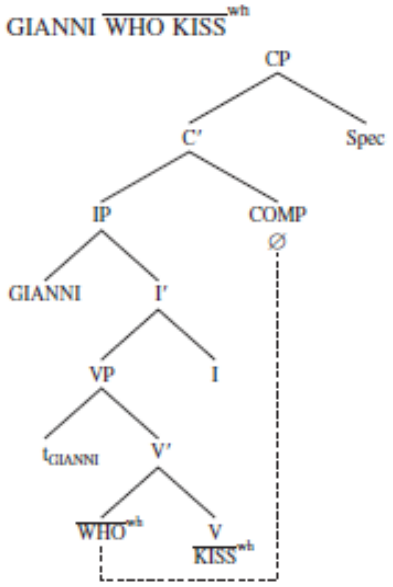


GIANNI KISS WHO$_{WH}$
'Who did Gianni kiss?'

Figure 2.18: Rightward movement in LIS - NMM scope over wh-sign and verb

(LIS)
(Cecchetto et al., 2009, pg. 298)

However, the question is how they account for instances where the wh-sign is left in situ (see **Error! Reference source not found.**).



GIANNI WHO KISS$_{WH}$
'Which of them did Gianni kiss?'

Figure 2.19: In situ placement in LIS

(LIS)
(Cecchetto et al., 2009, pg. 297)

Cecchetto et al. (2009) use the distribution of NMMs to account for these in situ constructions. While movement is one way to mark the wh-dependency, they claim that the spreading of the NMM is an additional, *modality specific* way, to mark this dependency[24] in sign languages. Cecchetto et al. (2009) explain as follows:

> "When the structure is linearized, the wh-NMM spreads over the lexical material that intervenes between the position of the wh-phrase inside the clause (the subject position if the WH-phrase is a subject, the object position if the wh-phrase is an object, etc.) and the COMP (complementizer) to which the wh-phrase is associated. We propose the function of wh-NMM in LIS is this: the spreading of wh-NMM marks a wh-dependency"
>
> (Cecchetto et al., 2009, p.296)

[24] In more technical terms this is the PROBE/GOAL theory as summarized by Chomsky (2001).

I now return to **Error! Reference source not found.** & **Error! Reference source not found.** where wh-dependency was marked by overt wh-movement. In these instances, the wh-NMM could optionally spread between extensions of the wh-dependency[25] as the relation *was already checked* through the *overt wh-movement*. In the case of **Error! Reference source not found.**, because the phrase stayed in situ, the only way to mark the dependency was through the spreading of the wh-NMM (through the entire extension of the dependency).

2.6.2.2. Doubling in LIS

To account for the recent discovery of doubled constructions in LIS, Branchini et al. (2013) analyse these as cleft questions. This is based on semantic evidence where wh-duplication is allowed only by *existential presupposition*. In other words, this kind of doubling is only licenced if the question presupposes that there is *someone* or *something* that is the answer to this question. The proposed analysis of these doubles is illustrated in **Error! Reference source not found.**.

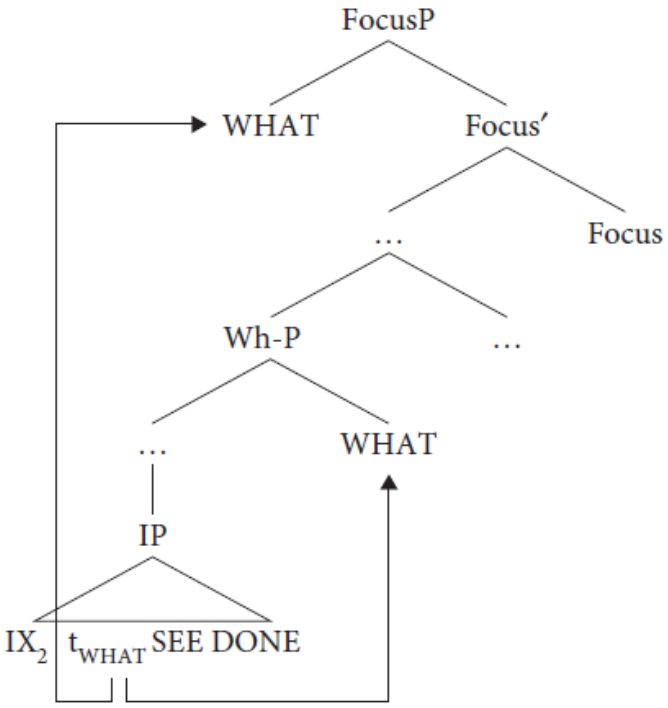


Figure 2.20: Doubling in LIS

(LIS)
(Branchini et al., 2013, p. 177)

[25] The wh-dependency is the span of wh-movement.

In this analysis, the rightward movement is applied first, which moves the wh-element to Spec, CP (in this tree labelled as WH-P) to check the [uWH] feature in C°. Additionally, there is a Focus Phrase added, as in LSB, which the wh-element in TP is copied to. When chain reduction takes place, the two wh-elements are not deleted because they are parts of different chains, but the final copy in the TP is.

2.6.2.3. Why is Spec, CP on the right?

The proposal put forth by Cecchetto et al. (2009) makes a further claim as to why the Spec, CP would be on the right in sign languages. In Section 2.6.2.2, I mentioned that the hypothesis of Cecchetto et al. (2009) is that sign languages can mark wh-chains in two ways: either by displacement/movement, as in spoken languages, or by NMMs (or they can also use both devices at the same time). This *fundamental dependency*[26] is the link required by the process *of feature evaluation;* essentially this link is the one between 'the Probe (in our case COMP/C°) and the Goal (in our case the wh-phrase in its position before wh-movement)' (Cecchetto et al., 2009, p. 300). As LIS is considered to be a head-final language, COMP/C° would be linearized to the right. If we assume that Spec, CP is on the left in LIS we would expect the complementizer phrase to resemble **Error! Reference source not found.**.

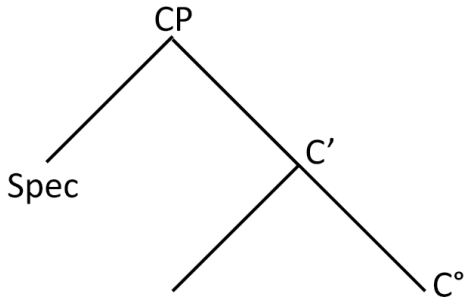


Figure 2.21: Head-final leftward facing Complementizer Phrase

[26] It Is important to reiterate how wh-dependencies are characterised by Cecchetto et al. (2009):
"We identify the lower link of the wh-dependency with the position occupied by the wh-phrase before wh-movement applies, or the position visibly occupied by the wh-phrase when it remains in-situ; and we identified the higher link with the position of the complementizer (Cecchetto et al., 2009, p. 300).

With this information in mind, let us consider the following counterfactual examples taken from Cecchetto et al. (2009):

(68) a. *[$_{CP}$ WHAT [$_{IP}$ GIANNI [$_{VP}$ t_{WHAT} EAT]…] COMP]

b. *[$_{CP}$ WHAT [$_{IP}$ GIANNI$_{WH}$ [$_{VP}$ t_{WHAT} EAT]…] COMP]

c. *[$_{CP}$ WHAT [$_{IP}$ GIANNI [$_{VP}$ t_{WHAT} EAT$_{WH}$]…] COMP]

d. *[$_{CP}$ WHAT$_{WH}$ [$_{IP}$ GIANNI [$_{VP}$ t_{WHAT} EAT$_{WH}$]…] COMP]

(LIS)
(Cecchetto et al., 2009, p. 301)

Based on (68a) the wh-dependency can spread in three possible ways. In (69b) the wh-NMM is able to link the position between the trace and the moved wh-element in Spec, CP. However, it does not mark the wh-dependency between the Probe (C°) and the Goal (wh-phrase in Spec, CP). In example (69c) the wh-NMM spreads between the wh-phrase and the trace. However, according to Cecchetto et al. (2009), it fails to mark the dependency (as they characterise it[29]) as it spreads over too much to be a reliable indicator of the wh-dependency. Finally, in (68d) the wh-NMM correctly marks the Probe and the Goal. However, it violates the phonological 'perseveration'[27] of the NMM.

Thus, based on the above examples, if the wh-phrase is moved to the left periphery the wh-dependency is not able to be marked properly by the wh-NMM. Cecchetto et al. (2009) conclude with:

> "Therefore, we assume that in sign languages like LIS, the default value of the linearization algorithm, which linearizes a specifier to the left, is overridden: Spec, CP is linearized to the right because this is the only way for the dependency between the Probe and Goal to be marked by wh-NMM… Thus, our account predicts that other sign languages should behave like LIS in placing the wh-phrase at the right periphery if two concurrent factors are present (i) the language marks wh-dependencies by NMM, and (ii) COMP/C° follows its complement."
>
> Cecchetto et al. (2009, pg. 302- 303)

Cecchetto et al. (2009) present a compelling argument for the rightward Spec, CP which is founded in the modality-specific nature of NMMs. In their analysis, they are able to use this

[27] Perseveration is a 'common phonological phenomena of sign languages according to which a handshape or NMM that is used several times in close proximity remains in place' (Cecchetto et al., 2009, pg. 301).

to explain both the right peripheral elements as well as to account for the in situ constructions. One question for this analysis is why sign languages have two options, that can both be used at the same time, to mark the wh-dependency. This is essentially a violation of Chomsky's Principle of Economy.

2.6.2.4. Conclusion

In this section I have examined the analyses of two sign languages. These analyses make different claims about the nature of wh-question formation in sign languages. The analysis of Nunes and de Quadros (2006) makes use of the Kaynean all-right-branching structure to account for wh-constructions found in LSB. In their account, the wh-movement is leftward to a leftward Spec, CP. This analysis is able to provide an account that is consistent with what is seen in spoken language syntax. On the other hand, Cecchetto et al. (2009) posit a rightward Spec, CP based on evidence in LIS which shows that NMMs can mark the wh-dependencies. Conversely this account claims that, because of modality factors, sign language syntax may employ novel devices not found in spoken languages.

The picture that becomes clear is that despite having considered various analyses for a number of different well-studied sign languages, we are no closer to reaching a consensus over the direction of wh-movement in sign languages. This, of course, is to be expected considering that research on this topic is still in its early stages.

What is desperately needed is more cross-linguistic data to provide evidence for or against the claims made in the various analyses. For this reason, the following section considers (in varying degrees) three under-studied sign languages. For these sign languages, like for SASL, little information is available regarding areas such as phrasal structure or hierarchical relations compared to ASL, LSB or LIS. However, these languages are able to provide some of the much-needed cross-linguistic data referred to above.

2.7. Wh-question formation in under-studied sign languages

Two sign languages are examined: Turkish Sign Language (TID) - investigated by İşsever & Makaroğlu (2013), and Croatian Sign Language (HJZ) - studied by Kuhn & Wilbur (2006). These analyses are used to exemplify the contribution that SASL research stands to make in the greater debate, as well as what kind of analysis can be expected.

2.7.1. Turkish Sign Language

İşsever & Makaroğlu (2013) investigated Turkish Sign Language (TID). TID is a head-final SOV language where wh-elements are found in a number of surface positions. Wh-elements may remain in situ (70a) & (71a), or undergo movement to the left periphery (70b) & (71b) or the right periphery (70c) & (71c).

(69) a INDEX WHAT READ
b. WHAT$_i$ INDEX t_i READ
c. INDEX t_i READ WHAT
'What did you read?'

(70) a. INDEX WHEN BOOK READ
b. WHEN$_i$ INDEX t_i BOOK READ
c. INDEX t_i BOOK READ WHEN
'When did you read the book?'

(TID)
(İşsever & Makaroğlu, 2013, p. 177)

However, when the wh-element is a complex wh-phrase there are some restrictions on the placement. A complex wh-phrase may occur in situ (71a) or in the left periphery (71b), but not in the right periphery (71c) (İşsever & Makaroğlu, 2013). Based on this evidence, İşsever & Makaroğlu (2013) claim that wh-phrases can only undergo leftward movement, as TID does not have a dedicated position on the right to host a wh-phrase.

(71) a. INDEX [WHAT BOOK] READ
b. [WHAT BOOK] INDEX READ
c. *INDEX READ [WHAT BOOK]
'Which book did you read?'

(TID)
(İşsever & Makaroğlu, 2013, p. 177)

Based on this evidence, İşsever & Makaroğlu (2013) make the following generalisation:

> "In a wh-movement construction, TID wh-phrases move to a left peripheral position while wh-words target a position in the right periphery"
>
> (İşsever & Makaroğlu, 2013, p. 179)

Wh-elements may also be doubled – similar to those in LSB. The *duplicates* of the wh-words can occur in the right periphery (72a) & (73a) but not in the left periphery (72b) & (73b), and a wh-word can duplicate but a wh-phrase cannot (72c). This seems to be good evidence for leftward movement of wh-phrases.

(72) a. INDEX WHAT BOOK READ [WHAT]
b. * [WHAT] INDEX WHAT BOOK READ
c. * INDEX WHAT BOOK READ [WHAT BOOK]
'What did you read?'

(73) a. INDEX WHERE BOOK READ [WHERE]
b. *[WHERE] INDEX WHERE BOOK READ
'Where did you read the book?'

(TID)
(İşsever & Makaroğlu, 2013, p. 180)

2.7.1.1. The structure of CP

In order to account for these constructions, İşsever & Makaroğlu (2013) employ a combination of the leftward analyses of Petronio & Lillo-Martin (1997) and Nunes & de Quadros (2006). They posit that TID, like ASL, has the Spec, CP position on the left and the C° to the right, as illustrated in **Error! Reference source not found.Error! Reference source not found.**.

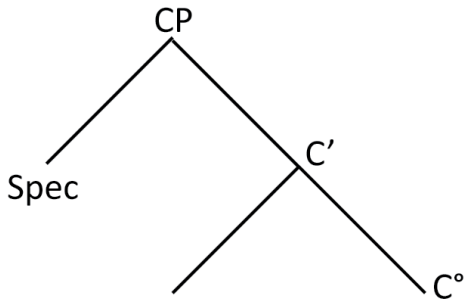


Figure 2.21: Head-final leftward facing complementizer phrase

Because Spec, CP is on the left, wh-phrases and wh-words can move leftward into this phrasal category. This accounts for examples (75) and (76) where the wh-phrase can appear in the left periphery (this is illustrated in **Error! Reference source not found.**).

(74) WHAT$_i$ INDEX $_{ti}$ READ
(75) [WHAT BOOK] INDEX READ (TID)
(İşsever & Makaroğlu, 2013, p. 177)

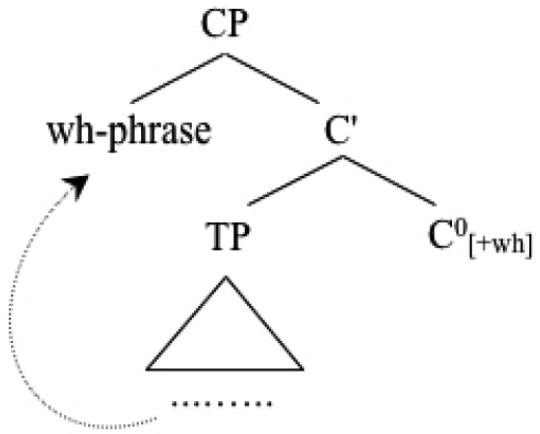


Figure 2.22: Sentence-initial wh-phrase in TID

(TID)
(İşsever & Makaroğlu, 2013, p. 183)

On the other hand, by having C° on the right, examples (76) and (78) can be accounted for (see **Error! Reference source not found.**). Here, the wh-word is found in the right periphery. Furthermore, this also predicts the ungrammaticality of wh-phrases found in the right periphery (78) as phrases cannot be hosted in a head category.

(76) INDEX ti READ WHAT
(77) INDEX ti BOOK READ WHEN
(78) *INDEX READ [WHAT BOOK] (TID)
(İşsever & Makaroğlu, 2013, p. 177)

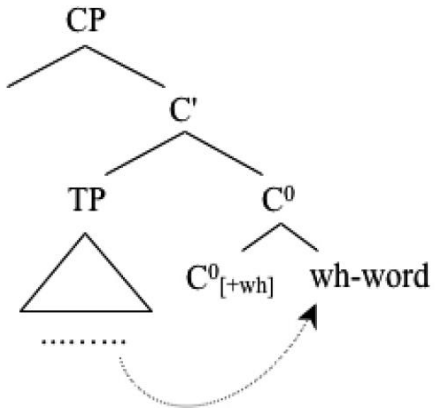


Figure 2.23: Head-final complementizer phrase in TID

(İşsever & Makaroğlu, 2013, p. 183)

Now let us consider instances of doubling. You will recall that only a wh-word may be doubled in the right periphery. İşsever & Makaroğlu (2013) argue along the lines of Nunes & de Quadros (2006) that the ungrammaticality in (79c) is due to reasons of linearization, and is related to the phenomenon of morphological fusion.

(79) a. INDEX WHAT BOOK READ [WHAT]
b. * [WHAT] INDEX WHAT BOOK READ
c. * INDEX WHAT BOOK READ [WHAT BOOK]
'What book did you read?' (TID)
(İşsever & Makaroğlu, 2013, p. 179)

According to Nunes & de Quadros (2006), only wh-words can morphologically fuse with C°. Thus, in (79a) the clause-final element has morphologically fused with C° making it invisible to chain reduction. There is no duplication of wh-phrases for the simple reason that 'they cannot adjoin to, and so, morphologically fuse with C°' (İşsever & Makaroğlu, 2013, p. 180). This provides further evidence for C° being on the right as it is able to capture the clause-final wh-element; if it were on the left, as it is in LSB, it would incorrectly predict that (80b) would be grammatical.

The structure of the CP appears to be similar to that proposed by Petronio & Lillo-Martin (1997) for ASL. However, İşsever & Makaroğlu (2013) consider constructions such as (81) to be ungrammatical in TID (illustrated in **Error! Reference source not found.**). In (81), the wh-element is duplicated, with instances in both the sentence-initial and sentence-final positions.

(80) *[WHAT]i $INDEX_{2\ t_i}$ READ $[WHAT]_i$ (TID)
(İşsever & Makaroğlu, 2013, p. 185)

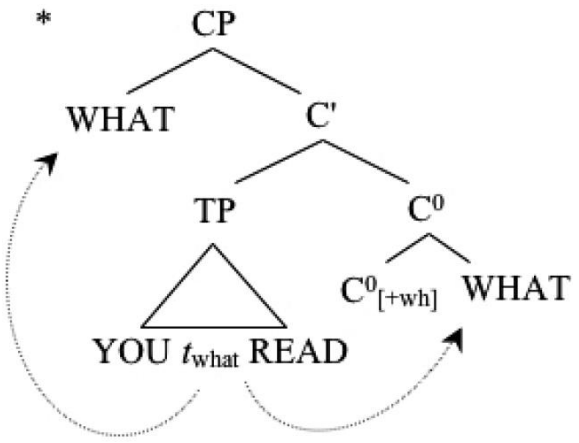


Figure 2.24: Doubling in TID

(TID)
(İşsever & Makaroğlu, 2013, p. 185)

In line with Petronio & Lillo-Martin (1997), İşsever & Makaroğlu (2013) state that 'base generated interrogative complementizes whose [WH] feature needs to be checked by another wh-element occupying Spec, CP' (İşsever & Makaroğlu, 2013, p. 185). The ungrammatically of (80) suggests that this analysis is not feasible for TID.

Instead, İşsever & Makaroğlu (2013) use this construction to show that, according to their analysis, in TID the [uWH] feature in C° can be checked either by moving a wh-phrase to the Spec, CP position or by a wh-word adjoining to C°. Importantly, once this feature has been checked (by either of these two operations), it cannot trigger movement of another wh-element for the same checking reason (as seen in (80)).

In summation, İşsever & Makaroğlu (2013) show that, in TID, wh-elements may move leftward or rightward. Wh-phrases target the Spec, CP which is on the left and wh-words move to C° which is on the right. They agree with Nunes & de Quadros (2006) that morphological fusion takes place in the C°. Instances of duplication allow this copy to escape chain reduction resulting in clause-final duplication.

Contributing to the larger debate of whether or not leftward movement is a universal, İşsever & Makaroğlu (2013) acknowledge that 'rightward movement *is possible* but only when the Spec position dedicated to wh-phrases is on the left' (İşsever & Makaroğlu, 2013, p. 186).

Again, this account fails to consider the distribution of NMMs which appear to be obligatory in all the examples provided. I consider this a major flaw in their analysis. Thus, in my analysis of SASL I ensure that the nature of NMMs is comprehensively addressed and mapped out (see Sections 4.2 & 4.7). Furthermore, İşsever & Makaroğlu (2013) do not discuss what licenses the in situ constructions as there is no movement to the Spec, CP position or to C° to check the [WH] feature.

2.7.2. Croatian Sign Language

Kuhn & Wilbur (2006) examined interrogative constructions in Croatian Sign Language (HZJ). In HZJ, which is a SVO language, wh-words are found in the sentence-initial position (81), the sentence-final position (82) or both (83). In HZJ, the question words 'what', 'what-kind', 'where', 'why', 'when', and 'how' can all be formed with the same manual sign, handshape 5[28]. However, there are variations that allow more specific forms.

(81) 5-ŠTO ČOVJEK JAHATI CONTENT QUESTION MARKING
5-what man ride
'What does the man ride?'

(82) DRUGI ČOVJEK 5-GDJE CONTENT QUESTION MARKING
second man 5-where
'Where is the second man?'

(83) 5-ŠTO PRATI 5-ŠTO CONTENT QUESTION MARKING
5-what wash 5-what
What does she wash?'

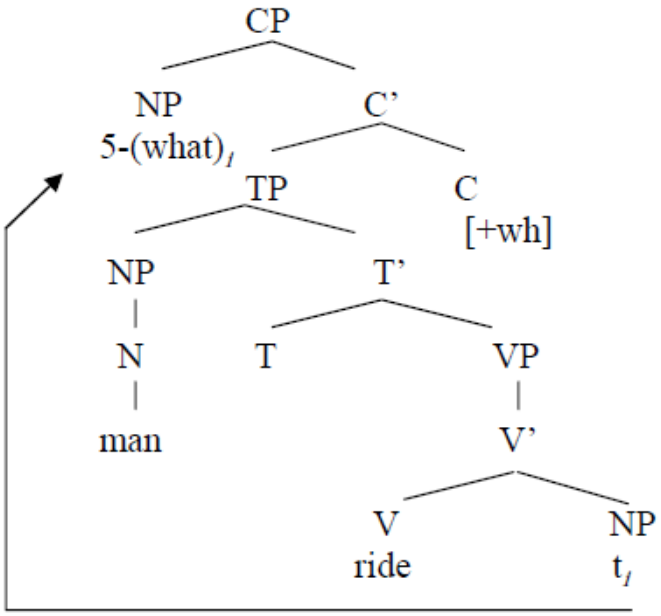
(HJZ)
(Kuhn & Wilbur, 2006, p. 159-160)

Kuhn & Wilbur (2006) base their analysis on that of Petronio & Lillo-Martin (1997) for ASL. They adopt the leftward-facing Spec, CP and the rightward C°. They, too, assume that there are [WH] features that need to be checked in C°, and that the NMM realized through these features spreads 'over its c-command domain occurring together with all the signs in the question' (Kuhn & Wilbur, 2006, p. 161). This accounts for the spreading in all wh-constructions in HJZ as the NMM always covers the entire sentence. Kuhn & Wilbur (2006)

[28] '5 content word' is formed when handshape 5 (palm open, all fingers spread) or handshape-b (fingers held together, thumb opposed) moves side-to-side in the horizontal plane, symmetrically in relation to midsagittal plane, with one or both hands (Kuhn & Wilbur, 2006, p. 158).

found that, as in TID, wh-phrases cannot be found in the right periphery. As a result, they see no justification for Spec, CP to be rightward in HJZ.

The structure below, **Error! Reference source not found.**, is used to account for constructions such as (81) where there is a sentence-initial wh-element. In this derivation, the wh-phrase moves to Spec, CP to check the [WH] features in C°. Kuhn & Wilbur (2006) comment that the appearance of object wh-questions in the left periphery is evidence that wh-movement does take place. Furthermore, the fact that these sentence-initial wh-elements may be wh-phrases provides support for putting Spec, CP on the left. This is because the specifier position can host phrases, whilst heads cannot. Finally, Kuhn & Wilbur (2006) are unable, in their analysis, to determine whether subject arguments in the sentence-initial position have moved or have simply remained in situ.



'What does the man ride?

Figure 2.25: Content Question Tree in HJZ

(Kuhn & Wilbur, 2006, p. 159)

Kuhn & Wilbur (2006) treat the final wh-word, as in (82), as a copy of the head in the wh-phrase. According to Kuhn & Wilbur it is through Spec-head agreement that the 'PF features, [WH] features, and θ-role are shared with the copied content word in C°' (Kuhn & Wilbur, 2006, p. 161).

Kuhn & Wilbur (2006) identify three so-called *doubled* structures in HJZ:

> 1. A real double in which the content element moves to the Spec, CP, and the final content double is copied in C. In these cases, the content question non-manuals are the same over the whole sentence.
>
> 2. A structure that consists of an assertion and a tag question. The non-manuals for content questions are held over the whole sentence, and additional non-manuals occur just before or on the final content sign, which is the tag adjoined to CP on the right. The additional non-manuals that occur are *blink*, *head tilt forward*, and *shoulders up*.
>
> 3. Not actually a double at all, but a two-sentence sequence. In this type of structure, the second content word is actually a new question. It occurs after a short break, which ends the first question. The non-manuals that are spread over the first question end before the next content word in the sequence and appear again over that question sign.
>
> (Kuhn & Wilbur, 2006, p. 162)

The kind of double that is attested to in (83) is what is described in point (1), above. Kuhn & Wilbur (2006) offer a very basic account for wh-constructions in HJZ. They, too, speculate that Spec, CP is on the left and that C° is on the right. This is based on the fact that wh-phrases can only be found in the left periphery, and not in the right periphery in HJZ. The use of the c-command to account for the NMM is satisfactory. According to Kuhn & Wilbur (2006) the NMMs spread over the entire domain of the sentence. This is predicated as C° does c-command the whole construction.

2.7.3. Conclusion

In this section, I have examined two 'under-studied' sign languages - Croatian Sign Language and Turkish Sign Language. Both use the split-headed structure proposed by Petronio & Lillo-Martin (1997) where Spec, CP is on the left and C° is on the right. This section highlights the contribution that these lesser-studied sign languages can make to the leftward/rightward debate. At this stage they appear to support the notion that wh-movement is leftward.

In the final section of this chapter, I will consider an alternative analysis whereby the wh-signs are analysed as particles rather than phrases. I will outline the criteria for analysing question particles in order to identify whether SASL makes use of this phenomenon.

2.8. Wh-phrases versus wh-particles: the case of Indian Sign Language

Indian Sign Language (IndSL) is a verb-final language where the 'verb sign always appears at the right edge of the sentence' (Aboh, Pfau & Zeshan, 2005, p. 21). As with most sign languages, IndSL has a fairly free word order where topicalization is a common strategy, though topic is not overtly marked by a NMM.

IndSL has two unique features in its wh-question formation observed by Aboh, Pfau and Zeshan (2005), whose analysis forms the basis for this section. The first is its question word paradigm. While other sign languages have multiple signs to represent various wh-question words, IndSL uses a single general wh-sign (G-WH). Aboh et al. (2005) show that this G-WH sign can combine with various phrases to express different meanings. They argue that this sign functions as a *wh-particle* rather than a *wh-phrase*. When the G-WH manual sign is found on its own, its meaning is derived from context. It also has the option of appearing with other manual signs to give a more specific meaning (see (84) – (86)).

(84) INDEX2 FRIEND SLEEP PLACE G-WH
'Where does your friend sleep?'

(85) INDEX3 ASK FACE G-WH
'Who did s/he ask?'

(86) INDEX2 BOOK TAKE NUMBER G-WH
'How many books will you take?'

(IndSL)
(Aboh et al., 2005, p. 24)

Interestingly, while the G-WH sign always appears in the clause-final position, complex wh-expressions may be left in situ (Aboh et al., 2005). This suggests that IndSL makes use of a wh-split as seen in (87) & (88) below:

(87) INDEX2 FRIEND **PLACE** SLEEP **G-WH**
'Where does your friend sleep?'

(88) INDEX2 [BOOK **NUMBER**] TAKE **G-WH**
'How many books will you take?'

(IndSL)
(Aboh et al., 2005, p. 24)

There is a second area where IndSL differs from most other sign languages. Most sign languages allow for a combination of clause-initial, clause-final (or both as in doubling), and sometimes in situ-placement for wh-elements. However, IndSL *only allows* for the *clause-final option* for the placement of the G-WH sign and does not allow for doubling. The analysis by Aboh et al. (2005) centres on these characteristics of IndSL.

The scope of the wh-NMM in IndSL obligatorily spreads over a minimal scope of just the G-WH sign (89), and a maximal scope of the whole clause (90).

(89) CHILD ANGRY G-WH$_{WH}$
'Why is the child angry?'

(90) [[FATHER INDEX3 SEARCH]IP [þwh]C [G-WH]SpecCP]CP$_{WH}$
'What is/was father searching?'

(IndSL)
(Aboh et al., 2005, p. 23 & 27)

2.8.1. Leftward and rightward analysis of IndSL: G-WH as a wh-phrase

Aboh et al. (2005) consider whether conventional leftward/rightward analyses can be applied to IndSL. The data in IndSL poses a serious challenge for the leftward Spec, CP as there are no elements found in the left periphery, nor is there doubling. Moreover, the analysis of Petronio & Lillo-Martin (1997) cannot be easily applied to IndSL where complex wh-phrases are found in the sentence-final position. As C° is a head it would be unable to host the clause-final wh-phrases. Thus, in order to derive the correct surface order, a number of operations need to be applied. First, the wh-phrase moves from its position to the Spec, CP to check the [WH] features. Then the entire TP moves to a position higher than

CP. This results in the wh-phrase being clause-final. The first problem that Aboh et al. (2005) encounter with this analysis is that 'it is not clear what specifier position remnant IP movement targets' (Aboh et al., 2005, p. 29). The second concern with regards to this analysis is that NMMs are not accounted for in a straightforward way. When a NMM is just over the G-WH, the spread can be accounted for through Spec-Head agreement. However, when trying to account for the spread over the whole sentence it becomes more challenging, as once the TP is moved it falls out of the c-command domain of C°[29]. This is illustrated in **Error! Reference source not found.**.

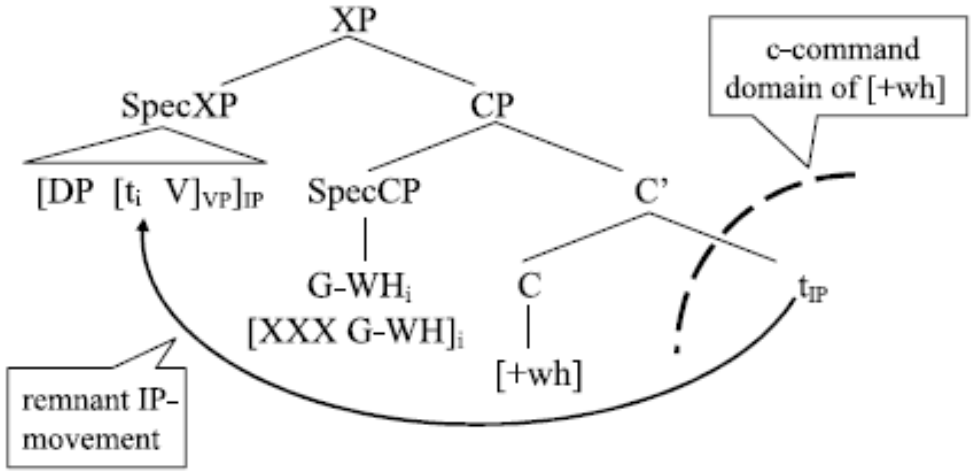


Figure 2.26: Leftward wh-movement in IndSL

(IndSL)
(Aboh et al., 2005, p. 28)

Aboh et al. (2005) find a rightward analysis to be more appealing for IndSL and apply one similar to that of Neidle et al. (2008). As seen in *Figure 2.26* the positioning of the G-WH sign strictly in the right periphery poses a serious concern regarding the idea of a leftward Spec, CP. In the rightward analysis, by having the Spec, CP on the right, a straightforward application of wh-movement is applied to accommodate the clause-final wh-element. This movement is illustrated in **Error! Reference source not found.**.

[29] For more information on why the leftward analysis cannot be applied to IndSL see Aboh, Pfau & Zeshan (2005, p. 28 – 29).

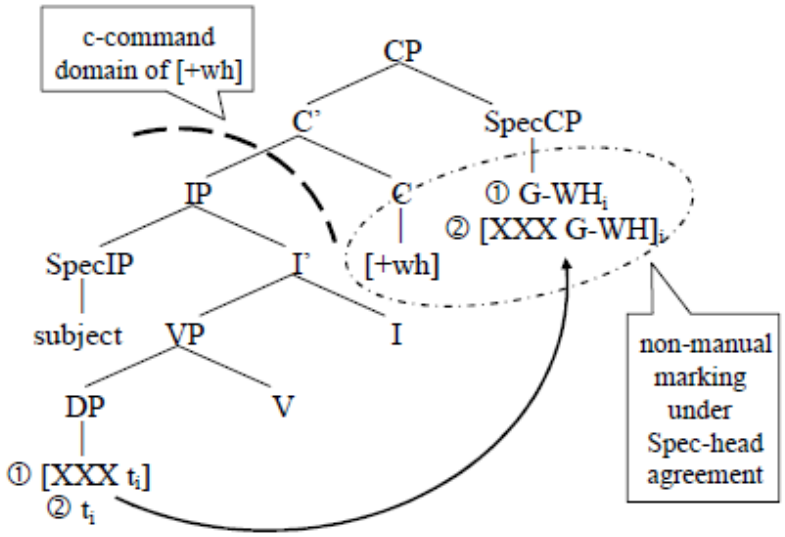


Figure 2.27: Rightward wh-movement in IndSL

(IndSL)
(Aboh et al., 2005, p. 26)

The spread of the NMMs is thus easily captured. Spec-Head agreement accounts for the spread over just the G-WH, and the spread over the entire sentence is accounted for through the c-command domain.

However, when we consider sentence-final complex wh-expressions, the explanation of NMMs is less obvious. Consider (91) which contains a complex wh-expression (PLACE G-WH):

(91) [INDEX2 FRIEND ti SLEEP [þwh]C [**PLACE G-WH**]i]CP
'Where does your friend sleep?

(IndSL)
(Aboh et al., 2005, p.26)

In this example, we would expect the NMM to spread over the whole wh-phrase in C°. However, this is not the case in IndSL, as shown by the grammaticality of (91). This is a problem for Aboh et al's (2005) analysis, but one way of solving it is to consider G-WH as a question particle.

In the following section, I report on evidence that Aboh et al. (2005) provide to show that although the G-WH sign can be analysed as a wh-phrase, it is better analysed as a 'clause typing morpheme that encodes the interrogative feature in wh-questions' (2005, p. 30).

2.8.2. G-WH as a question particle

Aboh et al. (2005) draw on Lele (an SVO East Chadic language) as an example of a language that uses a question particle. In Lele, there is a question particle, *gá*, that appears in both wh-questions and in yes/no questions. In the case of wh-questions, this question particle is found in the sentence-final position *along* with a wh-phrase that can be found in situ (92) or in the sentence-initial position (93). In Lele, wh-phrases are fronted due to *focusing* and are focus marked by the focus particle *ba.*

(92) Mé áy **wéy gá**?
2sG[F] marry **who INTER**
'Who did you marry?'

(93) **Wéy** ba é **gá**?
who FM go **INTER**
'Who went away?'

(Lele)
(Aboh et al., 2005, p. 30)

Aboh et al. (2005) assume this same characterisation in IndSL. However, where Lele makes use of overt wh-phrases, IndSL makes use of null wh-phrases (as illustrated below in (95)) with the G-WH particle in the clause-final position.

(94) FATHER INDEX$_3$ SEARCH <what> **G-WH**
'What is/was father searching?'

(IndSL)
(Aboh et al., 2005, p. 31)

IndSL, like many sign languages, makes use of null arguments in other contexts. However, it places a restriction that the use of null arguments is only permitted when the argument is recoverable from the context. Aboh et al. (2005) thus state that 'where the silent <wh> cannot be identified from discourse, IndSL resorts to wh-questions where the questioned argument or adjunct is overtly realised by the sign FACE, PLACE, NUMBER, or TIME' (Aboh et al., 2005, p. 31). These signs are called wh/pronominal elements.

Returning to the G-WH particle, Aboh et al. (2005) show that this particle functions as a head[30] and is associated with the wh-NMM. By this analysis, the spread of the NMMs is licenced by Spec-Head agreement.

With this information it is possible to consider the first account given by Aboh et al. (2005) of the syntax of wh-questions, with G-WH as a particle.

2.8.3. Head-final analysis of G-WH particle

In their analysis, Aboh et al. (2005) assume that IndSL is a head-final language where heads appear to the right of their complements, represented in **Error! Reference source not found.**. The G-WH is realised in the head of InterP as it is associated with the interrogative feature. To account for constructions where the G-WH particle is used, they assume that G-WH is base-generated in the head of InterP and that the null wh-pronominal element proposed in the previous section remains in situ. However, in order to check the [WH] features it moves from its base position to the specifier of InterP, where it is licensed under Spec-Head agreement. Thus, they propose that this movement must take place at the LF. In cases where the wh/pronominal is **overt** and in situ, the exact same derivation takes place where the overt wh/pronominal moves at LF (see **Error! Reference source not found.**). Again, when the NMM is over the G-WH, its spread is accurately captured through Spec-Head agreement.

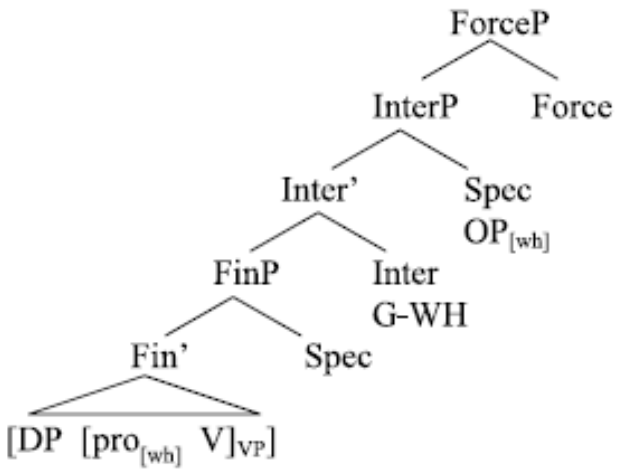
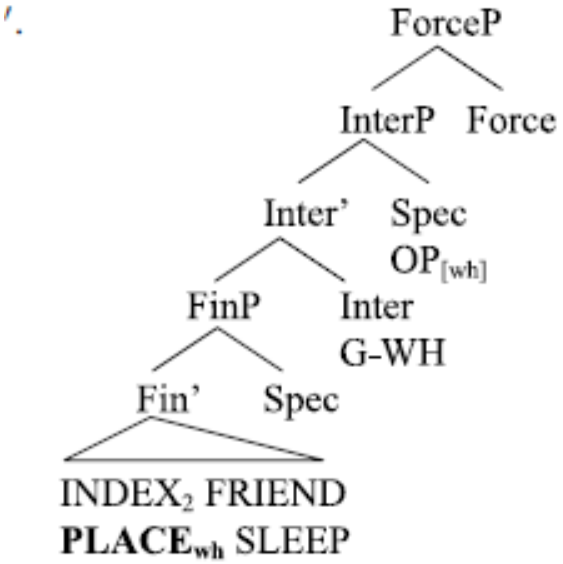


Figure 2.28: Basic head-final structure in IndSL

(IndSL)

[30] For the full argument see Aboh, Pfau & Zeshan (2005, p. 32).

(Aboh et al., 2005, p. 33)

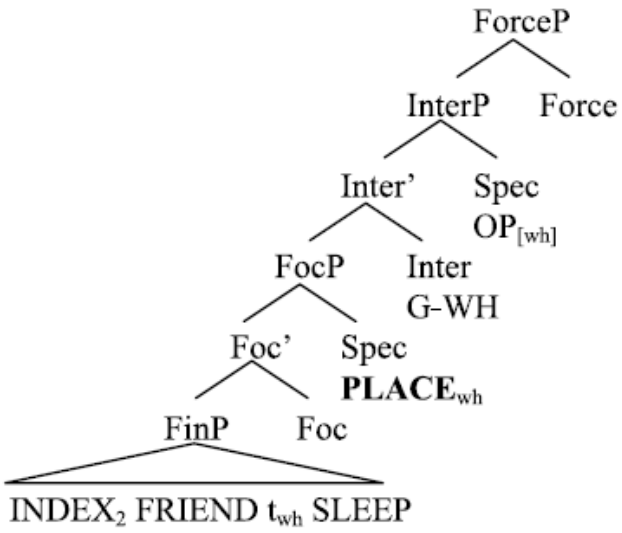


INDEX2 FRIEND [PLACE] SLEEP G-WH
'Where does your friend sleep?'

Figure 2.29: Particle analysis in IndSL

(IndSL)
(Aboh et al., 2005, p. 34)

Finally, in cases where the wh/pronominal moves, it moves for focusing reasons (*recall the discussion on* Lele in Section 2.8.2). Thus, it moves to the focus projection FocP (see **Error! Reference source not found.**). This derivation is able to account for instances where the NMM is over just the G-WH and not the wh/pronominal (which was problematic for the rightward wh-phrase analysis). When Aboh et al. (2005) consider the analysis discussed here, they do not make reference to the scope of the NMM over the whole sentence; however, this can easily be accounted for by the c-command domain of Inter°.



INDEX$_2$ FRIEND t_i SLEEP [PLACE]$_i$ G-WH
'Where does your friend sleep?'

Figure 2.30: Focused constituents in IndSL

(IndSL)
(Aboh et al., 2005, p. 34)

It is clear that this rightward analysis can account for the structures found in IndSL. However, the conceptual shortcomings[31] of a rightward specifier analysis cause Aboh et al. (2005) to consider the alternative perspective of head-initial analysis of G-WH.

[31] For more information on these conceptual shortcomings see Aboh, Pfau & Zeshan (2005, p. 35).

2.8.4. Head-initial analysis of G-WH

Aboh et al. (2005) assume Kayne's (1994) specifier-head-complement-structure as shown in **Error! Reference source not found.**.

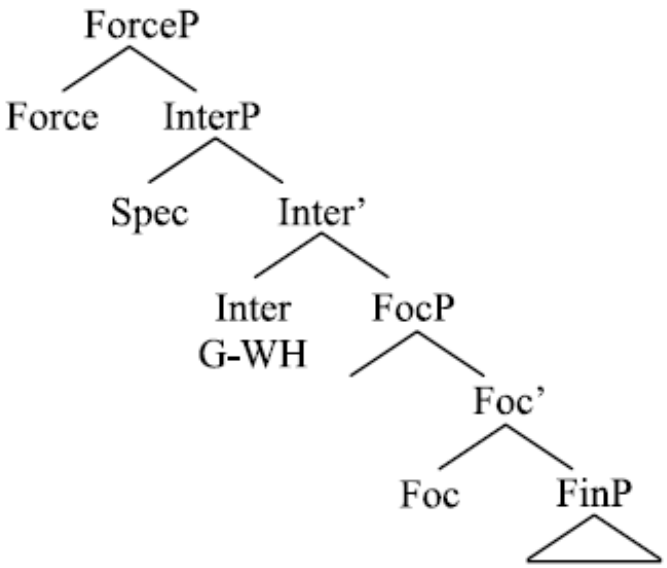


Figure 2.31: Head-initial analysis of G-WH

(IndSL)
(Aboh et al., 2005, p. 35)

To account for the constructions where an overt wh/pronominal stays in situ, Aboh et al. (2005) posit that the Spec, FocP 'hosts a null operator that binds the null wh/pronominal element inside the proposition' (Aboh et al., 2005, p. 35). Next, InterP forces the movement of the proposition to Spec, InterP due to clause typing. This is the result of Inter° having strong Extended Projection Principal features that are checked by the moved proposition that, in this case, includes the focus projection. This is represented in **Error! Reference source not found.**. Aboh et al. (2005) add that overt in situ constructions are regarded, semantically, as focus-neutral.

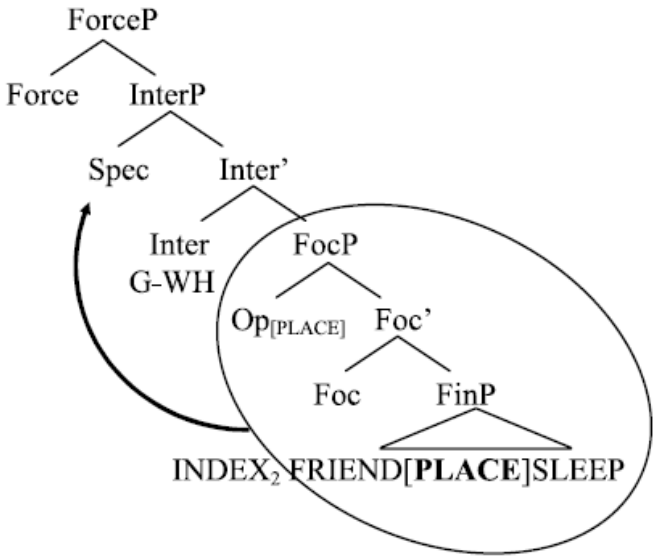


Figure 2.32: Focused analysis of G-WH

(IndSL)
(Aboh et al., 2005, p. 36)

Finally, the scope of the NMM in this account is similar to that in the rightward wh-phrase analysis where the spreading inside InterP could select just the head or the whole FocP that raised to Spec, InterP.

Finally, Aboh et al. (2005) consider constructions where the overt wh/pronominal has moved. As seen in the previous account, these wh/pronominals moved for focusing reasons. Thus, the first transformation moves the wh/pronominal to Spec, FocP to check the focus features. The Inter° triggers the movement of the phrase in Spec, FocP to Spec, CP to check the strong EPP features. Finally, Aboh et al. (2005) posit 'that movement through SpecFocP triggers movement of the remnant FocP past SpecInterP to a higher position, say SpecTopP'[32]. This is illustrated in **Error! Reference source not found.**. Their analysis is able to show the distinction between neutral wh-questions (in situ) and emphatic wh-questions (which use the wh/pronominals PLACE, TIME or NUMBER).

[32] Aboh et al. (2005, p. 36) note that 'At this stage of the discussion, it is not clear whether this last step of the movement is triggered by an attracting feature under a higher probe (e.g. Top) or whether it is contingent on movement of the PLACE/TIME/NUMBER expression through SpecFocP'.

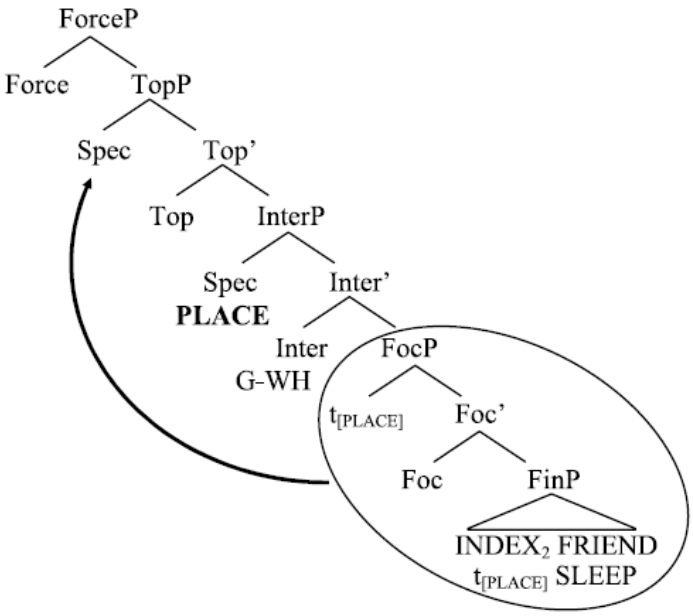


Figure 2.33: Emphatic wh-questions in IndSL

(IndSL)
(Aboh et al., 2005, p. 37)

The concern with this analysis is that it predicts that the NMMs cannot scope over the entire sentence, as the FocP constituents move to a position higher than InterP. However, there is data in IndSL to show that Topics fall outside the scope of clause-typing NMMs, though Aboh et al. (2005) do comment that further study is needed to confirm the spreading patterns in these contexts. The obvious benefit of this analysis is its conformity to structures that have been founded in spoken language literature.

2.8.5. Conclusion

In this section, I have examined various analyses of IndSL. According to Aboh et al. (2005), the wh-sign in IndSL is better analysed as a particle than as a wh-phrase (see Section 2.8.2). This is based on evidence from instances where complex wh-phrases were used. I considered two analyses of this particle, one in which there was movement to a rightward Spec, InterP and another where the Spec, InterP was linearized to the left. Both analyses were able to account for the constructions found in IndSL. However, the pattern that keeps emerging is that the rightward, Spec, CP can more elegantly account for the data.

Included in the SASL data, there was a sign that had the possible appearance of a wh-particle. This sign was produced using a B-Hand Shape where the palm faces downwards, and the hand is then rotated upwards so the B-hand shape finishes with the palm facing

upward (see Section 3.4.1). This sign was found exclusively in the clause final position. Using the criteria set out in the Aboh et al. (2005) analysis and the data collected in this study, I do not believe that this sign had the same function as a true wh-particle. However, this is an area that requires more SASL data if a deeper analysis is to be drawn.

2.9. Summary

In this chapter, I have highlighted the key components needed to understand wh-question formation. In Section 2.2, I examined spoken language theories. I began by considering the development of generative grammar approaches to wh-question formation. Wh-constructions have a set of features that label the clause as interrogative. This [WH] feature is found in the head of a functional projection. Constituents with matching features move into the Specifier position. Once in this local checking configuration, features can be checked through Spec-Head agreement in the complementizer Phrase.

In some languages, like English, this movement is overt, meaning that the move operations happen before SPELL OUT. However, there are sets of languages that appear to leave their question words in situ (or in the base position) which would then violate the feature-checking rules. In order to accommodate this, certain researchers have proposed that feature-checking happens after SPELL OUT. That is, the constituents move to check the features after they have been mapped out to the PF. I explored evidence from subjacency and islands which supports this claim.

In Section 2.3, I introduced the two main components of sign language question formation – manual signs and NMMs. Manual signs resemble wh-words in spoken language and are produced using the hands. Sign languages may vary with regard to the number of wh-signs that they use, the manner/form in which they are produced, the positions in which they are found in sentences. The position of a wh-sign is of the greatest interest. In sign languages, the wh-sign may be found in situ, in the left periphery or in the right periphery, or it may be doubled. In contrast to spoken languages, the majority of sign languages place the wh-sign in the right periphery. NMMs are signs produced with the face and body. They are unique to sign languages and play an important grammatical role. NMMs may differ in the forms they take; however, the greatest area of interest is their scope across other manual constituents.

Having explained these basic components, in Section 2.4, I provided a brief introduction to the literature on SASL. Most of the SASL research thus far has focused on language policy. The few formal linguistics studies that have been done have been mainly descriptive.

In Section 2.5, I focused on ASL, which is the sign language that has received the most attention from linguistic researchers. I explored the two analyses available for ASL. The first is that of Petronio & Lillo-Martin (1997). In their analysis they posit a leftward specifier and a final rightward C°. On the other hand, Neidle et al. (1998) posit a structure where Spec, CP is on the right. Both analyses are able to capture the patterns in ASL, though there are concerns with each of them.

I then considered, In Section 2.6, analyses of two other sign languages: Brazilian Sign Language (LSB) (Nunes & de Quadros, 2006) which follows the leftward facing Spec-CP, and Italian Sign Language (LIS) (Cecchetto et al., 2009), which follows the rightward-facing Spec, CP. The obvious advantage of having the leftward branching Spec, CP is that it conforms to the structure attested to in spoken languages. However, with so many sign languages selecting the right periphery one must ask why sign languages overwhelmingly make use of this position. Cecchetto et al. (2009) provide an explanation relating to the spreading of NMMs to account for this phenomenon.

In Section 2.7 considered two under-studied sign languages, Turkish Sign Language (TID) (İşsever & Makaroğlu, 2013) and Croatian Sign Language (HJZ) (Kuhn & Wilbur, 2006) to elucidate the contribution that they have made to the literature.

Finally, in Section 2.8 I examined the particle analysis used to explain the G-WH in IndSL (Aboh et al., 2005). This analysis offered a different perspective on the analysis of wh-signs. However, even within this analysis it is unclear whether the leftward Spec, CP or the rightward Spec, CP offers a better description for wh-particles.

2.10. Conclusion

In this chapter I have highlighted the need for more data to be collected on wh-question formation in sign languages. Research done on sign languages such as ASL, LIS and LSB has been instrumental in setting a foundation for further research. This is evidenced by the application of these analyses in the study of other sign languages such as TID, HJZ and IndSL.

What is clear is that there is a relative lack of African sign language data. This severely undermines the claims of others, particularly relating to the typology of wh-question formation in sign languages.

Filling the African sign language data gap is the first of two main “cores” of this research, and is clearly a necessary step - not only in increasing our understanding of sign languages, but also in testing the robustness of current linguistic theory.

The second core element of this thesis is ensuring the integrity of the SASL data that I collected. In the ASL literature, most of the discrepancies in the data are the result of conflicting opinions over what is grammatical. The key factors that influence this are the kinds of informants selected, and the methods used to elicit data. I rigorously engage with these factors in my methodology to ensure the validity of my data.

Chapter 3: *Methodology*

A comprehensive methodology is critical to any sign language linguistic research. This is because there are a number of factors that can affect the validity of the data. Some of these concerns are part of linguistic data collection in general – while others are specific to Sign Languages. The main aim of any sign language data collection is to collect a representative sample of data that is free of the use of artificial signing, or undue interference from spoken languages. Signed English is the main form of artificial sign language in South Africa, although the influence of other spoken languages may be present. The concern with artificial signing is that it can greatly affect the word order of a natural sign language - this is usually to mimic the word order, among other aspects, of a particular spoken language(s). For formal linguistic studies that are aimed at capturing the syntax, such as this one, this causes major concerns for the validly of the data. I focus on two components that influence the use of artificial signing. These are the informant selection and the data elicitation methods. These are two factors that are important to bear in mind to ensure that one's data is as free from artificial signing as possible, but there might be factors.

This methodology uses a four-step, multi-layered approach - which aims for recursive refinement of the data that is collected. The goal is to, try and eliminate the artificial forms using different informants and different elicitation methods each time. After each step in this process a preliminary analysis was conducted. This aided in refining the approach used in the following step of data collection and allowed for a recursive refinement of the data for my analysis.

The result must produce a sample of data that is both accurate and valid, but that is also comprehensive enough that generalisations about wh-question constructions in SASL can be drawn.

This section begins by discussing informant selection. It considers what criteria are needed for a good sign language informant. It then discusses how the choices made on informant

selection in this study contributed to the validity of the data. The next section deals with the data elicitation methods. It begins by discussing methods that are problematic because they may prime informants to produce artificial signing. Methods such as elicitation using spoken language are hugely problematic for sign language data - although this is the method most often used for syntactic analyses in spoken language. Naturalistic data, on the other hand, provides a more accurate sample. Naturalistic data is data collected from free signing in a natural discourse setting. Naturalistic data is generally devoid of artificial signing due to the fact that there are fewer factors that induce it. This would make one assume that the correct path to take when collecting data in sign languages – however, it may not produce enough data on the specific area of study. This is the factor that makes it unsuitable for this study as there are only a few instances of wh-questions in any given conversation. A very sizeable amount of naturalistic data would have to be captured and *then still coded* to generate enough analysable samples of wh-question formation to be useful. Moreover, this method does not provide any negative data which is critical to a syntactic study. The section on the data elicitation process (3.3) deals with concerns such as these, among others.

After informant selection and elicitation methods have been discussed in general, the next section begins to outline each step of the data collection process. Based on what has been previously discussed, the motives behind the choices made for each round of data collection are justified.

Finally, the section ends by describing the analytical procedures used at the end of each round. It explores how the final selected sample was analysed and compared to various analyses used for other sign languages to arrive with the proposed analyses for WH-questions in SASL.

3.1. Informant selection

In this section I discuss the factors that must be considered when selecting informants. First I consider the role that age of language acquisition plays and how this may affect the informant and, subsequently, the validity of the data sample. Table 1 summarizes the biographical details of the three informants that were selected.

Table 1: Summary of informants

	Informant A	Informant B	Informant C
Gender	Female	Female	Female
Location	Eastern Cape	Johannesburg	Johannesburg
Hearing status	Hearing	Deaf from birth	Deaf from birth
Deaf family/relatives	Mother	Grandparents, parents, siblings	Grandparents, parents, siblings
Acquisition	At birth from native signer	At birth from native signer	At birth from native signer
Active Participation in rounds	1, 2, 4	3	3

Next, in Section 3.1.2, I show why it is important for an informant to identify with Deaf Culture and how this may affect the data. Finally, I discuss the role of sample size and the pros and cons of elicited data versus naturalistic data.

3.1.1. Age of acquisition

The foremost concern for informant selection is the informant's age of language acquisition. Anderson & Reilly (2002) estimated that up to 90% of Deaf children are born to hearing parents, while in South Africa the Sign Language Education and Development (SLED) have suggested that this may be closer to 95% (Mitchell & Karchmer, 2004). This creates an atypical language acquisition environment where most Deaf children do not receive early exposure to a primary language (spoken or signed). This atypical language acquisition is attributed to the fact that hearing parents cannot expose their children to spoken language and typically do not know a sign language. While some parents may make an effort to learn a sign language variety, they themselves would technically be a second language speaker – this is again atypical as a native speaker usually provides the linguistic input. Conversely, the 5% of deaf children born to Deaf parents will acquire sign languages naturally and these are the best type of informants for any linguistic study on sign languages. These are the informants that I consider to be native speakers.

Numerous studies, such as Nathan, Stackhouse, Goulandris, & Snowling (2004) have shown that adequate stimuli at a young age[33] is paramount to acquiring native like competence – this is typically known as the Critical Period Hypothesis. However, Schools for the Deaf can provide an adequate source of linguistic input that can allow children to develop a status

[33] The exact range of this age is contested but it is widely accepted that it is before puberty.

close to that of a native signer. If a child attends a school for the deaf from a young age, they may be considered as a suitable candidate for this study. However, there are some complications due to the nature of the Deaf schooling system in South Africa. Previously in schools for the Deaf SASL was not regarded as a fully-fledged language. As a result, there was a strong oralist culture where signing was not encouraged by educators (Reagan, 2008). To further complicate the problem, the average Deaf child only starts school at the age of 9 (Katshwa, 2013). Thus, finding candidates who received an adequate amount of input at school to acquire SASL in a natural way is very challenging. However, many studies do make use of these 'late language learners' as at most Deaf schools, learners would have received more SASL input from their peers than from teachers. In other sign language studies, the use of late language learners has been a contentious issue. As we have seen in Section 2.5.2.1, much of the debate around wh-question formation in ASL has been centred on the data discrepancies between Neidle et al. (1998) and Petronio & Lillo-Martin (1997). One criticism that has come from Neidle et al., (1998) is that Petronio & Lillo-Martin (1997) make use of these late learners and native signers – while Neidle et al exclusively uses the latter. In a prior study by Petronio (1991) she noted that sentence-initial wh-objects were generally rejected by native signers of ASL. This finding is consistent with the responses of Neidle et al.'s (2008) native signers. In Petronio & Lillo-Martin (1997) they comment that they found "mixed judgment" when looking at similar constructions. Thus, the result of including these 'later learners' can paint a very different picture for the results - particularly the results of syntactic research.

This methodology aims to build on concerns that De Barros (2013) encountered with using 'late language learners' in her study on negation in SASL. In the study, I found that the late language learners were far more likely to use artificial signing than the native language signers. They were also more easily influenced by the presence of hearing researchers and the use of spoken language. They did not have access to the same linguistic intuitions as the native signers. Finally, they were more influenced by prescriptivism – native signers were able to be more critical about constructions, whereas the late learners tended to agree with everything[34].This is the result of a lack of confidence in their own instincts due the prescriptivism of English.

[34] Note that the prescriptivism tends to be prescriptivism in the direction of English, not natural SASL.

While some researchers consider 'late learners' to be suitable, this study excludes any participants not born to Deaf parents for the reasons mentioned above. The inclusion of late learners may lead to mixed judgements that could possibly cloud the data. Thus, the first step taken to ensure that forms of artificial signing do not occur in the data is selecting only native signers. However, this alone is not enough to fully guarantee an unaffected sample. In addition to age of acquisition, there is a range of sociocultural factors that must be addressed.

3.1.2. Cultural identification

The first is cultural identification. In South Africa there is evidence that a well-established Deaf community has existed for over a century (Reagan & Penn, 1997). Reagan & Penn (1997) comment that evidence for this community includes the existence of Deaf clubs, [Deaf] religious congregations, and both local and national organisations of the Deaf. In all of the abovementioned settings the language primarily used is SASL. Baker-Shenk & Cokely (1980) provide a model of Deaf Culture which illustrates the interaction between different aspects of Deaf Culture. They use four overlapping spheres, Audiological, Social, Political and Linguistic (see *Figure 3.1*). I use this model of Deaf Culture as a criterion for screening informants. I will show that having an informant that is immersed in Deaf Culture is more reliable.

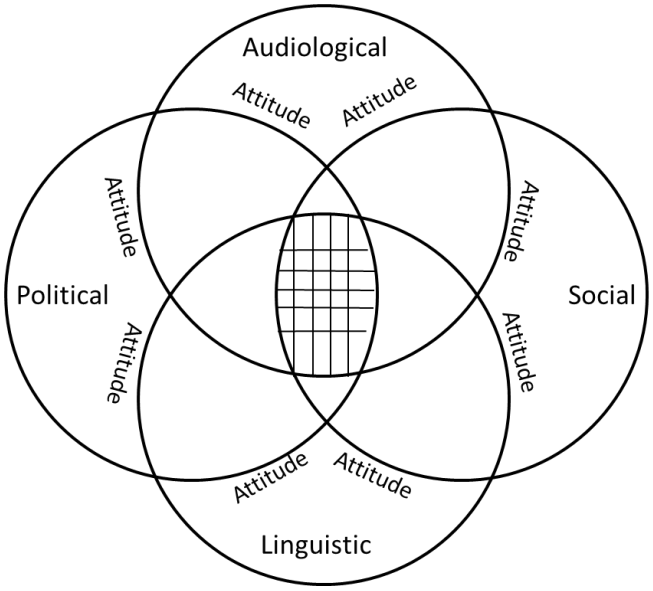


Figure 3.1: Deaf Culture model adapted from Baker, Shenk and Cokely (1980)

The first point, the audiological sphere, is clear: generally, one must have hearing loss to enter the Deaf community. However, this 'hearing loss' exists on a continuum. The 'more

deaf' one is, the closer they are to the inside of the Audiological sphere - this sphere works on a scale. A person should have an active role in the Deaf community to fall into the social sphere: this could include being a part of a Deaf church or sports club, marrying a Deaf person, going to Deaf club events and so on. The political sphere entails that a person should advocate for Deaf rights and the use of sign language. It is also thought of as the extent to which a person holds power in the Deaf community. Finally, the linguistic component is thought to be the most important. According to Reagan & Penn (1997), for the Deaf community the use of a *natural sign language* as one's vernacular is a main factor for community membership. A person's attitude towards their natural sign language should be positive and they should support the use of sign language as the primary means of communication.

The more involved one is in each of these spheres, the more of a core member of the Deaf community one is; the less involved one is, the more peripheral one is. To take the audiological sphere as an example, this explains why profoundly Deaf people are more easily accepted into the Deaf community than hard-of-hearing people, or hearing people who happen to have plenty of interaction with Deaf people

Selecting participants with a strong Deaf cultural identification increases the chance of having users that make use of natural signing. They are exposed to natural forms in their day-to-day interactions with other individuals who pride themselves on using SASL. Having informants who are a part of the Deaf community becomes more important when considering the current status of SASL in South Africa. SASL is a minority language in South Africa and as a result, the language attitudes of both Deaf and hearing people associated with SASL are not always positive. Many people still view sign languages as inferior to spoken languages. As a result, some signers avoid using authentic forms of sign language, instead, favouring forms that resemble spoken languages, such as English. For example, signers would use forms resembling spoken language more *in formal contexts* (Deuchar, 2013). In academic situations, this can occur more frequently as spoken languages are viewed as more prestigious or more suitable for academia than signed languages. Participants who have a strong cultural identification with the Deaf community, specifically in the political and social spheres, and participants who strongly identify with the Deaf

community are more likely to attach prestige to using natural sign languages, and so are more likely to use them in a data collection situation.

While the abovementioned variables have all been accounted for, there are factors such as age, race, gender and location that could not be considered for the present study due to limited resources. A number of papers cite that these factors do result in language variation (Senghas & Monaghan, 2002; Lucas, 2013). Moreover, two of the selected informants are related, which could result in the data reflecting their idiolect or at least certain signs and structures peculiar to their own family. On the other hand, this is unlikely because they are both well-educated, hold SASL in high prestige, have linguistic awareness and knew that I was trying to arrive at an accurate description of SASL syntax.

However, again given the scarcity of the literature available on the subject, this study has aimed to provide a foundation which further research can build on. The main concern of this methodology is capturing an accurate sample of SASL in which other variables can reliably be tested.

3.1.3. Sample size

The sample size was mostly determined by the availability of suitable candidates. Given the very small percentage of people born to Deaf parents along with the strict criteria that this methodology has aimed to follow, the number of participants was narrowed down to three. Although a larger sample size would increase the validity of the results, there are several advantages to keeping the sample size smaller. The first, mentioned in the previous section, is that dialectal and regional difference might introduce too many variables into this initial stage of research into SASL. By working with a small set of informants, these differences were kept to a minimum. It allowed patterns to be easily identified and provides the first foundation for further studies to test more variables.

The second is that traditional syntactic methodologies have relied on a small set of native speakers. In this sense, this methodology aligns itself with theory that holds that individual informants' native speaker intuitions can be trusted. Moreover, as we will see, the traditional elicitation process used in syntactic research is adapted in light of the specific concerns relating to sign language data collection to provide an impression of the syntax of wh-questions in SASL.

3.2. Elicited data versus naturalistic data

Naturalistic data in sign languages comes from natural conversation between two native signers. This has been found to greatly reduce the amount of artificial signing in a sample. For sign languages, there are more complications than there would be for collecting a naturalistic sample in spoken language. In naturalistic spoken language data collection, a small audio recording device can be placed in the room with the possibility that participants may begin to become unaware of its presence as they speak; this in turn leads to good naturalistic data. However, for sign language data collection, the use of video cameras means that participants have to be restricted to a particular area and variables such as backgrounds, camera placement and lighting have to be manipulated. This does create an artificial environment, which is not ideal for collecting naturalistic samples. There are alternatives to the 'staged' naturalistic environment where speech events, such as church sermons, could be recorded. Again, this particular kind of dialogue would still not reflect naturalistic conversation. Any prepared speech, such as a sermon, will clearly be more formal than spontaneous conversation, and is therefore more likely to incorporate features of artificial signing.

The greatest problem with the idea of collecting naturalistic data for this study is that traditionally syntactic research usually relies on *elicitation* processes to collect data. These elicitation processes are generally used because one needs a very large corpus of naturalistic data to find the syntactic patterns one wishes to study– one would need a very large corpus of naturalistic data to find the sorts of syntactic patterns that one wishes to study, such as wh-questions. Furthermore, to interpret or gloss this information is very time consuming and requires intensive assistance from a Deaf informant or interpreter – for a researcher such as myself who is not fluent in the sign language, all this data would be incredibly challenging instead of just eliciting the information I needed. However, using these data elicitation methods for sign languages is again not as straightforward as it is for spoken languages. The first concern is that the use of any spoken language (as a stimulus) in the data collection process primes participants for the use of artificial signing – this is why the naturalistic data approach has been preferred because it eliminates the need for spoken

language. Therefore, an elicitation English to SASL translation task is not suitable. I have used this method in previous studies (De Barros, 2013) and only a very small percentage of the participants were able to provide authentic translation of English to SASL – the rest of the participants were influenced by the use of English and this was reflected in the word order and the prevalence of non-manual features. Thus, the use of spoken language stimuli should be minimised at all costs in order to increase the validity of the data.

The presence of a researcher in the elicitation process also has repercussions for the data collection, due to the Observer's Paradox where one cannot observe a process without in some way affecting that process. In the case of this research this could result in informants altering their responses to give the answers that they think the researcher is looking for. Participants who do not hold a strong view of sign languages as prestigious may be prompted to give signed English answers, as English can often be seen as the more prestigious form. Prescriptive views of grammar orienting to spoken-language norms may also play a role in priming artificial forms. Selecting informants with a strong identification with Deaf Culture is a way to combat these issues.

Finally, just having the presence of a hearing researcher can affect the sample. The Deaf are used to accommodating their language, particularly to hearing people. The area that appears to be affected the most is the non-manual markers (NMMs). The NMMs are severely weakened when a hearing researcher is present as these often confuse hearing people or those new to signing. The NMMs are of great importance to the grammar of sign languages, and particularly true of their syntax, and therefore must be accurately captured in the sample.

There are several advantages to data elicitation methods that must be discussed. The first is that it allows the researcher to probe for specific forms. It then allows the researcher to manipulate these forms, testing what is grammatical. This results in negative evidence, which is an important element of a syntactic analysis. Finally, it allows the researcher to have access to the linguistic intuitions of the informants.

Given these considerations, the use of data elicitation methods in sign language research has to be carefully thought out. The syntactic nature of this research and the practicalities, for the research in particular, are more fitted to an elicited data approach. With careful

consideration of each of the abovementioned point, a focused and reliable impression of the syntax of wh-question formation in SASL can be captured. There are various elicitation procedures that have been used to collect data, for example the role-play tasks or the corpus- based 'interview task' used by Branchini, Cardinaletti, Cecchetto, Donati, & Geraci (2013). In the following section (3.3) I outline my method of data collection. I believe it provides an analysable sample of SASL, from which intuitions about the language can be drawn as my method promotes the use of as little spoken/written language as possible (by eliminating prompt cards or worksheets etc.). It uses speaker-to-speaker interaction which elicits the standard linguistic variants used by the community and finally, it allows access to a closed community which promotes an environment where signers can be critical of each other's constructions. By the signers critiquing each other, it allows for the possibility of ungrammatical forms that may arise due to the elicitation procedure to be screened. This provides an additional measure to ensure that the sample collected is accurate and representative.

3.3. Outline of method

The method for the data collection uses a four-step multi-layered approach. I also carefully selected informants so that they, for each stage, provide the most suitable and reliable data. The following section begins by describing the selected informants, before moving on to each step in the data collection process.

Round 1: Wh-questionnaire
Round 2: Interview
Round 3: Focus Group
Round 4: Translation

Due to the visual nature of sign language, the only way in which to record data was through videotaping and, given the importance of the face in sign language linguistic data, it is impossible to preserve the participant's anonymity. This ethical consideration was attended to before any of the data collection began. The informants all needed to provide consent that they were willing for their faces to be shown in the figures reproduced in this thesis and any subsequent publications that may arise. All the informants were given a consent form (see Appendix 2) that was given to a professional interpreter to translate into SASL. This was recorded on video and played to the informants before the session began. This was to

ensure that they fully understood the obligations they would have to fulfil before any tasks were undertaken.

3.3.1. Round 1: English to SASL translation task

The first round of data collection involved an English-to-SASL translation task elicited by a hearing researcher. Although this particular kind of task usually poses problems for sign language data collection (see Section 3.2), this data formed part of a foundation that would be further refined in the subsequent rounds. It also required a specialised informant given that it contained a translation task: the informant would need to be fluent in both English and SASL.

Informant A was used for the first session of data collection. She was born hearing, but to Deaf parents making her a Child of a Deaf Adult (CODA). As a result she acquired SASL as her primary language but is also fluent in English. So although she does not fit the criteria of 'hearing loss' per se, her access to native fluency makes up for it in this regard. Informant A grew up in the Eastern Cape, but has travelled and interpreted across a number of regions in South Africa. As a result, she knows a wide variety of regional dialects of SASL. Informant A is active in both the political and social spheres of Deaf Culture. She has an active role in the Deaf community and works with several Deaf organisations. She is also a well-known accredited SASL interpreter that has translated for a number of signers across the country and in several settings. This gives her unique insights and a range of metalinguistic knowledge. The unique qualities of Informant A are vital for this stage of the elicitation task as the hearing researcher was able to access her linguistic knowledge.

The translation task was based on a 100-item WH Questionnaire (Appendix 1). The lack of literature on SASL wh-questions meant that the questionnaire focused on a broad range of wh-constructions. The types of constructions elicited included:

1. Subject/object wh- questions: *Who saw the boy? / What did the girl get for her birthday?*
2. Indirect/direct object constructions: *Who did you give the oranges to? / What did you give your sister?*
3. Wh-constructions involving reciprocal verbs: *Who did we sign to?*
4. Locative wh-constructions: *Where was the President born?*

5. Temporal wh-constructions: *When are you going on holiday?*
6. Manner wh-constructions: *How does the baker make his chocolate cake?*
7. 'why'/'which'/'how many' wh-constructions: *Why is it always so hot in February? / Which student arrived late? / How many guests are invited?*
8. Surprise questions*: A: The man sold the house. B: He did WHAT?*
9. Embedded questions: *Who did John say that Mary kissed?*

The vocabulary used in the questionnaire was kept simple to make translation easier. The questionnaire was administered in English by the hearing researcher. The researcher read out each item in the questionnaire and Informant A was asked to translate the questions into SASL. The data collection was set up in an empty room with the researcher and informant. The informant was seated in front of the video camera with the researcher seated next to it (see *Figure 3.2*).

Figure 3.2: Round 1 data collection setup

The responses were video-recorded on a continuous loop to capture any discussion between responses and any mistakes that the informant corrected. Once the session was complete, the video was edited so that each response appeared on a single clip, making it easier to analyse. Each response was then glossed and tabulated where the following specific features were recorded: type of Wh-Question, placement of the wh-sign, the type of non-manual feature used, scope of non-manual feature, additional features and a final column for additional comments. Once the data was sorted, general patterns were inferred from the tabulated data.

One area where an unexpected challenge arose was in the way some of the English sentences in the data were structured. The participant found it difficult to translate sentences with do-support, which is understandable considering that SASL does not make use of this feature. Another area where translation challenges arose was with the semantics of some verbs. In sentences such as “how did the man chop?” the verb ‘chop’ could not be straightforwardly translated. This is because in sign language many verbs are signed to match the action which they are describing- in other words the verb selected as a translation of an English verb depends on the direct object of the verb. In the above example the sign used for chopping a tree is different from that used for chopping a carrot. More information had to be provided for the sentences to be translated, e.g. “how did the man chop the tree?” While both these factors did not affect the sample in a negative way, they are factors that should be considered in future methodologies as areas to be clarified, or in the case of do-support, to be avoided.

As expected, the elicitation approach had limitations that were reflected in the data generated from this approach. The first area I expected to be affected was the Non-Manual Markers (NMM). The scope of NMMs was very challenging to code as they were not always clearly defined on the face. In some cases, it was difficult to identify any NMM at all, even though we know that the absence of an NMM is ungrammatical. The difficulty in coding may have also been the result of the researcher not being a first language speaker of SASL. Like tonal languages where intonation is difficult to distinguish for non-native speakers, the same can be said for sign languages and NMMs. However, it was expected that the presence of a hearing researcher would be a variable that would affect the strength of NMMs. The second area where the influence of the English stimuli was expected was word order. In the first round of data collection, the placement of the wh-sign varied greatly with sentence-initial, in situ and sentence-final-placements. Although the right periphery/sentence-final position was preferred, there appeared to be no explanation or pattern emerging to differentiate the alternative positions. However, I later show that this right periphery/sentence-final position was the only place where the wh-word is found in pure SASL is word-final position.

There were two unexpected results that arose in this data collection session. The first was that a different NMM appeared to what was expected. This was described as the ‘eyebrow

raise' NMM. This appeared to be unusual as the majority of sign languages make use of a 'frown' NMM to represent wh-questions. In the SASL data from the first round, the use of both these NMMs was present. I show in Section 4.2 that the 'eyebrow raise' NMM is only used in particular contexts and that the 'frown' NMM is the main NMM used in wh-question formation.

The second unexpected result was that Informant A also made use of an unusual 'open hand' gesture that would follow a wh-sign. It is labelled as a gesture here as I later go on to show (see Section 4.1) that it did not possess any grammatical function – and was a feature of her idiolect[35].

There were also several positions that the wh-sign could be found in in round 1 (sentence-initial, sentence-final, possible in situ, no wh-sign). However, I go on to show that there is only one placement where the wh-sign can move to *clause-final.*

Without further data, I would not have been able to explain or refine my arguments surrounding these initial patterns picked up from the data. Thus, the data collected at this stage, without further recursive refinement of the dataset, would be of no use because it does not provide an accurate impression of wh-question formation in SASL.

In the second round of data collection these areas of concern and interest were further investigated in an interview/elicitation task.

3.3.2. Round 2: Interview

A set of follow up questions was drawn up once the data had gone through a preliminary analysis. It focused on the areas where both expected and unexpected variation had occurred. The aim of this session was to try to access Informant A's linguistic intuitions to better understand the nature of Wh-questions in SASL. The interview was set up in the same environment as the first session, but occurring a week later. Again, the researcher used spoken language (English) and asked the informant to translate these sentences (see *Figure 3.3*).

[35] It should be noted that there was very little data for the 'open hand' gesture and that the claims made here, are based on this limited data as well as from the insights of informants B & C. Thus, I make a tentative claim that requires more data to make a firmer conclusion.

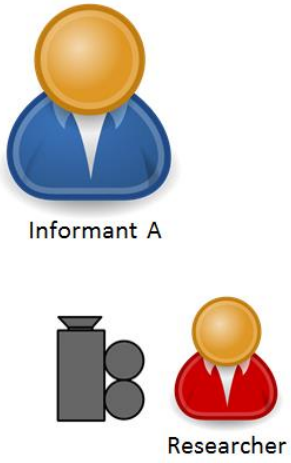


Figure 3.3: Round 2 data collection setup

The first area that the interview centred around was the placement of the wh-sign. The informant was first asked to sign a number of sentences from the previous session where the wh-sign was placed in a position other than the right periphery. Interestingly, in these conditions the placement of the wh-words occurred in the right periphery despite having appeared in other positions in the prior session. The researcher then manipulated the position of the wh-sign, asking the informant to try to sign the sentence even if they thought it was ungrammatical. This was an important element of the interview session as it allowed for the collection of negative data. This negative data would form an important part of the third session and the syntactic analysis. All the data collected was tabulated and uses the same criteria as round 1.

The informant was also asked to discuss the different NMMs that were used. Again, the informant was asked to sign sentences where the 'eyebrow raise' had been used. This received mixed results as some sentences kept the original form while others were changed to the 'frown'. Initially, the informant had not realised that she had used the 'eyebrow raise' in some of the constructions. When the informant was asked to comment on why she had used a particular construction over another, she was unable to provide a straightforward answer. She did mention that context had a role to play but was unsure what that context might be. This is not unusual as people often make linguistic choices that they are unaware of. She did offer one comment on a construction where she was asked to sign with the eyebrows up and said that she felt like she 'was signing to a child'. This information was enough to make a tentative inference about the nature of the 'eyebrow raise' in SASL (see Section 4.1). Finally, the informant was asked to comment on the 'open hand gesture' that

was used in conjunction with the wh-sign. She was unaware that she had used the gesture and was unsure of what its possible use and meaning could be.

Rounds 1 and 2 both provided crucial data for the analysis of wh-questions in SASL. The aim was to provide the first, generalised picture of the placement of the wh-signs and the NMMs that accompanied them. However, while some of these variables were addressed, the elicitation method has downfalls that make the data unsatisfactory for the final analysis. The use of the hearing researcher and the use of spoken language both need to be eliminated if the sample of data is to be considered valid and reliable. Moreover, there are concerns about only using a single informant. A further criticism is that Informant A is not Deaf, although SASL is her first language.

The third round of the data collection overcomes these difficulties by using two Deaf informants in a focus group setting.

3.3.3. Round 3: Focus group and acceptability judgements

The third session of data collection was an important step to ensure the validity of the data. In this round, two new informants were introduced. Informants B and C are sisters who were born Deaf to Deaf parents. Both informants were born and grew up in Gauteng, Johannesburg. Informants that fit these criteria are challenging to find but are vital to this kind of research. Having been born Deaf and exposed to SASL at the earliest stage possible, we can assume that these informants will have the best kind of native speaker competency. They both strongly identify with and advocate Deaf culture and are also active in the political and social spheres of the Deaf community (See Section 3.1.2). Informant B also has experience in teaching SASL and is currently studying towards her Honours degree in sign language linguistics. This gives her possible extra meta-linguistic knowledge. The data collection took place at Informant C's house. This venue was chosen because it is an environment where SASL is exclusively used and where both the informants would feel comfortable. The aim was to move away from a 'formal research setting' where external (hearing) norms would be more likely to be imposed. The some of the drawbacks of using both informants (B and C) is that they are related, which limits the sample representivity and that they may also have been drawing on their own idiolects or special language developed in their own family. I believe that these two informants, given their background and skills, will give the most valid and reliable data. A feature that increases the

representivity of the research and the likelihood of their using generally-used SASL is the fact that they were commenting on the signing of Informant A. As long as the data is valid and reliable, future research will be able to test other variables.

For this round of data collection, Informants B and C were asked to make 'indirect grammaticality judgments' on 40 selected video clips from the previous two rounds. Cornips & Jongenburger (2001) discuss that direct grammaticality judgements are often problematic as they promote false responses. Labov (1996) comments that using direct grammatical judgments often leads the informants to use a variant they believe to be more prestigious or 'correct' rather than the variety that they actually use. This concern becomes even more evident for sign language where "signed English" is often seen as the more correct or prestige form over "natural SASL"[36]. Cornips & Jongenburger (2001) suggest that indirect grammatically judgements should be used when studying variation or minority languages. For the indirect grammaticality judgments elicited in this round of data collection, the informants were asked to consider whether they would sign like this and to whom. In SASL instructions shown earlier to the informants they were asked to consider the following questions, signed by Informant A, about the video clips:

- Does this look like signed English?
- Who would sign like this?
- Who would I sign like this too?
- Where would I sign this (school, at home, to hearing people)?

By giving the informants these points to discuss they were able to share some of their own linguistic insights with each other without the hearing researcher being present. The informants also asked each other questions such as "why would you sign it like that?", "who do you think would sign it like that?" in the discussion time. This provided some comparative naturalistic data. This data was used to check whether the informants were in fact using the forms they were judging to be grammatical.

[36] As pointed out by an anonymous reviewer, prescriptivism can work both ways. It is not always the case that a similarity between a structure in a signed language and corresponding structure in a spoken language is always the result of interference of the spoken language. Moreover, even if a structure in one language results from language contact with another language, this does not necessarily or automatically mean that the structure is not acceptable. There have been instances where signers admit to usually using a form closer to 'artificial signing' in everyday signing but altered their constructs away from this in more formal signing because of the stigma attached to sign language reflecting spoken language. I acknowledge that there may be elements of prescriptivism, as outlined above, in the collected data. However, only with a much bigger sample can a firm claim be made about these kinds of prescriptivism in SASL. Instead I try and examine what trends the collected data shows as a foundation for other research,

The video clips were copied onto a laptop that was shared between the two informants (see *Figure 3.4*).

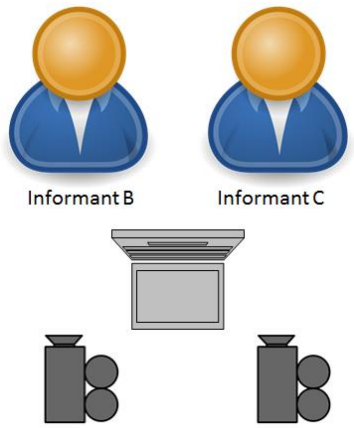


Figure 3.4: Round 3 data collection setup

Two video cameras were used to capture the individual signing space of each informant, which also allowed for more detail to be captured for each signer. The video cameras were synchronised and left recording, much like in the previous rounds. In the beginning of the data collection, Informant B and C were given the consent forms and were also given a translated SASL video explaining what was in the consent forms and instructions on what the research entailed to ensure that they were fully aware of the nature and obligations of this research (see Appendix 2). They also had the option at this stage to use an interpreter via Skype for clarification on questions they might have. They were then given a video clip of the instructions, which were translated into SASL. This was done to make sure that firstly, the instructions were clear, and secondly, to begin to remove any influence of spoken language. Once the informants signalled that they were ready to begin, the hearing researcher left the room. This was the second measure taken to try to remove any spoken language influence. By having the design of the data collection set up in such a way that the researcher did not have to be present, accommodation to the hearing researcher was kept to a minimum and it made the process less intimidating for the informants. This encouraged the informants to share their opinions on the constructions without feeling embarrassed.

In the acceptability judgement task, the clips on the laptop were numerically ordered and the informants were instructed that they should watch the video clips in numerical order and as many times as they needed. Once they had watched each video clip, they were instructed to repeat the sentence exactly as it was signed in the video. They were then

instructed to try and answer the question signed in the video clip. This was done to ensure that they had understood what the question had meant. From there the informants would discuss what, if anything, they thought was wrong with the construction, and they then signed the question the way they thought it should be signed. The clips were structured to investigate three areas of concern raised in the previous rounds of data collection: whether the open hand gesture was obligatory, the status of the 'frown' and 'eyebrow raise' NMMs and the position of the wh-sign.

For the first category, constructions with open hand gestures were edited so that there were contrasting pairs, one version of the sentence without the open hand gesture and other with the open hand gesture present. Because the open hand gesture followed the wh-sign, which was in most cases clause- final, it could be easily edited out. The edited clips and the original sentences were shown together as contrasting pairs. The aim was to see if the informants judged the one construction as being more grammatical than the other. Interestingly, the informants were able to see that one clip of each pair had been edited. They commented that they could see that it had been "cut off". Having this data appearing in contrasting pairs allowed the informants to see clearly what was being tested. In this setting, this was advantageous as the informants then discussed what the significance of the open hand gesture was. Both informants agreed that it was not obligatory and did not fulfil any grammatical function. It was concluded by Informant B and C that the open hand gesture was in fact a feature of Informant A's idiolect. The clips in the first category not only provided information on the open hand gesture, but also provided more information into other areas. One of these was the strength of the NMMs. Both informants agreed that many of the constructions were signed with "weak NMMs". This was likely the result of the hearing researcher being present in the data collection- that is, this was likely the result of Informant A accommodating to the hearing researcher. The informants were able to sign the constructions themselves using the more pronounced NMM that would be expected if signing to a native signer.

Another advantage of beginning the data collection with grammaticality judgements of open hand gestures as contrasting pairs was that the informants could see that not all of the constructions to be shown were signed grammatically. One concern about using Informant A in the clips was that she is well known by both informants (B and C) and has interpreted

for each of them on numerous occasions. There was a concern that the informants were not going to be critical of Informant A's signing for these reasons. However, this was not the case when they discussed the open hand gesture. Both informants were critical, which indicated that they would probably be critical in the other grammaticality judgement tasks too.

In the second category, the position of the wh-sign was tested by using one sentence, "Who saw the boy?" This sentence was chosen because in the second round of data collection it was manipulated by the researcher, where Informant A signed various different positions for the wh-sign in this construction. Seven different combinations, many of them based on patterns in other sign languages, were presented to the informants. This technique is used in syntactic studies as it provides important information on what is not grammatical. The informants were confused by all the constructions with a doubled wh-sign (1).

(1) *BOY <u>WHO SAW WHOwh</u>
'Who saw the boy?'

(SASL)

They were unsure why it would be necessary to have the additional wh-sign and questioned why one would want to sign it that way. In the constructions where the wh-sign was not in the clause-final position the informants agreed that these seemed like signed English. Finally, for constructions where the wh-word was found in the right periphery, both informants agreed that they would sign the question this way, but found the NMMs to be "weak" again. Data from the other categories showed that the informants exclusively selected the right periphery for the placement of wh-signs – and this stage of data collection confirmed this: even when the informants were given other options, they could not think of a context where it would be acceptable to use a wh-sign in any position but on the right periphery.

The final category examined the NMMs. Constructions where the 'eyebrow raise' and the 'frown' had been used were mixed. Some sentences had the exact same word order but different NMMs and these were placed in a random order to see if the informants were able to distinguish a difference when the sentences were presented in isolation. The two NMMs were also placed in contrasting pairs to see if that would make a difference to the way the informants judged the sentences. When the informants first received sentences with the

'eyebrow raise', they immediately corrected it to the 'frown' saying that this felt better for them. After several constructions where the 'eyebrow raise' had been used, the informants began to discuss what the difference between the two NMMs was. Their only comment was that context played a role, but they were unable to elaborate more on this. The use of no NMMs was also tested and this was judged as completely unacceptable each time.

Once these three categories of data collection had been completed, a secondary experimental task was conducted. The setup of the data collection was the same as the previous task with the exception of how the data was presented. In the secondary task the stimulus was written English sentences that the informants were asked to translate. This data collection tried to elicit complex wh-questions where island effects could be seen e.g. (2).

(2) a. The book Asanda read slowly
b. What did Asanda read how?

However, it did involve the use of English sentences. Given the nature of these complex questions, the statement that completed the question was given first and the informants were asked to translate this followed by the complex question. The informants struggled with this task, finding it very challenging. For this reason, this data was not included in the final analysis. In future, these constructions should be elicited in the first round of data collection and then go through the same acceptability judgments as the other data from this round.

Once the data was collected, Informant B and C's videos were edited to a split screen view. This way the conversation between the two informants could easily be followed. The videos were then cut into separate clips, with each clip containing the discussion around one of the constructions tested. One problem that occurred in the editing of the videos was that there was no clear indication of when the signers had moved onto the next video. This was only retrievable by looking at the content of what was being said. In the future, the clips should be marked with a sound or through some sort for gesture to improve the editing process.

The level of sign language in this round was too complex to be coded by just the researcher alone. The metalinguistic nature of the complex discussions that took place meant that a

professional interpreter was needed. Thus, in round four of the data collection, Informant A was asked to translate and also reflect on and evaluate the data from Round 3.

3.3.4. Round 4: Translation and evaluation

The purpose of the final round of data collection was to produce a detailed and accurate transcription of the data from Round 3. The complexity of the discussion required the use of a professional translator. Fortunately, Informant A is a qualified interpreter and has interpreted for both Informant B and C before. An additional benefit of using Informant A in this task is that she was able to reflect on the judgments that Informants B and C made on the constructions she produced in rounds 2 and 3. A final informant was also included in the last round. Informant D was born Deaf to hearing parents, but attended a school for the Deaf at a young age. Thus, Informant D does not fit the definition of a "native speaker" and instead qualifies as a 'late language learner'. He has also been involved in several Deaf organisations as well as in teaching SASL. Informant D was included in this round to see if the data from Round 3 varied from the other informants who had been exposed to sign language from birth. This is particularly important when we reflect on Petronio & Lillo-Martin's (1997) study which used mixed signers that judged certain constructions differently from the native signers used in Neidle et al. (2008).

The two informants were shown the video clips of Informants B and C's focus group. They also had access to the original clips from rounds 1 and 2 as a reference, which was needed in some cases. The researcher was present in this stage of the process to ask the informants any questions or to probe areas that needed further clarification. This round was continuously recorded on a video camera in the same way as the previous rounds. The footage in this session was then later transcribed and any additional constructions were glossed. Through this final cross-checking process, the reliability of the data was increased as much as possible.

One area that was of interest was how the judgments of informant A and D differed from each other. Informant A agreed with the majority of the judgements of Informants B and C. She also offered further clarification on certain statements. For example, when Informant B commented that the NMMs were weak, Informant A responded by saying "my NMMs were weak because I was signing to Courtney [the hearing researcher]". However, Informant D found constructions that were considered to be Signed English by Informants A, B and C as

acceptable, saying that he "could sign it this way". On the other hand, Informant A judged these forms to be incorrect. Examples such as these showed that variation might occur based on the age of SASL acquisition in the informants. Future research should test whether other late language learners of SASL hold the same views as Informant D. This would be able to provide evidence as to whether late learners have *a different set of acceptability judgements* to that of 'native' speakers. This could possibly shed light on why there is so much variability in the ASL data between the findings of Petronio & Lillo-Martin (1997) [who use late language learners] versus Neidle et al. (2008) [who only use native speakers].

3.3.5. Follow-up questions

One concern in the data collection process was that in the third round of data, two constructions were overlooked in the sample – the sentence-initial wh-sign and the doubling wh-sign in the sentence-initial and sentence-final position37. It would have been of interest to have generated some examples containing the above constructions and test them in the third round of acceptability judgements. The sentence-initial wh-sign was only found in a very small number of constructions in round 1 and the specific form of doubling mentioned above was never attested in the data, but is discussed in the literature on other sign languages. It is for this reason that these two constructions needed to be tested. In order to facilitate this, Informant B was sent a small set of video clips containing Informant A signing the aforementioned doubling constructions and constructions with the sentence-initial wh-sign. Informant B was asked to perform the same judgement task as in round three and send back the response. She judged both forms as ungrammatical. While these forms did not receive the same scrutiny as others, their scarcity in the previous samples did not highlight them as areas of focus. However, in order for the analysis to be comprehensive, these follow-up constructions needed to be tested. Future research should test these constructions further to confirm my findings about them.

3.4. Analysis

In my analysis, the first step that was taken was sorting and selecting the data[38] (Section 3.4.1). In this section I outline the process of refining the data through each stage of the

[37] However, the informants were shown instances of doubling with the wh-sign in-situ and in sentence-final position, see section (3.3.3).

[38] It should be noted that while every effort has been made to ensure the sample was accurate, it does not include an instance of wh-question spontaneously produced by a Deaf signer.

data collection process. Once I had a reliable set of data, the next step in the analysis was describing each of the features that were involved in wh-question formation in SASL (Section 3.4.2). Finally, in Section 3.4.3 I describe the steps that I took to formulate my syntactic analysis.

3.4.1. Sorting and selecting data

After each round of data collection, the edited video clips were each transcribed and glossed. These constructions were sorted into the format shown in Table 2 below:

Table 2: Example of collected data

NO		Gloss	WH Position	NMM	Scope of NMM	Type	Additional Comments
2		ARRIVE LATE <u>WHOwh</u>	Right Periphery	Frown	WH Word	Subject WH	Directional Lean used
2		arrive late who					
2		"Who arrived late?					
3	*	<u>WHY HOT FEBRUARYwh</u>	Left Periphery	Frown	Whole Clause	Why Question	Unusual placement of wh-word
3		why hot February					
3		"why is it hot in February"					

The first column in the table denotes the number of each construction. The second column contains the various glosses used for each construction. The first row describing each construction contains an SASL gloss of the sentence – including the scope of the NMM which is indicated by underlining it. Underneath the SASL translation is a more direct translation of the SASL into English. The third and final gloss in the row is the original sentence that was elicited. The third column denotes in which position the wh-sign was found in the sentence. The fourth column describes the NMM and the fifth column captured its scope. The sixth column describes what kind of wh-question was being asked. Finally, an additional column was included for any further comments on a construction.

Once the constructions from round one had been tabulated I was able to examine any general trends. In the first round of data collection there was a clear preference for the right periphery as 68 of the 97 constructions tested had the wh-sign in the clause final position (see Section 3.3.1). However, there was a greater degree of variation between the two

different NMMs with 24 instances of the 'eye brow raise' being used with the remaining 73 comprising of the 'frown' NMM. In round one there was also the use of the open hand gesture which required further investigation. Looking at the trends in the second round (see Section 3.3.2), the placement of the wh-sign occurred exclusively in the right periphery, except for constructions where alternative placements were elicited. The NMMs still varied, as did the possible context linked to their use. Finally, there was still use of the open hand gesture; however, there was again no clear emerging pattern. In the third round, there was again the exclusive use of the right periphery to host the wh-sign and the round 3 signers had a strong preference for the 'frown' NMM, rejecting the 'eyebrow raise'. Using the third and fourth round data, a comprehensive analysis was made based on the collected information.

There were some question types that appeared in the data but were omitted for the final analysis as they were either beyond the scope of this project or did not yield enough data to provide a satisfactory analysis. This included reciprocal verbs, surprise questions and multiple wh-questions. These are areas that need to be considered in SASL's wh-question formation through future research.

3.4.2. Description of wh-constituents and non-manual markers

The first stage of analysis included a basic description of the signs used in the various wh-constructions. This is based on the Liddell & Johnson (1989) Movement-Hold Model currently used to describe signs by looking at areas such as handshape, path movement and signing space. Currently, there is very little available information on wh-constructions and thus this was an important and necessary step in filling the gap in the literature. The wh-signs described were then compared to forms found in other sign languages. This examined not only the way in which the signs looked, but also the size of the question word paradigm. Some sign languages only make use of a small question word paradigm which then affects the way in which they construct wh-questions – however, SASL has a full question word paradigm and thus, is expected to be more closely related to sign languages that share this feature. This is important as much of this analysis relies on comparing other analyses used for similar constructions in other sign languages constructions, testing them to see whether they are adequate for SASL.

The distribution of the NMMs is the driving force in syntactic analyses of wh-questions in sign languages. As we have seen in ASL, the two very different analyses of Petronio & Lillo-Martin (1997) and Neidle et al. (1998) (see Section 2.5.1) are driven by what each believe are the acceptable placements of the wh-signs. The final two rounds of data collection were used to determine what the grammatical distribution of wh-signs in SASL were. However, in order to have a robust analysis the forms that were produced in the first and second round that were judged ungrammatical were also used as *negative evidence*.

The two NMMs also underwent a detailed description. First, a basic description of the two NMMs' physical forms was made before moving on to the scope; that is the signs that the NMM is simultaneously signed with. The different variations of the scope were carefully noted for each construction, as well as scopes that were not permitted. In order to understand the role that the two different NMMs might play, the informants were asked a series of questions in the third and fourth round of data collection (see Section 3.3). The 'frown' NMM has been attested as a primary feature in marking wh-constructions in a number of sign languages (Zeshan, 2006). Based on the patterns drawn from its use in the data collection this appears to be true for SASL too. The 'eyebrow raise', in the context of wh-questions, is less commonly spoken about in the literature. In order to analyse this feature, accounts of its use were taken from other sign languages (see Section **Error! Reference source not found.**) and compared to SASL. There were some similarities between its use in SASL and in the other sign languages described in the literature. Using this as a possible insight into its use, a tentative claim was made about the status of this NMM. However, this analysis focuses on the 'frown' NMM which is reported in the literature as the main NMM associated with wh- question formation in sign languages. In order to uncover the status of the 'frown' NMM, its distribution over other manual signs was closely examined and recorded.

This data was then used in the next stage of the analysis, which aimed to use syntactic theory to explain this phenomenon.

3.4.3. Syntactic analysis

The critical data needed to posit a syntactic analysis were the scope and status of the NMM and the placement options for the wh-words – which are important for reasons discussed below. In order to derive a structure, I compared the analyses of other sign languages that

appeared to have a similar structure to SASL (based on scope and status of NMM and placement options for wh-signs).

The placement of the wh-signs was an obvious starting point for the analysis. From the data gathered it was clear that the patterns drawn from rounds 1 and 2 would not be suitable; instead the data drawn from the signers in round 3 was used. The placement options have a significant impact on the way in which the analysis is structured. This is seen across the literature where researchers tend to posit rightward analyses for sign languages that do not have left peripheral wh-elements and make use of the right periphery. On the other hand, sign languages that do make use of left peripheral elements tend to have leftward analyses. This is again exemplified in the two different ASL analyses i.e. Neidle et al (1998) and Petronio & Lillo-Martin, (1997), where the placement options appear to guide the different analyses used. Thus, placement of the manual wh-signs was used as an initial guiding strategy for the analysis of SASL. Based on the data collected in round 3, the overwhelming pattern showed that the placement of the manual wh-sign was in the right periphery and that manual wh-signs were obligatory. Sign languages with similar patterns to this were then selected to consider whether the analyses used for them could be applicable to SASL.

The sign languages selected were Indian Sign Language (IndSL), Italian Sign Language (LIS) and American Sign Language, based on the findings of Neidle et al. (1998). Although some characteristics differ in each of the sign languages (Italian Sign Language and ASL allow for in situ placement of wh-signs), all the above mentioned SLs make use of the right periphery for wh-signs. The analyses for each of these sign languages were tested to see if they could account for the placement of manual signs in the right periphery in SASL; Aboh et al. (2005) for IndSL, Cecchetto, Geraci, & Zucchi (2009) for LIS and Neidle et al. (1998) for ASL (see Section 3.9)

The next step was testing whether leftward analyses would also be able to accommodate the right peripheral wh-elements in SASL. Two leftward analyses were selected, that of Petronio & Lillo-Martin, (1997) for ASL and Nunes & de Quadros (2006) for Brazilian Sign Language (LSB). These two analyses were selected because they differ on the placement of the Spec, CP as well as on theoretical grounds. The analyses of Nunes & de Quadros (2006) is based on Kayne's (1994) asymmetry theory (see Section **Error! Reference source not found.**) and testing whether this theory of syntax could account for SASL was of interest.

Both these analyses were able to account, through several transformations, for the rightward placement of the wh-signs in SASL (see Section 4.8).

At this stage in the analyses, the different leftward analyses and the rightward analyses were able to account for the manual wh-signs in SASL. The next step was to see if the transformations used in the various analyses would hold when NMMs were introduced. In some areas of the literature, the focus has been solely on the accounting for the manual signs, with NMMs falling by the wayside – for example Nunes & de Quadros (2006) give no account for how the NMMs are reflected in their analysis. I hold to a strong position that no syntactic analysis is complete until the NMMs have been accounted for – in conjunction with manual signs.

An important piece of data came from the informants in Round 3 where they stated that without the 'frown' the sentence did not feel like a wh-question. While some highly lexicalised cases allowed for the manual wh-sign to be dropped, the 'frown' NMM was always obligatory. This provided evidence for the next step of the analysis, which was examining the status of the 'frown' NMM.

Information was again based on the NMM distribution patterns found in the third round of data. The first step was mapping the distribution options in SASL. The data presented three options for the scope of 'frown NMM'; the first being over the entire clause (but not over subjects), the second being over just the wh-sign and finally what appeared to be over just the verb and wh-sign.

This information was used to posit that in SASL the [uWH] feature is associated with the 'frown' NMM. Based on this information, along with evidence on the intensity throughout the distribution of this NMM, the location of this NMM was posited to be the head of Spec, CP.

The next stage in the analysis was applying this property of the NMM and examining whether the various distributions of the NMM could be captured in the syntax of the various analyses. It was at this stage that a clear picture began to emerge in the data.

Both the leftward analyses, while being able to account for the placement of the manual signs, failed to accurately capture the distribution of the NMM. When the same transformations were applied to both leftward analyses, there were problems at the level

on which the NMM was generated. Thus, having considered the option of a leftward Spec, CP the next step in the analysis was to go through the same procedure with the rightward analyses. This time when the transformations took place the NMM's distribution was able to be accounted for. Based on this method of testing I posited that Spec, CP is on the right for SASL. A final consideration involved comparing the posited structure for SASL in De Barros (2013) with what was generated through this study to see whether this earlier analysis would still hold in SASL, based on the new data.

The reason the analysis was structured in this manner was based on the information currently available on SASL, as well as the amount of data generated in the study. A comparative analysis provided a framework in which the constructions could be tested. Moreover, it also served to evaluate the current theory available for sign language syntax. Given that there is disagreement in the literature over the position of Spec, CP, in other words, whether sign languages are capable of rightward movement or not, this style of analysis allowed for an immediate cross-linguistic investigation of this phenomenon.

3.5. Conclusion

This methodology set out to gather data that would be comprehensively provide an accurate characterization of wh-constructions in SASL. This need for valid data in sign languages is highlighted by Petronio & Lillo-Martin (1997) and Neidle et al. (1998). While both studies examine wh-question formation in ASL, they each make vastly different claims about the directionality of the wh-movement. This is because each of the studies has different claims about what is grammatical in ASL and this in turn leads to these opposing analyses. One possible contributing factor to these differences in grammaticality is informant selection.

Therefore, the first step in ensuring the validity was selecting very specific informants that were born to Deaf parents (with the exception of informant D). This ensured that they would be native speakers who acquired SASL in a natural way. These informants were then used in a multi-layered data collection procedure consisting of four rounds.

This multi-layered data collection procedure was used to eliminate the amount of spoken language found in the collected data. From previous attempts in data collection (De Barros, 2013), this was found be a factor that greatly impacted the validity of the sample.

Therefore, each stage in the data collection aimed at refining the process to include less and less spoken language.

The first round focused on collecting a broad sample using an English-to-SASL translation task. Based on this, the primary function of Round 2 was to elicit alternative constructions which could be evaluated in the acceptability judgements done in Round 3. While Rounds 1 and 2 contained elements of spoken language, Round 3 contained none. This was because all the SASL material collected in the first two Rounds was used as the main stimulus in Round 3. In Round 3 two new informants performed acceptability judgements on this collected data and produced the most valid data which could be used for analysis. This data was translated and further evaluated in Round 4, to provide the final, refined set of data ready for analysis.

This data was then tabulated, focusing on the position of the manual wh-sign and the distribution of the NMMs. A key feature of the data was to ensure that NMMs were accurately recorded as it was critical to capture these elements in the analysis. Next, the general patterns arising from this data were compared with other sign languages. The analysis used for these sign languages was tested on the SASL constructions. Of particular interest was to see how the SASL data contributed to the leftward movement and rightward movement debate. In Chapter 4, I show that rightward movement best accounted for the data collected in SASL.

Chapter 4: *Findings & Analysis*

In this chapter, I analyse the two key components of SASL wh-question formation: ***manual wh-signs*** and ***wh-NMMs***. I begin with the manual wh-signs, as they are the structures most comparable to wh-words in spoken language. Six manual wh-signs were identified in the SASL data I collected. Each of these is described by its physical form as well as where it can be positioned in the sentence. The data showed that in SASL the right periphery is the sole position targeted by wh-signs – other placements such as the left periphery, in situ and doubling were not permitted.

As for the NMMs, two forms were identified. The first was categorised as the 'eyebrow raise' NMM. Although this NMM is associated with question formation, its use relies on particular contexts and is not thought to be linked with a [WH] feature. The second NMM is characterised by 'furrowed/frowning eyebrows'. I considered this as the main wh-NMM associated with wh-question formation in SASL, making it the focus of this analysis. I suggest that the wh-NMM is located in the in C° based on evidence that shows that NMMs are associated with *features* found in the *heads* of functional projections (in this case the complementizer phrase). Finally, I consider the distribution of the wh-NMM by examining the possible combination of its use with other manual signs.

My analysis is focused on capturing the characteristics of wh-signs and wh-NMMs in SASL. In order to formulate the analysis, I begin by looking at previous structures proposed by Sandler & Lillo-Martin (1997) for ASL, and by Nunes & de Quadros (2006) for LSB. As I will demonstrate, the leftward Spec, CP used in these analyses is unable to capture the structures found in SASL. Instead, I use the rightward facing CP posited by Neidle et al. (1998) for ASL, and by Cecchetto et al. (2009) for LIS to account for the clause-final placement of wh-signs. I will show that the wh-sign moves to the rightward Spec, CP to check the [WH] features in C°, which results in the correct word order.

Next, I will consider the distribution of the wh-NMMs. I will show that an analysis which makes use of the c-command to capture the scope has some theoretical issues. These issues revolve around the *optionality of spreading* as well as the *availability of features* for checking. I will explore the possibility of using Spec-Head agreement as the only operation needed to account for the distribution of wh-NMMs.

Finally, I present my own analysis. I introduce the concept of an Agreement Object Phrase (AgrOP). In my analysis the scope of the wh-NMM is accounted for by Spec-Head agreement, and the OV word order is generated by a movement of the object to Spec, AgrO.

SASL Structure

In this section, I outline the basic facts available on SASL. Vermeerbergen et al. (2007) discuss the issue of basic word order in SASL. There are a variety of word orders observed across different sign languages. Indeed, Bouchard & Dubuisson (1995) observed that sign languages have a greater flexibility in word order than most spoken languages. In Vermeerbergen et al. (2007), SASL was observed to prefer that the verb to be in the final position. As a result, the constituents were arranged in either a SOV or OSV order. One can infer that information structuring (i.e. Topic and focus) may be a cause of the differing constructions. This is often the case in languages where no single canonical word order is observed. Whether this claim is accurate remains to be proven; however, the most important observation at this stage is that, in SASL, the verb is final.

De Barros (2013) examined sentential negation in SASL. De Barros (2013) confirmed the observations made by Vermeerbergen et al. (2007) surrounding the verb final position in the word order (see (1) & (2) below). The informants agreed in De Barros (2013) that the word order is not rigid. However, the unmarked form for a declarative sentence is SOV.

(1) WOMAN FLOWERS BUY (unmarked form)

(2) WOMAN FLOWERS BUY (unmarked form)
'The woman buys flowers' (SASL)

Also observed by De Barros (2013) is that SASL, like most sign languages, appears to lack non-modal auxiliaries which could be hosted in functional projections. However, there are other functional signs that provide evidence for the position of functional categories in the structure. One example of these functional signs is modals (see (3)).

(3) HEAR CAN
'(I) can hear'

(SASL)

Another example of a functional sign is the aspectual marker DONE/FINISH, which is often used to indicate the completion of an action (see (4)).

(4) ASANDA FLOWER BUY DONE/FINISH
'Asanda bought flowers'

(SASL)

According to De Barros (2013), SASL also makes use of manual negation signs and negative modals (see (5) – (8)).

(5) MOTHER SHOCK SPEAK NOT$_{NEG}$
'Mother was shocked that I could not speak'

(6) HEAR CANNOT$_{NEG}$
'(I) cannot hear'

(7) MEET NOTHING$_{NEG}$
'(we) had not met at all'

(SASL)

Time adverbs such as YESTERDAY/TOMORROW are found in the sentence-initial position (see (8)).

(8) YESTERDAY TEACHER TEACH
'Yesterday the teacher taught'

(SASL)

On the other hand, manner adverbs that are produced using manual signs[39] are found post-verbally like all the above categories (excluding the time adverbs (see (9))).

(9) INDEX ARRIVE LATE
'I arrived late' (SASL)

4.1. Manual wh-signs

The data from all three rounds of data collection showed that SASL makes use of the basic question word paradigm of (1) WHAT, (2) WHO, (3) WHEN, (4) WHY, (5) HOW and (6) WHERE. In this section, each sign is described by the handshape used, the location of the

[39] In many cases adverbs are produced using simultaneous morphological which is inflected onto the verb as opposed to sequential morphemes found in spoken language.

sign in relation to the signer, the orientation of the palm, and the movement that the sign makes.

4.1.1. Description of manual Wh-Signs in SASL

Error! Reference source not found. shows the manual sign for “WHAT”. This sign is marked by a D-handshape with the palm facing away from the signer. The sign is held in front of the signer in neutral space where the finger shakes from side to side almost in a ‘wagging motion’. This back and forth movement may be small or exaggerated depending on the signer’s intention.

- Signed with the D-handshape.
- The location is in front of the signer in the neutral space.
- The palms face away from the signer.
- Signer’s hand shakes from side to side.

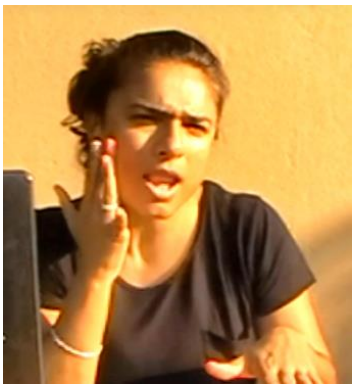
Figure 4.1: Manual sign of "WHAT" in SASL

Error! Reference source not found. shows the manual sign for “WHO”. This sign has a modified B-handshape where the fingers are bent inward to make contact with the chin. The sign is accompanied by some rounding/pursing of the lips where the lip shape often mimics the mouthing for the English word equivalent “who”. There is no internal movement in this sign but rather contact with the chin is held for the duration of the sign.

- Signed with a modified B-handshape where the fingers are arched inward.
- Contact is made with the signer's chin with the tips of the fingers.
- The palm faces the signer.
- The hand is held on the chin of the signer.

Figure 4.2: Manual Sign for "WHO" in SASL

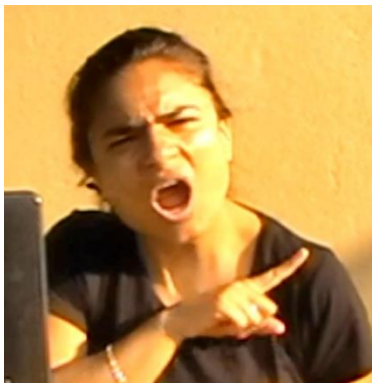
Error! Reference source not found. shows the manual sign for "WHEN", which makes use of the B-handshape. The palm orientation is toward the signer, with the fingertips touching the cheek. The internal movement of this sign is characterised by the fingers making a 'wiggling' motion up and down with the fingertips, each time touching the cheek. This sign is also sometimes accompanied by the mouthing of the English spoken word "when".



- Signed with a modified B-handshape where the fingers are spread.
- Signer touches the side of the face with their fingertips.
- The palm faces toward the signer.
- The fingertips wiggle back and forth on the point of contact.

Figure 4.3: Manual Sign for "WHEN" in SASL

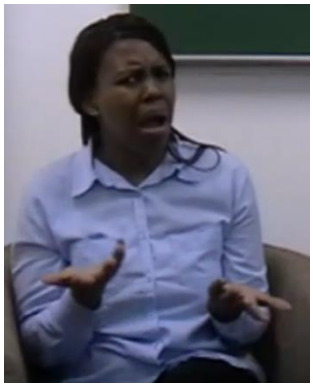
Error! Reference source not found. shows the manual sign for "WHY" in SASL. It is signed using the D-handshape with the palm facing downward. The location of the sign is the upper left chest area where contact is maintained for the duration of the sign. Again, the mouthing of the English spoken language form often accompanies the sign.



- Signed with D-handshape.
- Contact is made with chest of the signer.
- The palm faces away from the signer.
- Handshape is held at the point of contact.

Figure 4.4: Manual Sign for "WHY" in SASL

Error! Reference source not found. shows the manual sign for “HOW” in SASL, which comprises a double-handed B-handshape. The sign is located in the neutral space in front of the signer. The movement begins with the palms facing down; the hands then turn outward to allow the palms to face upward. Sometimes there may be an additional movement of the hands moving from side to side.



- Signed with a double-handed modified B-handshape where the fingers are spread.
- Signed in the neutral space in front of the signer, with the hands close together.
- Hands twist so that the palms face upwards.

Figure 4.5: Manual Sign for "HOW" in SASL

Error! Reference source not found. depicts the manual sign for “WHERE” in SASL, which comprises two B-handshapes in front of the signer in neutral space. The palms are orientated upward and the signer makes a shaking ‘side-to-side’ movement with the hands for the duration of the sign.

- Signed with a double-handed modified B-handshape with spread fingers.
- Signed in the neutral space in front of the signer with the hands located in front of the signer.
- The palms face upwards.
- Movement is repeated from side to side.

Figure 4.6: Manual Sign for "WHERE" in SASL

These were the six main manual wh-signs identified in the SASL dataset. The next step in the analysis was to examine the possible positions where these wh-signs might occur.

4.1.2. Position of wh-signs in SASL

The position of wh-words in overt syntax has been a central component of spoken language syntactic analyses. Spoken languages offer two general positions -the left periphery or in situ- for wh-words. However, we have seen that sign languages are able to make use of a range of positional options, namely sentence-initial, sentence-final, doubling, and in situ. From the first round of data collection, it appeared that SASL used all of these placement options as well as some unusual constructions. However, in the second round of data collection, apart from the elicited negative data, all of the manual signs appeared in the right periphery. Once again, in the third round of data collection, the native signers used only the right periphery and judged the other positions found in the previous round’s data as ungrammatical.

Sentence-initial

There were two instances where the wh-sign was found in the left periphery (see (10) and (11) below). However, in the focus group (i.e. the third round of data collection – see

Section 3.3.3), the informants judged these sentences as ungrammatical. Thus, I consider them to be ungrammatical or influenced by signed English.

(10) *WHY FEBRUARY HOT$_{wh}$
'Why is it so hot in February?'
(11) *WHO$_{wh}$ BUY NOTHING$_{NEG}$
'Who buys nothing? (SASL)

Doubling

In cases where there was doubling, the informants in the focus group commented that it did not make sense that the wh-sign was repeated. In these instances they removed the initial wh-sign, leaving the second sign in the right periphery (12) & (13).

(12) *BOY WHO SAW WHO$_{wh}$
'Who saw the boy'
(13) a. *CHILDREN WHICH CAKE WANT WHICH$_{wh}$
b. CHIDREN CAKE WANT WHICH$_{wh}$
'Which children want cake?'

(SASL)

In situ

There were three instances where there was a possibility of in situ placements. In (14) we see 'WHO' replacing the subject that would have been base-generated in that position given the SOV word order of SASL. All of these instances were judged as ungrammatical by the informants in Round 3 of the data collection process.

(14) *BOY WHO SAW$_{wh}$
'Who saw the boy?'

(SASL)

As we will see in the following sections, wh-signs appear in the right periphery of the sentence (see (15)).

(15) BOY SAW WHO$_{WH}$
'Who saw the boy?'

(SASL)

Based on data from this study, we see that the wh-signs in SASL are more "peripheral" than other elements (mentioned above) that appear in the right periphery. The fact that manner

adverbs ((16) & (17)) and negative quantifiers (18) occur to the left of wh-items shows that these wh-items are not in situ. They have moved to a VP external position, namely Spec, CP.

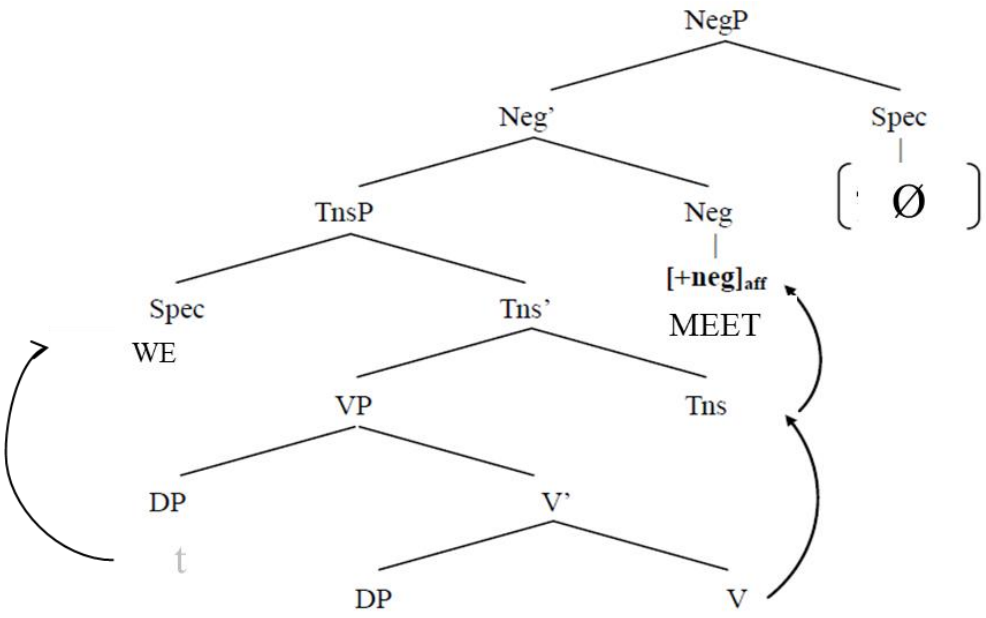
(16) ARIVE LATE WHO$_{WH}$
'Who arrived late?'

(17) SWEETS EAT OFTEN HOW$_{WH}$
'How often do you eat sweets?'

(18) CLEAN HELP NOTHING WHO$_{WH}$
'Who didn't help clean?' (SASL)

Based on this evidence De Barros (2013) claims that SASL is a head-final language, at least in the clausal domain, as the verb follows the object and functional heads that contain modals, and negation, etc. all follow the verb.

The structure posited by De Barros (2013) for sentential negation in SASL is based on similar work undertaken by Pfau & Quer (2003) in German Sign Language (DGS). DGS, like SASL, is a head-final language which makes use of an underlying SOV word order. Pfau & Quer (2003) make use of split-headed trees to account for the SOV word order observed in DGS. De Barros (2013) applies this to SASL and, along with the basic word order fact discussed above, proposes a structure for SASL. **Error! Reference source not found.** illustrates the basic tree proposed by De Barros (2013) for SASL.



'We did not meet'

Figure 4.7: Sentential negation in SASL

Omission of the wh-sign

Generally, omission of the wh-sign is not permitted. Informants commented that such omissions made it difficult to distinguish whether a question was being asked. However, there do appear to be specific contexts in which the wh-sign may be omitted.

In the data, there were two instances where the wh-sign was omitted (see (19) & (20)).

(19) ?LECTURE START TIME$_{wh}$

'when does the lecture start?'

(20) INDEX SIGN$_{ER}$

'How quickly can you sign?'

(SASL)

In these two constructions, whilst both omit the wh-sign, they also include particular NMMs. In (19) the 'frown' NMM (known as the wh-NMM) is used, whilst in (20) the 'eyebrow raise' NMM (ER-NMM) is used. The ER-NMM is dealt with in detail in in Section 4.2.1 on NMMs as its use has unique properties. Here, I shall focus instead on the construction of (20).

In other sign languages, wh-constructions without overt manual wh-signs have been theorised to have *null operators* or *null arguments*. A null operator/argument is a covert or unpronounced form of the manual sign. It appears in the logical form where it is able to check features; however, it is not physically or overtly expressed in the phonological form. This null operator is not an uncommon feature in either spoken languages or sign languages. In Spanish, the subject may be left unexpressed, as seen in (21) below.

(21) a) __ Hablo Español
(I-) speak Spanish
b) __ Hablamos Español
(we-) speak Spanish

(Spanish)
(Sandler & Lillo-Martin, 2006, p. 16)

ASL also makes use of null operators, allowing two different types: "those identified by *verbal agreement morphology*, and those *licenced by the discourse*" (Sandler & Lillo-Martin, 2006, p. 16). The type linked to *discourse* is what we see in wh-constructions.

In these particular contexts, the null argument must be *retrievable from the context* in order to license its use, i.e. "what the covert wh-question is asking must be recoverable from the context for it to be used" (Petronio & Lillo-Martin, 1997, p. 35). Example (22) shows a possible context in which these null wh-arguments are licensed in ASL.

Possible context: the speaker knows that the addressee received several gifts from different people, and that one gift was a pair of earrings.

(22) EARRINGS$_{t}$ GIVE$_{wh}$ __
EARRINGS GIVE (WHO)
'Who gave you the earrings?' (ASL)
(Petronio & Lillo-Martin, 1997, p. 35)

The question is whether the null operator/argument hypothesis can account for constructions with no manual wh-signs in SASL. We know that SASL makes use of null operators in other contexts, such as those seen in morphological agreement verbs like 'SMOKE' (see (23)).

(23) SMOKE
"(I-) smoke" (SASL)

However, based on research in other sign languages, null arguments in wh-constructions are licensed by *discourse factors* rather than through morphological agreement. If we consider the possible context of example (19) (repeated as (24)), there is a strong possibility that this question could be linked in a discourse setting where the context could be recoverable.

(24) LECTURE START TIME$_{wh}$
What time does the lecture start? (SASL)

This example, coupled with the fact that SASL has been known to make use of null operators in other contexts, makes it seem likely that the absence of an overt manual wh-sign may be

the result of its functioning as a null operator[40]. However, in ‘,out of the blue’ contexts, it appears that the use of a manual wh-sign is compulsory.

Sentence-final

Although there were some inconsistencies in the data acquired in Round 1 of the data collection process, the clear pattern that emerged from Round 3 was that wh-signs are located in the right periphery. The informants in this study consistently rejected any other positions, consistently correcting them by placing the wh-sign in the right periphery. This was the case for all of the question words, as seen in examples (25) – (30):

(25) WEDDING DANCE HOW$_{wh}$
‘How will you dance at the wedding?’

(26) HOLIDAY GO WHEN$_{wh}$
‘When do you go on holiday?’

(27) DOG BOOK GET WHERE$_{wh}$
‘Where did the dog get the book?’

(28) FOOD STUFF BUY WHY$_{wh}$
‘Why are you buying food?’

(29) HAPPEN WHAT$_{wh}$
‘What happened?’

(30) ARRIVE LATE WHO$_{wh}$
‘Who arrived late?’ (SASL)

At first glance, the variation in the data from this study may be puzzling. In Round 1, several positions were used, whereas a very rigid word order was observed in Rounds 2 and 3. To make sense of this variation, I return to the methodological considerations (see Section 3.1) that were made prior to the data collection phase. In light of these considerations, the variation observed in Round 1 is expected as a result of the spoken language interference in this session (see Section 3.3.1).

In Round 1 the data was elicited orally, using English, by a hearing researcher. As outlined in the methodology, previous studies have shown that the use of spoken language may have an effect on word order and sentence structure in sign language (see Section 3.2). The position of the manual wh-sign is critical in understanding the syntax of wh-questions. Thus,

[40] The data on null elements is very limited and this is only a tentative claim based on secondary evidence. This would be an area for further study to see if these supposed ‘null wh operators’ do in fact act in the same way as other null operators in SASL. Furthermore, the interaction/restrictions that null wh operators would have on the scope of NMM would be of interest.

I designed my method to ensure an unaffected sample. In order to achieve this, the use of spoken language was eliminated in Round 3 of the data collection process (see Section 3.3.3), and the participants selected for this round were both *deaf* native speakers (see Section 3.1). Once these variables had been controlled, the results (from Round 3) revealed a striking preference for the right periphery – with the informants making exclusive use of this position as well as judging other placements as unacceptable. This finding is not unique to SASL. Whilst there are several sign languages, such as ASL, that allow for a number of positions for manual wh-signs, others (such as Indian Sign Language) make exclusive use of the right periphery placement option[41]. Based on this study, the right periphery appears to be the unmarked form for wh-questions in *authentic* SASL. However, there do appear to be some instances where the wh-sign may be omitted under a particular set of circumstances.

Summarising the findings so far, it has emerged that SASL selects the right periphery as the exclusive landing site for all six manual wh-signs. Native informants judge doubling, left periphery positioning, and in situ positioning as ungrammatical though there is a small number of cases where the wh-sign may be omitted. I have suggested that, based on evidence from other sign languages and general patterns in SASL, there are specific circumstances where the wh-sign may not be physically pronounced but functions rather as a null operator. However, the preference appears to be that wh-signs should be present in the vast majority of wh-constructions.

4.1.3. Landing site for manual wh-signs

In current theory, the landing site for wh-words is theorised to be the Specifier of the complementizer phrase. However, certain researchers (such as Rizzi (1997)) criticize the CP as being too broad. In Rizzi's (1997) analysis, he expanded the CP into several categories to capture a more specific function of the words. I shall work with the notation of the standard complementizer phrase, as it is able to capture the necessary wh-construction features. I find no need to expand the CP further at this stage, as the following analyses will show. As discussed in the literature review (see Section 2.3.1), wh-constructions have an uninterpretable [WH] feature found in the head (C°) of CP which needs to be checked with an interpretable [WH] feature usually associated with wh-items. In order to check this feature, the wh-item needs to be in an AGREE relationship with the head of C. It appears

[41] For examples of this placement see Section 2.8.

that in SASL, feature checking is accompanied by movement of the wh-item to spec-CP to create the specifier/head checking configuration depicted in 8. repeated here, I assume that movement takes place for independent reasons, e.g. an EPP feature associated with the uWH features, or phase-based movement (Bošković, 2002).

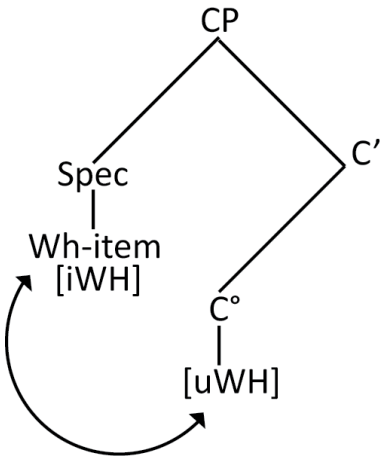


Figure 4.8: Leftward facing CP

To fall into this checking configuration, the wh-word (or wh-sign in our case), is forced to *move*. Traditionally, the CP has been linearized to the left. This has been based on evidence from spoken languages, which most often select the left periphery (see). However, some researchers claim that this leftward CP is unable to account for a several sign languages – particularly those such as SASL that do not make use of the left periphery at all. The alternative is to explore a different option, such as that put forth by Cecchetto et al.et al. (2009), where Spec CP is linearized to the right (see **Error! Reference source not found.** repeated here).

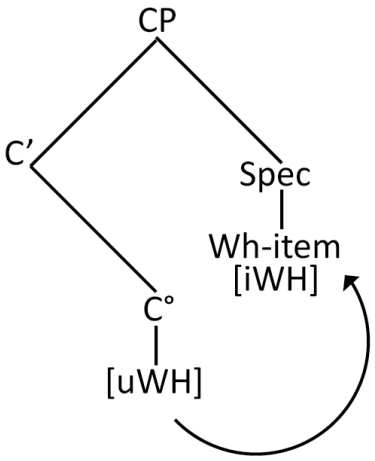


Figure 4.9: Rightward facing CP

In the sections to follow, both the left and right Spec, CPs are tested to see whether they can generate the correct word order for SASL. It will become clear that both are able to account for the word order – however, the leftward analysis has several shortcomings when the NMMs are considered. Thus, this next section explores the NMMs, used in wh-constructions, which play a critical role in developing an analysis for SASL.

4.2. Non-manual markers

NMMs are a fundamental feature in the grammar of sign languages. They have proven to be more than just gestures; rather, they display grammatical properties that sign language syntacticians have been working to capture (Sandler & Lillo-Martin, 2006). In SASL, two NMMs were found to be associated with wh-questions: the 'eyebrows raised' (see **Error! Reference source not found.**) and the 'frown' or 'furrowed eyebrows' (see **Error! Reference source not found.**). Both of these NMMs were accompanied by a head tilt or forward lean.

Figure 4.10: 'Eyebrow Raise' Non-Manual Marker in SASL

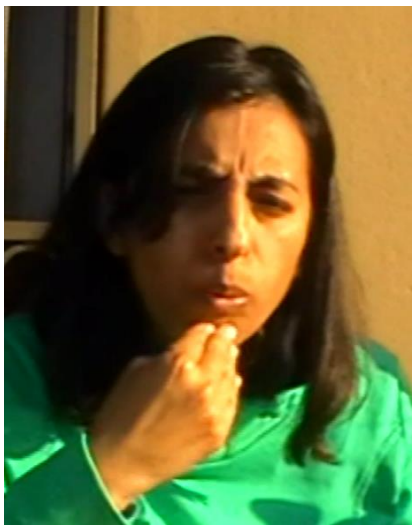


Figure 4.11: 'Frown' Non-Manual Marker SASL

The informants made it very clear that omitting these NMMs was considered ungrammatical (see example (31)).

(31) *BOY SAW WHO

Other NMM features that accompanied the above NMMs were a forward lean and a head tilt (seen in **Error! Reference source not found.**). These accompaniments are also seen in other sign languages – such as ASL, IPSL, and HGZ, to mention a few (Petronio & Lillo-Martin, 1997; Aboh, Pfau, & Zeshan, 2005; Kuhn & Wilbur, 2006). The role that NMMs play is not explored in this analysis; however, based on other sign languages, they appear to mark subtle nuances in wh-constructions.

The next section deals with the 'eyebrow raise' as this NMM is not typically associated with wh-constructions. A basic theory on how to account for this NMM is posited – however it is a tentative claim that needs further research to prove its accuracy.

In the data, the TOPIC-NMM was also present in some of the constructions. It was marked by raised eyebrows with the eyes wide open. The use of this TOPIC-NMM is explored in greater detail in my SASL analysis.

In Section 4.2.1 & 4.2.2 that follows the focus shifts to the 'frown' NMM. I use the semantics, scope and intensity of this NMM to show that it is the main NMM associated with the [WH] feature found in the head of CP - making it the main NMM involved in wh-questions for SASL. Thus, this NMM will henceforth be referred to as the wh-NMM.

4.2.1. The 'Eyebrow Raise' non-manual marker

The first of the two NMMs identified in the data was the 'eyebrow raise', the use of which has been attested in other sign languages. It has been associated with non-interrogative contexts where there are pragmatic conditions placed on the content of the answer, e.g. *Why did you just walk out of my store with that without paying*? (Sandler & Lillo-Martin, 2006, p. 465). Typically, the 'frown' is used when the speaker requires an answer with content; however, when the information being questioned is already known this is replaced by other facial expression (Sandler & Lillo-Martin, 2006). This suggests that the frown indicates focus.

The informants in this study were aware that the use of the 'eye brow raise' changed the meaning of the question, and that its use relied on context. In **Error! Reference source not found.** & **Error! Reference source not found.** the informants changed the NMMs for the sentence 'when did you see the car?' In **Error! Reference source not found.** the informant makes use of the 'eyebrow raise' NMM, whereas in **Error! Reference source not found.** this changes to the 'frown' NMM.

Figure 4.12: 'When did you see the car?' with 'eyebrow raise' NMM

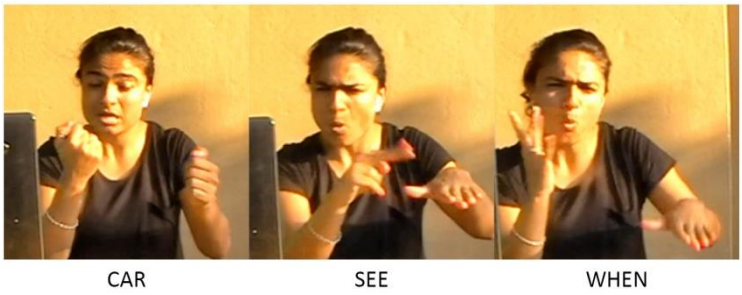


Figure 4.13: 'When did you see the car?' with WH-NMM

When the informants were asked to comment on what this particular 'context' might be for the use of the 'eye brow raise', they were unable to provide an answer. This is expected as people often make language choices for linguistic reasons that they are unaware of. Moreover, the nature of the data elicitation process did not readily allow for a situation where the requested information would be known by all the signers. In the instances where the 'eye brow raise' was used, the native signers did not outright reject the sentences. Instead, they preferred the 'frown' in various contexts.

In example (32), the informants were given a sentence with the 'eyebrow raise' but no manual wh-sign. They commented that without the manual wh-sign, the example did not feel like a wh-question. This suggests that the 'eyebrow raise' alone is not enough to convey the semantics of a wh-question. On the other hand, in particular contexts the use of just the 'frown' NMM was enough to classify a sentence as a wh-interrogative construction. This provides evidence for the association of the [WH] feature with the 'frown' NMM. However, the fact that the native signers replaced the NMM where the 'eye brow raise' was used may indicate that this NMM was rejected because the *questioned information was unknown to the signers* (as a result of the way the data collection process was set up).

(32) ?SIGN QUICKLY$_{ER}$
'How quickly can you sign?"[42] (SASL)

Thus, we can make a tentative claim based on the evidence in SASL found in this study. The 'eye brow raised' NMM may be applied in contexts where the requested information is known by all the signers, whereas the 'frown' NMM may be used in contexts where content information is required in the answer because of its link with the [WH] feature, i.e. the 'frown' indicates focus.

There is also evidence suggesting that the 'eyebrow raise' NMM is used when speaking to small children or in specific contexts where the 'frown' may be interpreted as giving the question a negative reading (Sandler & Lillo-Martin, 2006). When the informant in Round 2 was asked to change a construction that she had previously signed with a 'frown' to the 'eyebrow raise', she expressed that she would sign like that to children. This suggests the

[42] The first informant was asked to translate the sentence 'how quickly do you sign?' which she translated as example (21). However, when the informants in round 3 translated this as 'you sign quickly'.

possibility that in SASL the 'eyebrow raise' is used in specific discourse contexts (like the one described above) where a possible negative reading is being avoided.

The 'eyebrow raise' in this study was an unexpected feature that arose during data collection. As a result, the information available is very limited. This would be an area for further investigation whereby the context of its use could be fleshed out in greater detail. The 'eyebrow raise' also raises an interesting point regarding factors that affect NMMs in sign language. Sandler & Lillo-Martin (2006) consider that "the use of the non-manual marker is dependent on factors other than syntactic structure: pragmatic force and sociolinguistic contextual information" (Sandler & Lillo-Martin, 2006, p. 466). This would be an interesting avenue to explore, though it is beyond the scope of this investigation. Instead, the focus of this thesis is on the 'frown/furrowed eyebrows' NMM that is typically associated with true wh-questions in sign languages.

4.2.2. The 'Frown' non-manual marker

The following section provides evidence to support the claim that the 'frown/furrowed eyebrows' NMM is the *main* NMM associated with wh-questions in SASL. I consider three aspects of this NMM. The first is the semantics of the response required when the 'frown/furrowed eyebrows' NMM is present. I use this to show that the NMM is associated with the [uWH] feature. Next, I examine this NMM's scope and the intensity to show that it is located in the head of CP. Finally, I consider the possible syntactic properties that govern the distribution of this NMM and how it relates to other hierarchical structures.

Semantics of the wh-NMM

The 'frown/furrowed eyebrows' NMM, henceforth referred to as the wh-NMM, was found to be obligatory in all wh-constructions where a manual wh-sign was used[43]. Although there were certain contexts where the *manual* wh-sign could be omitted, all of the informants categorically stated that without the wh-NMM (see **Error! Reference source not found.** and *Figure 4.15*) the sentence was ungrammatical, as seen in examples (33) & (34).

[43] Apart from contexts where the 'eyebrow raise' NMM is used.

Figure 4.14: "WHO" without any NMM

(33) *BOY SAW WHO
'Who saw the boy?' (SASL)

Figure 4.15: "WHEN" without NMMs

(34) *CAR INDEX SEE WHEN
'When did you see the car?' (SASL)

As explored in the previous section, what separated the 'eyebrow raise' NMM from the wh-NMM was the expected response to the question. When the wh-NMM was present, the informants were expected to provide an answer involving content. Thus, the obligatory nature of the wh-NMM and the nature of the anticipated response suggests that, *semantically*, the wh-NMM is expected to be associated with the [uWH] feature, i.e. WH indicates information focus.

There are essentially two semantic components that the [uWH] feature refers to. The first is the Question feature, [+Q], which gives the reading 'I request that you answer'. The second is [uWH] which gives the reading 'I request that you answer with content'. It is the inclusion

of the [uWH] that separates wh-questions from other forms of questions, i.e. yes/no questions.

Scope of the wh-NMM

The wh-NMM had two scope options with respect to the manual signs in the clause. The *minimal* obligatory scope for the wh-NMM is over just the manual wh-Sign ((35), (36) & (37)).

(35) MOTHER INDEX BOOK GIVE WHICH$_{wh}$
'Which book did you give your mother?'

(36) WINTER START WHEN$_{wh}$
'When does Winter start?'

(37) JOHN THIS SIGN WHAT$_{wh}$
'What did John sign?' (SASL)

The scope could then optionally spread over the verb and any other signs between the verb and the wh-sign ((38), (39) & (40)). However, in cases such as (39) it would be ungrammatical for spreading to occur only over "LATE".

(38) TREE MAN CHOP HOW$_{wh}$
'How did the man chop the tree?'

(39) ARRIVE LATE WHO$_{wh}$
'Who arrived late?'

(40) SISTER YOUR BUY FORGET WHAT$_{wh}$
'What did your sister forget to buy?' (SASL)

There do not appear to be any semantic differences between the two scope variations. Rather, differences seem to be stylistic as the two informants commented that both sentences were grammatical as in (41) & (42), and that the signers used the two variations interchangeably.

(41) Informant A: MOTHER YOUR BOOK GIVE WHICH$_{wh}$
(42) Informant B: MOTHER YOUR BOOK GIVE WHICHwh
'Which book did you give your mother?'
(SASL)

In the data, the wh-NMM never scoped over the subject (see (44)) or the negation (see (45)). In (44) we see that it is ungrammatical for the wh-NMM to spread over the TP, and for negation it is physically impossible for both the negative NMM[44]and the wh-NMM to occur at the same time. This suggests that there may be a blocking effect by these two categories (TP and NegP) for the scope of the wh-NMM.

(43) [$_{TP}$ME] SIGN WHO$_{wh}$
'Who did you sign too?'

(44) *[$_{TP}$WINTER] START WHEN
When does winter start?

(45) CLUB GO-IN [$_{NegP}$NOTHING$_{neg}$] WHICH$_{wh}$
'Which club did you not go too'

(SASL)

The native informants in Round 3 considered the intensity of the NMMs to be an important factor. They found that some of the NMMs from Rounds 1 and 2 were 'weak', and required correction (see **Error! Reference source not found.** and **Error! Reference source not found.**). This illustrates how subtle the differences in NMMs can be. Moreover, it illustrates the level of complexity that these features display.

Figure 4.16: 'Weak' NMM

[44] Note that this refers to the 'frown' NMM associated with negation and not the NMM headshake.

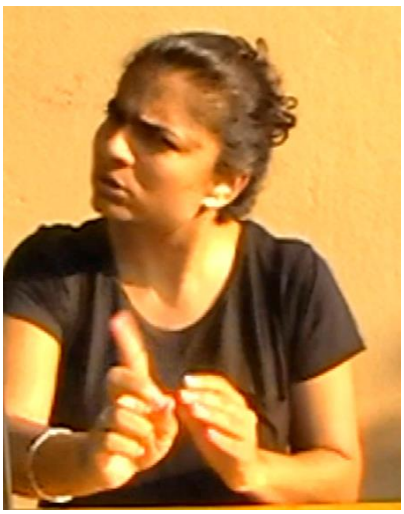
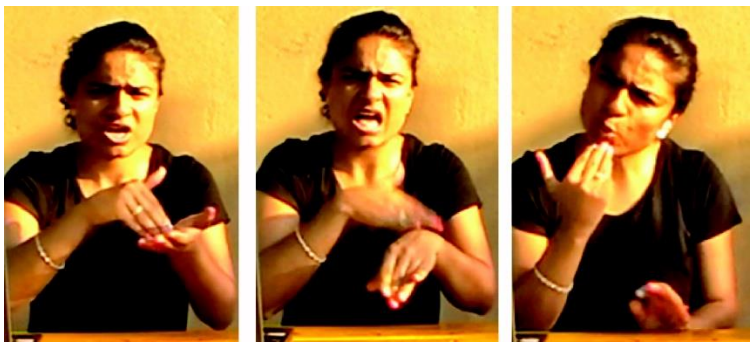


Figure 4.17: 'Corrected' NMM

The occurrence of the weaker NMMs in Rounds 1 and 2 can be attributed to the presence of the hearing researcher. Hearing people are often thrown off or distracted by the use of NMMs. Because of this, NMMs are often *weakened* in the presence of hearing people as a language accommodation tactic. In Round 3, the informants corrected the weakened NMMs. When the scope is greater than just the wh-sign, the subtlety of the NMMs makes this scope difficult to describe. In the data, where there was a wider scope there appeared to be more emphasis on the wh-NMM, as seen in **Error! Reference source not found.** and **Error! Reference source not found.**.

Figure 4.18: 'What did your sister forget to buy?'



ARRIVE LATE WHO

Figure 4.19: 'Who arrived late?'

In **Error! Reference source not found.** the wh-NMM in the last frame is slightly more pronounced than in the first frame, and with the addition of the forward lean it suggests that there is more intensity placed on the wh-sign. We see the same pattern in **Error! Reference source not found.**, with more intensity being placed on the wh-NMM in the final frame that contains the wh-sign. This is consistent with claim that NMM's 'maximal intensity is in the node of origin and the intensity of the marking diminishes as distance from that node increases' (Neidle et al., 1998, p. 4; Bahan, 1996). The first two frames in **Error! Reference source not found.** appear to depict slightly less pronounced NMMs.

Given the basic facts stated above, we can begin to put together an analysis to account for the distribution and intensity of the wh-NMM. Recall the substantial evidence that NMMs are associated with features found in the heads of functional projections (Neidle et al., 1998) (see Section 2.2). In our case, this is considered to be the focus [WH] found in the head of CP. If we assume that the intensity is greatest over the node of the NMM's origin (and in our data, the intensity has been greatest over the wh-sign that we have speculated to be found in Spec, CP) it is satisfactory to conclude that the wh-NMM is found in C°.

To provide a backdrop to my analysis I will recap the basics of what is understood about SASL structure before presenting various possible analyses for wh-question formation in SASL.

Evidence for considering a rightward Spec, CP in SASL

I assume, like De Barros (2013), that SASL is a head-final language. Thus, I make use of the split head structure for clausal/lexical structures. There is a generalisation that all functional categories are head initial, as this is an area of debate where some researchers apply

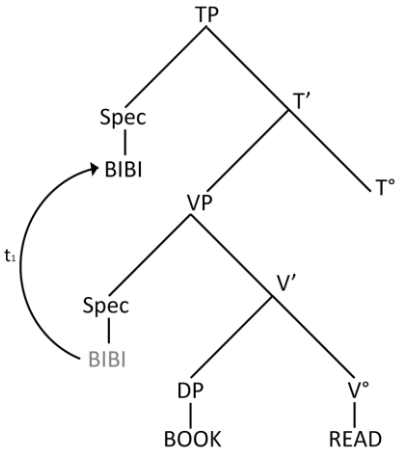
different rules to different functional phrases. There is evidence in my data that supports the hierarchical order between phrases proposed by De Barros (2013). For one, the informants in this study confirmed that whilst both SOV and OSV are used, SOV is the unmarked form for declarative sentences in SASL.

(46) a. BIBI BOOK READ (unmarked word order)
'Bibi read the book'

b. BIBI$_{TOP}$ BOOK READ (unmarked word order with topic marking)

(47) DOG$_{TOP}$ ATIYAH SAW (marked word order)
'Atiyah saw the dog' (SASL)

Based on inferences made from the work by Vermeerbergen et al.et al. (2007), SASL may be a language that arranges its constituents based on a topic and focus relationship. In SASL we know that topic can be marked by the 'eye brow raise' NMM. This overt topic-marking strategy does not appear to be obligatory in the unmarked form, but there is evidence in the data to suggest that is required for marked forms. This may suggest that both overt topic marking and constituent order are strategies used by SASL. These structures in (46a) & (46b) may be represented as in ***Error! Reference source not found.***[45].

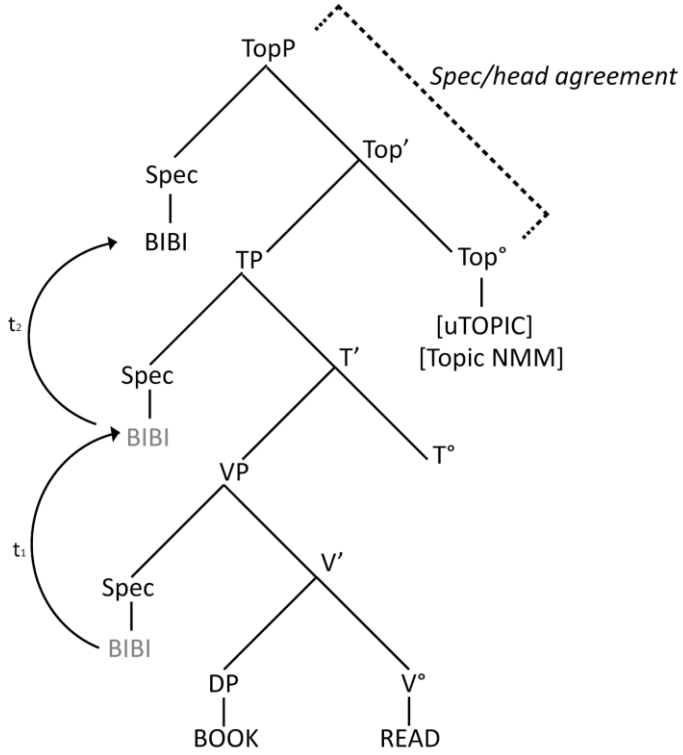


'Bibi read a book'

Figure 4.20: Unmarked non-topicalised form

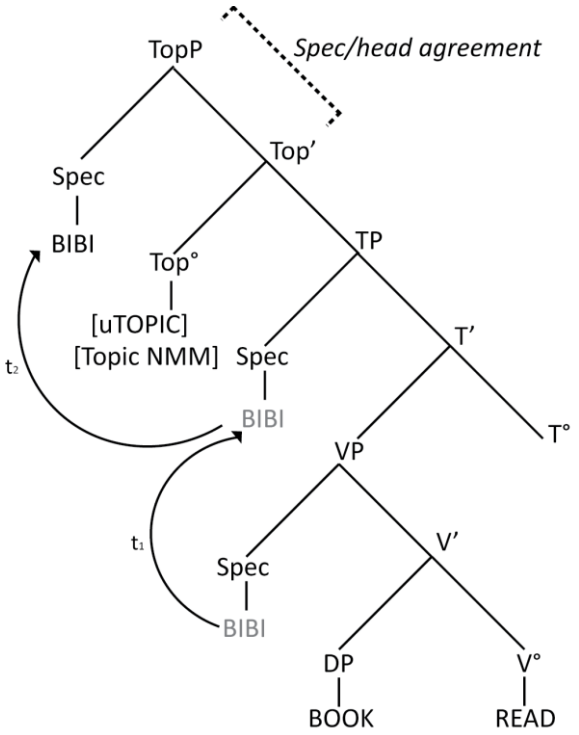
[45] In Figures 4.20 – 4.29 I assume that TP is head-final to capture the head-final characteristics of the language. However, from Figure 4.30 onward I revise this as I use a different mechanism to capture this. I assume a leftward-facing TP and derive the head-final characteristics using object movement to ArgO.

In **Error! Reference source not found.**, the subject ‘BIBI’ moves to the specifier of TP to gain nominative case from the nominative case feature in T°. This illustrates the unmarked word order in SASL where there is no Topic Marking present.



‘Bibi read the book’

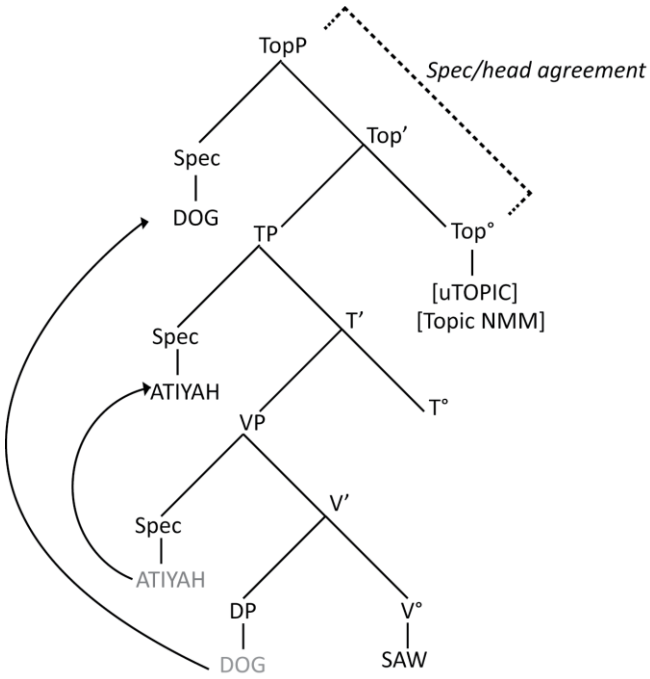
Figure 4.21: Unmarked declarative form with topic marking - option one



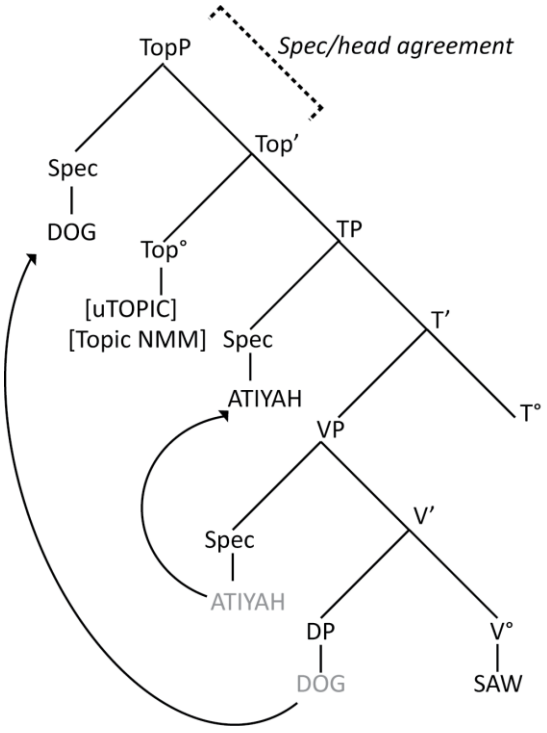
'Bibi read the book'

Figure 4.22: Unmarked declarative form with topic marking - option two

Error! Reference source not found. and **Error! Reference source not found.** offer two options for the configuration of the topic phrase. The topic phrase could either have a split head configuration or the phrase could be head initial. Either way, the derivation is the same. The subject, in this case BIBI, makes an additional transformation from the structure shown in (46a). Once the subject has received nominative case it moves again into the specifier of the topic phrase where is checks the [TOPIC] feature in TopicC°. The Topic-NMM, which is signalled by raised eyebrows and wide open eyes, is associated with the [TOPIC] feature in TopicC°. When this feature is moved into this Spec-Head agreement position, it checks the feature, and using this same process of Spec-Head agreement the scope of the Topic-NMM is applied. This leaves us with the representation of an unmarked declarative with overt Topic marking.



'Atiyah saw the dog' Figure 4.23: Marked for with topic marking - option one



Atiyah saw the dog'

Figure 4.24: Marked for with topic marking - option two

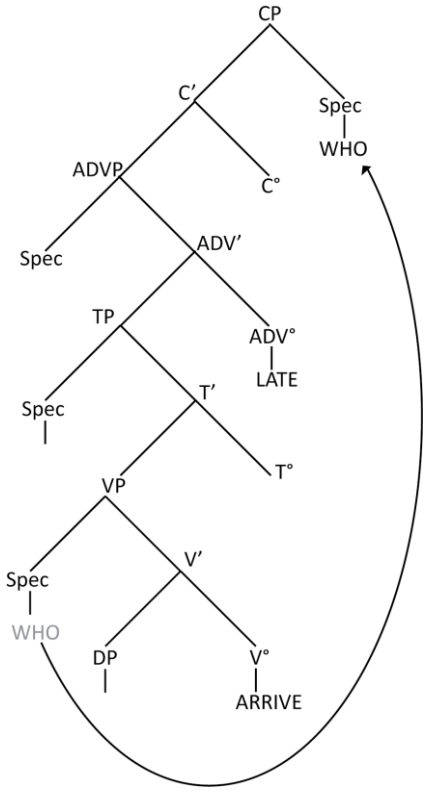
Error! Reference source not found. and **Error! Reference source not found.** again show the two options for the construction of the topic phrase; however, both make use of the same transformations. In this structure, the object is moved to the topic phrase to front this

information. It is moved to the specifier of TopicP where the [TOPIC] feature is checked and the moved object receives the Topic-NMM. This illustrates how object fronting is achieved through topic marking, providing the marked word order in SASL with Topic non-manual marking.

The data also confirmed that time adverbials such as YESTERDAY occur in the sentence-initial position in wh-questions. I will expand more on the wh-phrase in Sections 4.3 & 4.4.

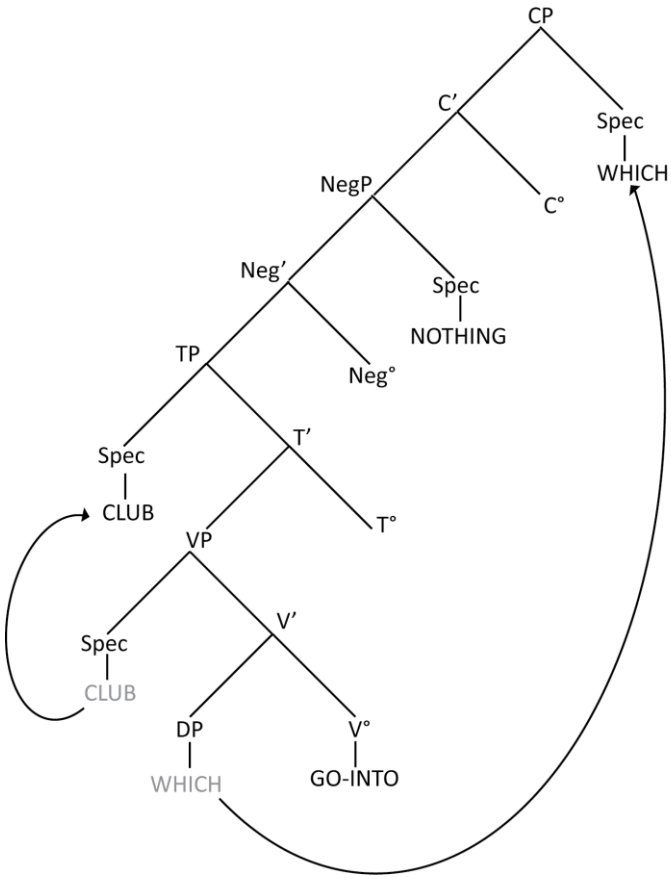
(48) YESTERDAY TEACHER$_{TOP}$ TEACH WHAT$_{WH}$
'What did the teacher teach yesterday?'

Both adverbials and negative quantifiers occur post-verbally. However, the wh-sign remains the most rightward peripheral element as seen in example (48) (see **Error! Reference source not found.**, **Error! Reference source not found.** & **Error! Reference source not found.**).



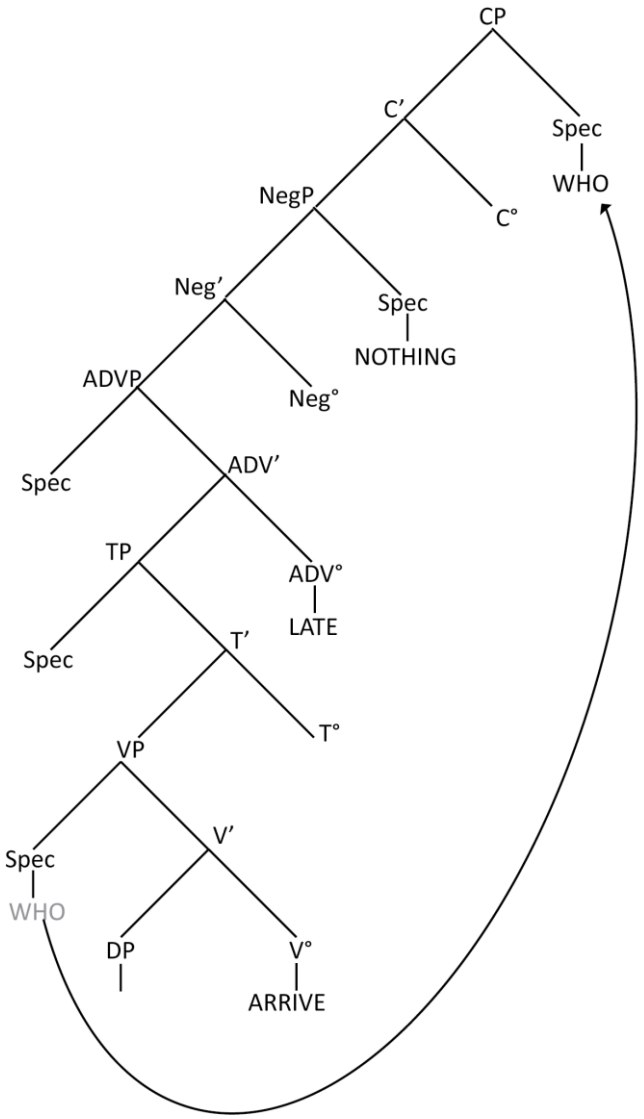
ARRIVE LATE WHO$_{WH}$
'Who arrived late?'

Figure 4.25: Wh-movement with adverbials in SASL



CLUB GO-INTO NOTHING$_{NEG}$ WHICH$_{WH}$
'Which club did you not go to?'

Figure 4.26: Wh-movement with negative quantifiers in SASL



ARRIVE LATE NOTHING WHO
'Who did not arrive late?'

Figure 4.27: Wh-movement with adverbials & negative quantifiers in SASL

In all the above examples, the wh-sign is the most right peripheral element and this conclusion is based on other elements such as negative quantifiers, which are usually found on the right. In this structure, by having Spec, CP on the right, we are simply able to account for the position of the wh-signs.

This captures the verb final placement in SASL and suggests that because complementizer phrases are functional categories they should be head initial. I then posit, like Neidle et al.et al. (1998), Cecchetto et al.et al. (2009) and Aboh et al.et al. (2005), that Spec, CP is on the right. The advantage of using this rightward analysis is that by having the specifier on the

right we are able to straightforwardly capture the right peripheral wh-elements in SASL and, as I will show, it is able to best account for NMM scope, too.

In the following section, I begin by considering other analyses to test the extent to which they account for the facts presented above. The elements that a successful analysis should capture are summarised below:

1. The clause-final placement of manual wh-signs
2. The scope of the wh-NMM marker over the manual wh-sign
3. The scope of the wh-NMM marker over the verb and manual wh-sign

I then move on to present a rightward analysis which resembles the one put forth by Aboh et al.et al. (2005) for IndSL (see Section 2.8.1). I will argue for the proposed structure, which builds on the facts put forth by De Barros (2013), below. I will argue that wh-signs move to the Spec, CP (as defined by Chomsky & Lasnik (1993) and Rizzi (1997)) which, in SASL is, linearized to the right. I will argue that it is spreading facts (or scope options) of the NMMs which support this structure as the most accurate representation of hierarchical structures in SASL.

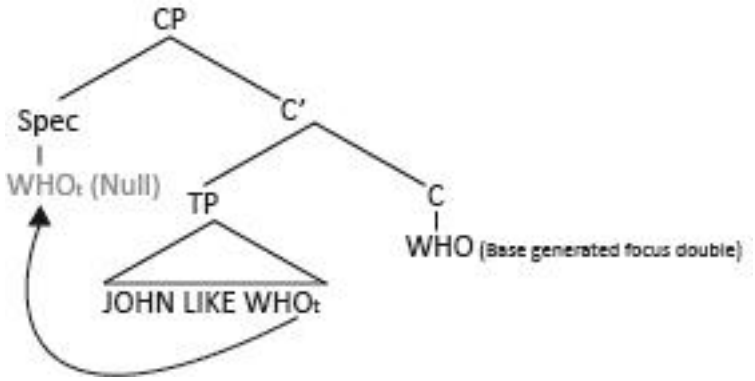
4.3. Leftward analysis of direct wh-questions in SASL

I will begin by considering whether the leftward movement analysis (Petronio & Lillo-Martin, 1997; Nunes & de Quadros, 2006) can adequately capture the syntax of wh-questions in SASL. The main assumption made by leftward analyses is that the Specifier of CP is on the left.

Where some analyses differ is in where the head of CP is located. In the ASL analysis of Petronio & Lillo Martin (1997), they split the complementizer phrase so that the head is final (see Section 2.5.1). On the other hand, Nunes & de Quadros (2006) follow the Kaynean (1994) principal which only allows for right branching trees (see Section 2.6.2). The result of Nunes & de Quadros (2006) analysis is that the head is leftward. I examine both leftward analyses to ascertain the extent to which they account for the SASL data.

Leftward Spec, CP & head-final C°

If we adopted the analysis of Petronio & Lillo Martin (1997), we would have to assume the same analysis they used to account for *doubling* in ASL (**Error! Reference source not found.**) as SASL only allows for right peripheral placements of wh-signs[46].



JOHN LIKE WHO[47]
'Who likes John?'

Figure 4.28: Doubling in ASL according to Petronio & Lillo-Martin (1997)

Under this analysis, the sentence-final wh-sign would be considered as a *focus double* - that is a base generated in the head of CP. Next, we would have to assume that there is a sentence-initial wh-element labelled as a "twin" under Petronio & Lillo-Martin (1997). According to this analysis the twin is marked with a [+F] and acts as a *focus operator*. As an operator, the twin undergoes LF raising to [Spec, CP] where there is Spec-Head agreement to check the [+F] [48] of the final double in C (through c-command). As there are no sentence-initial wh-elements in SASL we assume that the wh-sign in Spec, CP is null. I have already made a case for the use of null arguments in SASL, thus the application here does not appear out of place. Through this method, we can derive the correct word order in SASL wh-question formation.

However, the major concern for this analysis is the context in which SASL allows for null elements. As I have illustrated, null operators are only licensed when the operator is retrievable from the prior context, or in highly lexicalised contexts. This is the case for most

[46] See section 2.3 for Petronio & Lillo-Martin's (1997) analysis of doubles in ASL.
[47] NMMs have been left out for simplicity here.
[48] As you will recall, doubling occurs in ASL, according to Petronio & Lillo-Martin (1997), for emphatic/focusing purposes (hence the [+FOCUS] feature). (see Section **Error! Reference source not found.**).

sign languages (including ASL) and I have shown that it is also applicable to SASL. Thus, accepting the use of null elements for all cases of wh-question formation in SASL seems highly unlikely. In the data collected, most of the wh-constructions did not have wh-elements that were retrievable from the context nor were they found in highly lexicalised contexts (see example (49)). Another concern is that the "double" is more visible than the covert element. Intuitively, a null element cannot be double. Also, usually, doubles have *fewer* features, not more.

(49) YOU MAKE CAKE GIVE WHO$_{wh}$
'Who are you making the cake for?' (SASL)

It is clear, then, that this analysis does not provide an adequate explanation for the *general* pattern seen in SASL.

Next, let us consider the scope of the wh-NMM. The scope is typically accounted for through Spec-Head agreement between the manual sign in Spec, CP and the wh-NMM in C°. In SASL, in attempting to derive the scope over just the manual sign, we run into problems as the manual sign in the specifier is null. Do we then assume that because the sign is null there will be no marking over this sign? Or might there be an articulation of the wh-NMM without a manual sign? This is illustrated in example (50), which was a pattern that was unobserved in the data.

(50) *___$_{wh}$ YOU MAKE CAKE GIVE WHO$_{wh}$

Furthermore, if we had seen the above pattern in SASL, we would expect some sort of perseverance effect. Sandler & Lillo-Martin (1997) state that if the same NMM is used in separate parts of the sentence, the NMM should persevere until the next instance of the NMM. This would predict pattern (51), which was not observed in the data.

(51) *YOU MAKE CAKE GIVE WHO$_{wh}$

Therefore, it does not appear to be logical to then assume that the Spec-Head agreement is being used in SASL to account for NMM. This is problematic as NMMs are generally associated with feature-checking. The fact that the [uWH] feature is being checked through

Spec-Head agreement but then does not receive an overt wh-NMM seems counter-intuitive; especially considering that the wh-NMM must be present in all wh-constructions in SASL.

The only way to account for the scope of the NMM in C° is to assume that there is some sort of spreading from the Spec, CP to the head. However, based on the perseverance effects described above (see examples (50) & (51)) this seems unlikely. The only other option would be to assume that because the wh-NMM and the [uWH] are both in C°, they are essentially the same thing, and as there is manual material in C° the NMM just becomes overt. I will show in my analysis how Spec-Head agreement is a better predictor for scope marking, both on a theoretical basis and in terms of illustrating that, in SASL, the marking of NMMs is an overt realisation of feature-checking (see Section 4.7).

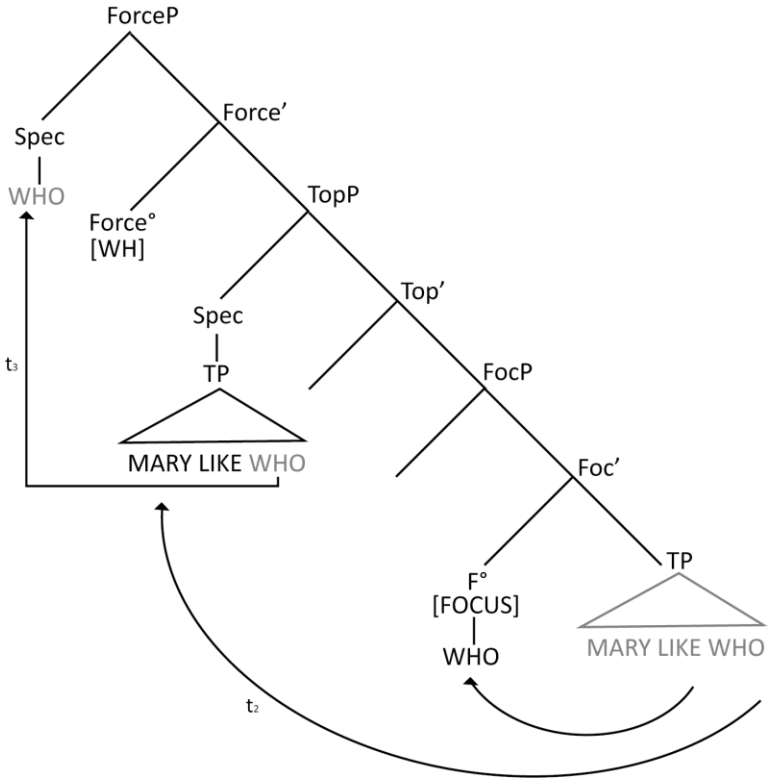
In the leftward analysis, there is also the option to use c-command to account for the distribution of the NMM. However, the use of c-command to account for the scope over just the clause-final wh-sign does not appear to be possible. This is because the scope of the c-command domain will always be larger than just the domain of C°. Thus, trying to use c-command would again result in the ungrammatical scope pattern observed in (52) where the NMM spread over the entire clause.

To account for the scope over the verb and the manual sign, we can use the c-command domain of C°, as did Petronio & Lillo-Martin (1997), using a topic phrase. As the sentence stands, it is entirely in the c-command domain of C°, which includes the subject. This is a spreading pattern that was never observed in the data. Thus, the only way in which to derive the correct scope of the NMM is to move the subject out of the c-command domain of C°. We would have to assume that the TP moves to a position higher than CP, which - as mentioned - could possibly be a topic phrase. This would leave the VP in the c-command scope of C°, which would account for the second spreading pattern. The concern with this account is that, in SASL, Topics (see Section 4.2) appear to be overtly marked by a Topic-NMM. The fact that some of the constructions that displayed this scope did not have overt topic-NMMs raises the question of why some would optionally use this topic marking despite being moved to a topic phrase. Again, where a specific feature is checked in the

syntax, the NMM marker associated with that feature should be obligatory all the time or never. Hence, this analysis does not capture the facts of SASL.

Leftward Spec, CP & head initial C°

The leftward Kaynean (1994) analysis used by Nunes & de Quadros (2006) differs from the one used by Petronio & Lillo Martin (1997). It is therefore worth considering whether it is able to capture the syntax of SASL.



(WHO) LIKE MARY WHO$_{WH}$
'Who exactly likes Mary?'

Figure 4.29: Doubling in LSB with a null, sentence-initial element

The first transformation in **Error! Reference source not found.**, repeated above as *Figure 4.*29, moves the wh-sign to the head of the Focus Phrase. In this position, according to Nunes & de Quadros (2006), it morphologically fuses to the head. Next, in order to derive the clause-final wh-sign, remnant movement is applied that moves the entire TP to a higher position in the sentence. This, then, renders the wh-sign in F° as clause-final. Finally, the wh-

sign in the moved TP makes a second transformation to the Spec, CP to check the [WH] feature.

Chain reduction takes place where the lower chains are deleted – which eliminates the wh-elements in the moved TPs. The morphological fusion of the wh-element in F° is ignored by the chain reduction and thus remains sentence-final. However, in SASL we would have to assume the sentence-initial wh-element to be null to derive the correct word order where there are no sentence-initial wh-signs.

However, assuming a null sentence-initial element again raises concerns. As noted in Section 4.1, null elements in SASL only appear to be licensed when the nulled argument is retrievable form the context. Given the way in which the data was collected, it is highly unlikely that the wh-items were retrievable from the context. Therefore, is difficult to assume that this would be a general pattern used by SASL. Thus, this account does not provide a satisfactory analysis for the word order of wh-questions in SASL for the same reason that the analysis by Petronio & Lillo-Martin (1997) did not.

There are also issues with moving the wh-word, which is an XP, to a head position, and the fact that the wh-word is an XP also causes concerns with the process of morphological fusion. Because the wh-word is technically a phrase, we would not expect this fusion to take place as morphology is word-internal. The constraints on the morphological fusion come across as unclear, which leads it to be over-generative.

Finally, this analysis is unable to account for the scope of the wh-NMM in SASL. For one, Spec-Head agreement cannot account for the first spreading pattern that takes place over just the wh-sign in F°. As I have shown, the [WH] feature in C° is associated with the wh-NMM, and because the wh-sign is not in a Spec-Head configuration with C°, it cannot receive the wh-NMM. Instead, we would have to assume that there is a NMM associated with the [F] feature in F° which spreads over the wh-sign. However, because the wh-sign is once again in the head of a phrase (as opposed specifier), the same assumption of the awkward 'head spreading' that was used in the Petronio & Lillo-Martin (1997) analysis has to be used here (this is opposed to spec/agreement or c-command).

Nunes & de Quadros's (2006) account runs into similar problems to that of Petronio & Lillo-Martin (1997) due to Spec, CP being on the left. This results in problems with generating the correct word order and accounting for the distribution of the wh-NMM. Therefore, this analysis does not explain the SASL data.

I will now show how placing Spec, CP on the right is able to account for the areas where the leftward analysis is unable to.

4.4. Rightward analysis of direct wh-questions in SASL

In this section, I will explore three possible analyses that place the Specifier of CP on the right in SASL. These analyses build on the structures and concepts proposed by Neidle et al.et al. (1998) (ASL), Cecchetto et al. (2009) (LIS), and Aboh et al. (2005) (IndSL) for wh-question formation. I will also attempt to incorporate the structure put forth by De Barros (2013) for SASL. I will present three possible rightward analyses for SASL, and discuss the strengths and weaknesses of each using the three constructions listed below (which represent the three scope markings for SASL). I will use these constructions to compare the analyses and illustrate which I believe to be best suited to SASL.

1. BIBI READ WHAT$_{wh}$ *(Scope over clause-final wh-sign)*
2. BIBI$_{TOPIC}$ READ WHAT$_{wh}$ *(Scope over clause-final wh-sign and matrix verb)*[49]
3. CHILDREN CAKE WANT WHICH$_{wh}$ *(Scope over clause-final wh-sign that replaced a DP)*

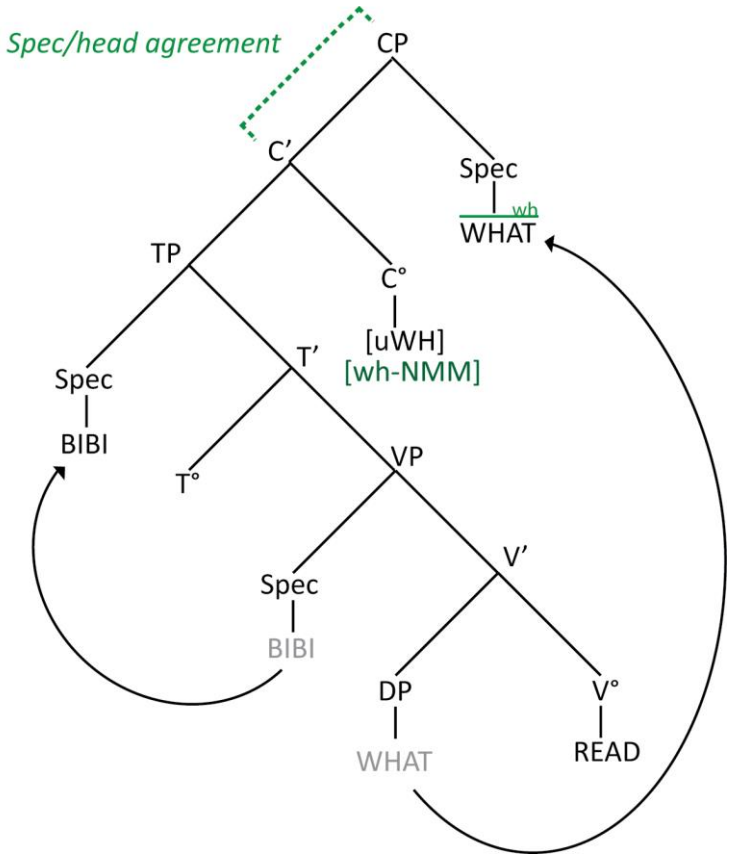
These constructions were selected as they capture the basic wh-construction constituent order in SASL as well as the two possible scope options found in the SASL data.

4.5. Analysis 1

The first potential analysis uses the spilt-headed tree outlined above in Section 4.3 and places Spec, CP and C° on the right. In order to derive our first construction where the wh-sign is sentence-final and the scope of the wh-NMM is only over that sign (see **Error! Reference source not found.**), the wh-sign moves to the Spec, CP position where is it able to check the [uWH] feature in C° (shown in green in **Error! Reference source not found.**). The rightward positioning of Spec, CP allows the wh-sign to be clause-final. I can assume, like Neidle et al.(1998) and others, that NMMs are associated with the features found in

[49] The dashed line indicates that the topic-NMM can be optionally marked in these constructions.

functional heads – thus the scope over just the wh-sign is accounted for through a Spec-Head relationship (that is the wh-sign in Spec, CP and the wh-NMM in C°).

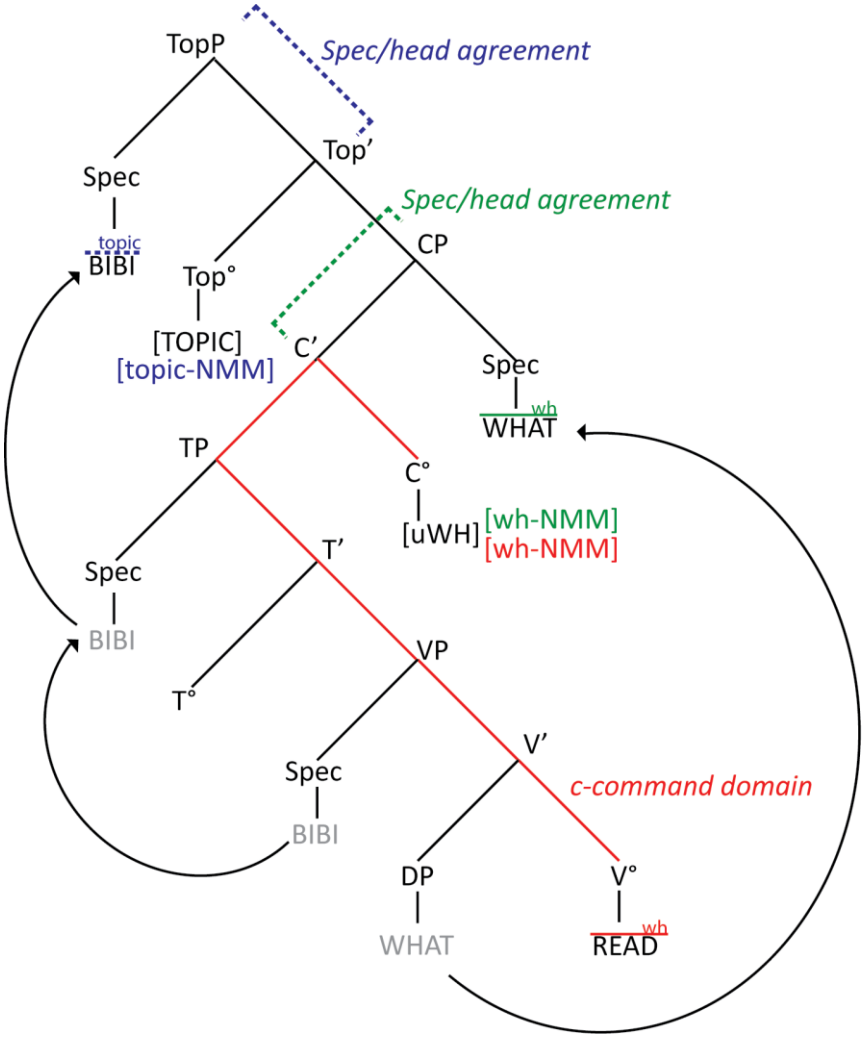


BIBI READ WHAT$_{wh}$
'What did Bibi Read?'

Figure 4.30: Analysis 1 - Scope over clause-final wh-sign

To account for the second construction, where the wh-sign is clause-final and the spreading is over both the verb and wh-sign, I use a similar account to Neidle et al.(1998). The first transformation in **Error! Reference source not found.** would be moving the entire DP to a position higher than the CP. We can postulate that this could be the topic phrase as we sometimes do see the topic-NMM being used in these constructions (shown in blue in **Error! Reference source not found.**). The next transformation sees the wh-sign move to the Spec, CP position where it can check the [uWH] feature. This gives us the correct constituent order where the wh-sign is clause-final. Next, the spreading can be accounted for through the c-command (shown in red in **Error! Reference source not found.**). As in Neidle et al. (1998), the spreading of the NMM can be accounted for through the c-command domain of

the C°. Because the DP has moved to a higher position, it is no longer in the c-command of C°, which leaves the entire VP covered. The scope is then extended through the wh-sign in Spec, CP through the Spec-Head agreement mentioned above.

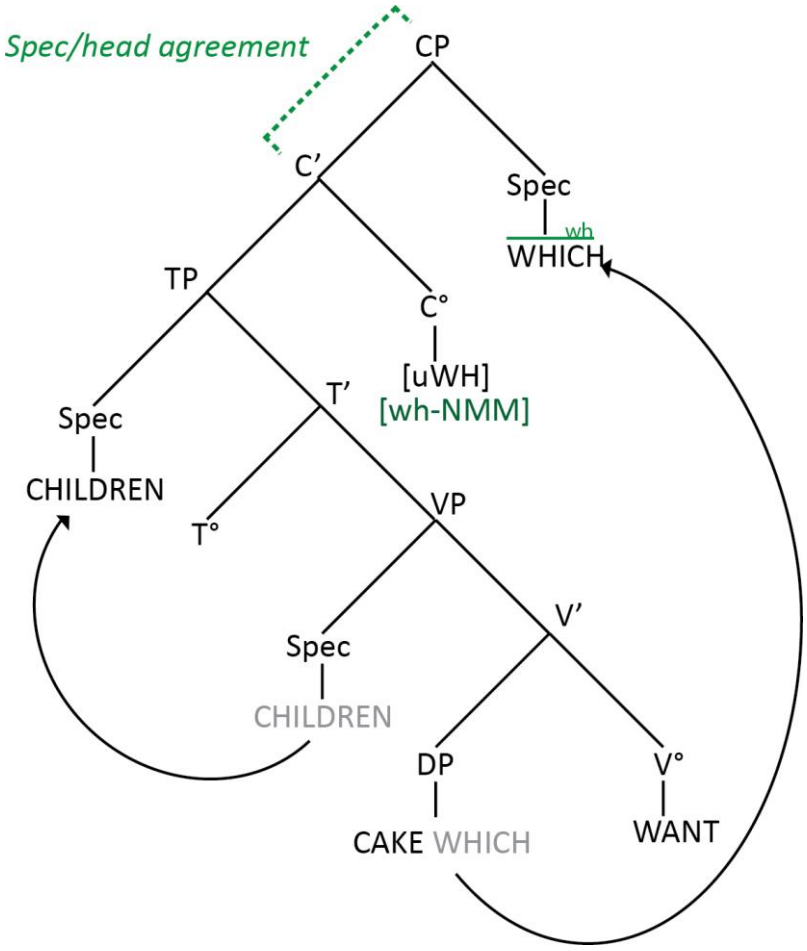


BIBI$_{TOPIC}$ READ WHAT$_{wh}$
'What did Bibi Read?'

Figure 4.31: Analysis 1 - Scope over clause-final wh-sign and matrix verb

Finally, in Analysis 1, construction 3 is captured in the same way as construction 1. In *Figure 4.32.*the wh-sign moves to Spec, CP where it checks the [uWH] feature and scope is accounted for using Spec-Head agreement. However, Analysis 1 predicts that if CHILDREN did not move to a position further up, and if there were the same optionality for the NMM to spread (as in *Figure 4.32*), the entire sentence would be covered by the scope of the NMM. It also predicts that if CHILDREN did move to a position further up and we applied the optional spreading rule, then the NMM could scope over CAKE WHICH WANT. I cannot

confidently rule out that these constructions are ungrammatical as I have not tested their grammaticality with the assistance of native signers. However, the most important prediction that this analysis offers is being able to derive the scope over only WANT WHICH, which is seen in *Figure 4.32.*



CHILDREN CAKE WANT WHICH$_{wh}$
'Which cake do the children want?'

Figure 4.32: Analysis 1 - scope over clause-final wh-sign that replaced a DP

The benefit of Analysis 1 is that it can account for the broad word order of the constructions found in the SASL data. This rightward movement analysis can simply and eloquently capture the syntax of wh-questions in SASL without having to make a number of costly transformations. Moreover, based on the typological evidence that SASL constantly selects the right periphery for wh-elements, it makes sense to posit a rightward analysis rather than a leftward analysis for SASL.

Whilst Analysis 1 is a definite possibility for the analysis of wh-questions in SASL there are some theoretical issues surrounding the spreading of the NMM which need to be considered. If we consider construction 2, where the scope of the NMM is accounted for through both the Spec-Head agreement and c-command, one would expect there to be another feature to motivate the spreading – that is, we would expect one feature to account for the Spec-Head agreement and another feature to account for the use of c-command.

If [uWH] is checked by wh-movement, the feature is checked and then deleted. This means that when optional spreading takes place, i.e. over the verb, it is not motivated by a feature (as this feature as already been deleted). The fact that this analysis requires an operation to be BOTH optional and unmotivated is a concern. At the very least, it would require a theory of PF feature spreading as an additional stipulation.

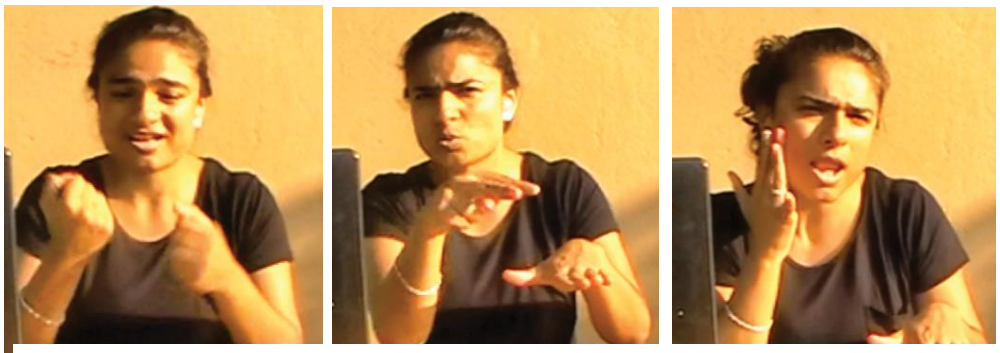
The obligatory nature of wh-spreading to occur solely over the manual wh-sign does motivate that it is associated with the [uWH] feature. This gives more reason to consider theory of Spec-Head agreement as it is more theoretically grounded. However, then the spreading through the c-command domain becomes unmotivated. Furthermore, the c-command spreading pattern in Analysis 1 incorrectly predicts the grammatically of (52). From the limited data available, it appears that topic may or may not be overtly marked by the topic-NMM. Thus, there is no evidence that readily suggests that the TP MUST move to a position higher than CP in constructions where there is spreading over the verb. Without that transformation, in examples like (52), spreading would occur over the entire sentence which, we have seen, is ungrammatical.

(52) JOHN SAW WHO$_{WH}$
'Who did John see?' (SASL)

The unmotivated spreading of the c-command domain of the NMM is reason to consider an analysis that eliminates this process.

Moreover, in Analysis 1, for the c-command domain not to scope over the subject (in this case BIBI), we have to assume that it moves to a position higher than CP. In other sign languages, like ASL, the topic phrase has widely been accepted as the landing site for these moved subjects. In ASL, topics are always overtly marked by a topic–NMM; however, in

other sign languages like IndSL, topics are not overtly marked by a NMM (Aboh et al., 2005). My data suggests that SASL can overtly mark topic with a NMM. However, in cases where the scope is over both the verb and the wh-sign, topic marking is not always present.



CAR SEE WHEN

CAR SEE WHEN

CAR SEE WHEN$_{wh}$
'When did you see the car?'

Figure 4.33: Informant 1 with no topic marking

CAR SEE WHEN

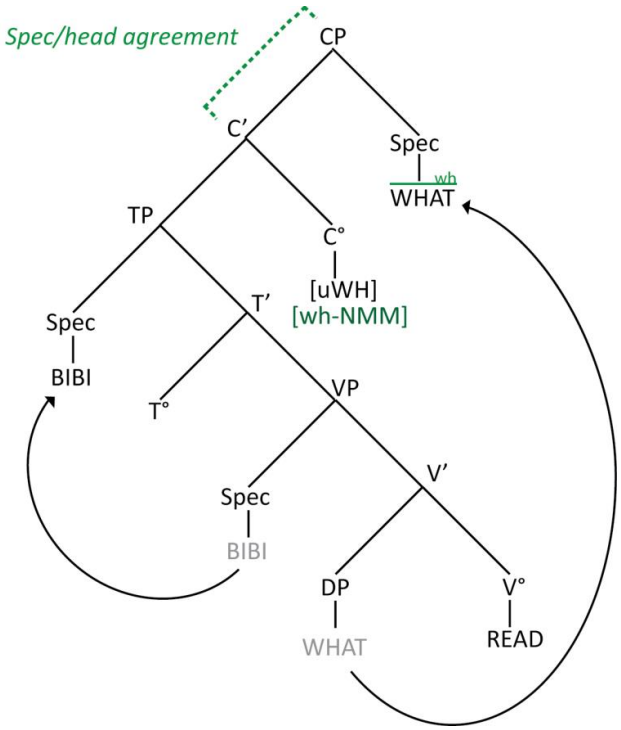
CAR$_{topic}$ THIS YOU SEE WHEN$_{wh}$
'When did you see the car?'

Figure 4.34: Informant 2 with topic marking

Applying Analysis 1, in cases where the object would have to raise to TopP to account for the scope, we would expect the topic marking to be spread over the subject every time; however, this is not what the data suggests. Consider **Error! Reference source not found.** and **Error! Reference source not found.** where the same sentence of "when did you see the car" is signed different by the two signers. In **Error! Reference source not found.** the informant signs the sentence without the topic-NMM, whereas in the first frame of **Error! Reference source not found.** the informant uses the 'eyebrows up' NMM (which is widely associated with topic marker). With the exception of the topic marking, sentences are signed identically by the two signers. Analysis 3 would allow us to account for this pattern as in that analysis the object may *optionall*y raise without being affected by the scope of the wh-NMM. As the entire VP moves to get scope, the Spec-Head relationship does not affect the TP. This is not the case in Analysis 1 where unless the TP moved to a position higher than CP, for example TopP, the c-command domain would spread over the TP which would result in an ungrammatical construction in SASL.

4.6. Analysis 2

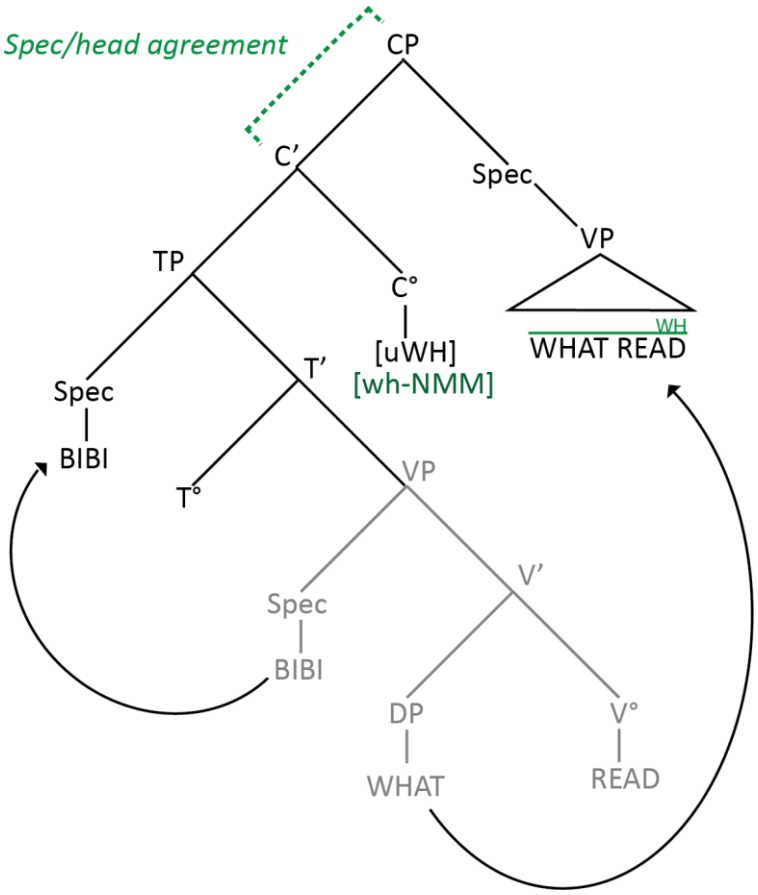
Analysis 2 aims to solve the c-command scope issues outlined with respect to Analysis 1. Like Analysis 1, it makes use of the rightward Spec, CP and a split-headed structure. As such, it deals with construction 1 in the same way as Analysis 1. The wh-sign moves Spec, CP to check the [uWH] feature in C°. The wh-NMM scopes over the wh-sign which is now in a Spec-Head configuration (**Error! Reference source not found.**).



BIBI READ WHAT$_{wh}$
'What did Bibi Read?'

Figure 4.35: Analysis 2 - Scope over clause final wh-sign

When it comes to construction 2, however, instead of using c-command to account for the scope spreading over the verb, Analysis 2 moves the entire VP into Spec, CP. In *Figure 4.36* by moving the entire VP, we are able to account for the spreading of the NMM through Spec-Head agreement rather than through the unmotivated second operation of c-command. Thus, Spec, CP requires an XP in its Spec. But Spec, CP is blind to the exact nature of the XP - any XP will do. Thus, Spec, CP can be filled optionally by either a DP or a VP pied-piping a uWH wh-item.



*BIBITOPIC WHAT READ wh
'What did Bibi Read?'

Figure 4.36: *Analysis 2 – Scope over clause-final wh-sign and matrix verb

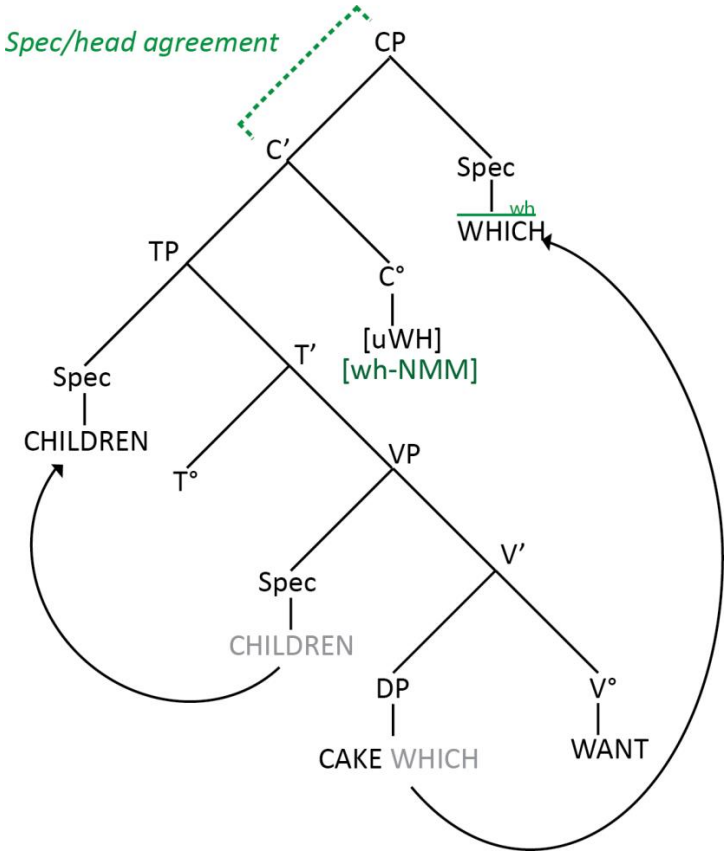
This analysis allows us to predict that, in SASL, the variation in the scope options is the result of the optional movement of either the DP or the VP. This optionality of movement is the same as what we see in English pied piping. Consider (53a-b):

(53) a. Which box did you put it in?
b. pp[In which box] did you put it ___

In (53b), the moved wh-phrase may optionally 'bring with it' the prepositional phrase containing 'in' to the sentence-initial position. In SASL, we would then assume that the VP may optionally pied-pipe along with the DP phrase to the sentence-final position of Spec, CP. Thus, we have a more theoretically sound reason to accept Analysis 2 over Analysis 1, based on the ability of the former to capture the scope of the wh-NMM.

However, there is one major concern with Analysis 2, in that it fails to capture the correct word order in wh-question formation as the wh-sign is not final. We could resolve the word order problem by swapping the positon of the DP and V°. However, reversing this order would result in the incorrect word order for construction 3. Ultimately, Analysis 2 cannot be considered because when the VP moves to the Spec, CP position, the sentence becomes ungrammatical.

Finally, let us consider construction 3. Analysis 2 is able to account for spreading and the canonical word order. In *Figure 4.37* the first transformation sees the wh-sign moving to Spec, CP where it checks the [uWH] feature. It gets the NMM scope marking through the Spec-Head configuration it is in the CP.



CHILDREN CAKE WANT WHICHwh
'Which cake do the children want?

Figure 4.37: Analysis 2 - Scope over clause-final wh-sign that replaced a DP

The clear advantage of Analysis 2 lies in its ability to account for the spread of the NMMs using a single operation, i.e. Spec-Head agreement. Any syntactic analysis that does not account for the use of NMMs in a well thought-out and theoretically grounded way fails to

capture a vital aspect of sign language grammar. However, whilst Analysis 2 does hit the mark in this regard, its inability to capture the correct word order for constructions where the NMM needs to spread over both verb and wh-sign, as in construction 2, makes this analysis inadequate.

Thus, the two previous analyses each capture certain aspects of the SASL data, but fail to capture others. Analysis 1 explains the word order while Analysis 2 explains the scope of the NMMs. In my final proposal, Analysis 3, I aim to maintain the Spec-Head agreement relationship to account for the spread of NMMs, as well as to suggest a way in which to solve the word order issue.

4.7. Analysis 3

Analysis 3 has the same foundation as Analyses 1 & 2, in that the CP is still rightward. De Barros (2013) uses a split-headed structure to ensure that the verb is final in SASL; however, in Analysis 3, I propose that the DP is final. Because the DP rather than the verb (V°) is now final, I introduce an additional functional category: the Agreement Object Phrase (AgrO). This phrase has been attested in both spoken and sign languages, and there is substantial cross-linguistic evidence to support the use of AgrO in SASL. I propose that the Object DP moves to Spec AgrOP to satisfy a checking requirement on referential DPs, but not on WH items. There are a number of possible features that could trigger the movement of an object in AgrO:

- referentiality in the DP;
- Case marking;
- Order of topic versus focus;
- Anti-focus (Zeller, 2008);
- The high level of morphological agreement in sign languages.

Each of these could be investigated in future research. For now, I will assume that AgrOP licenses material that is not focussed (antifocus) such as pronouns and full DPs. This is supported by the fact that question NMMs (which include focus) do not spread leftwards past the verb, i.e. material to the left of the verb appears to be non-focussed. However,

since a wh-item is inherently focussed, it cannot move to or remain in SpecAgrOP but must move to SpecCP where it is licensed.

Thus, I use the same hierarchical relations put forth by De Barros (2013), just without the split head structure. My proposed structure for SASL is illustrated in **Error! Reference source not found.**.

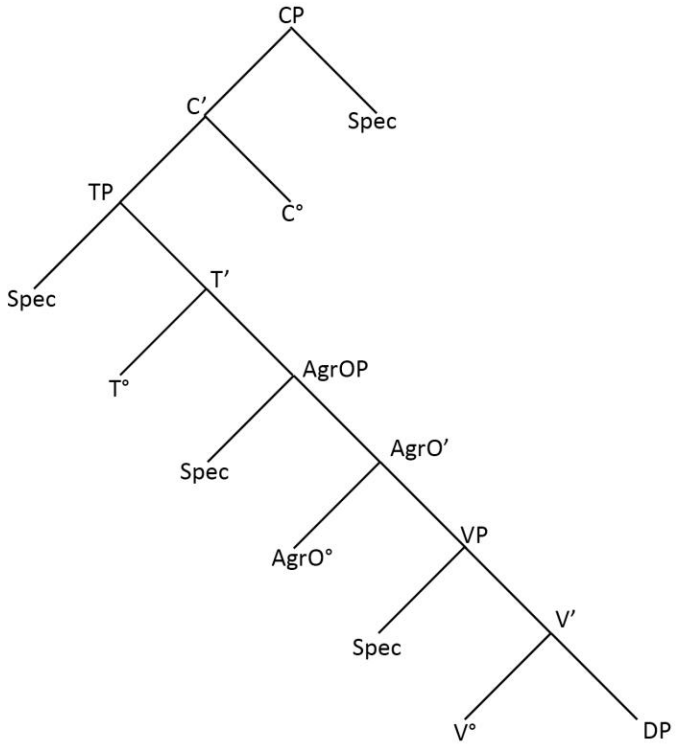
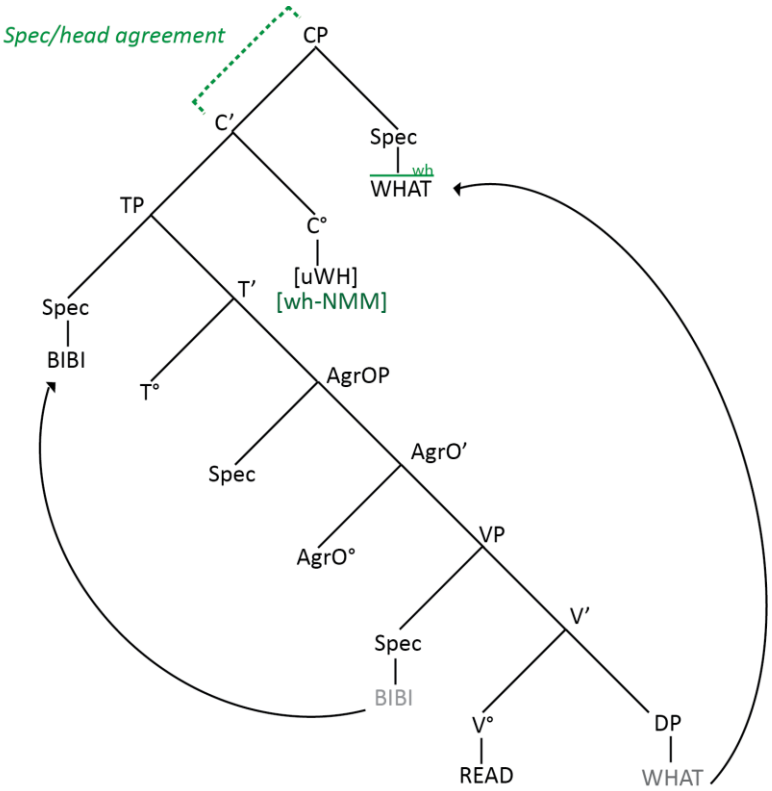


Figure 4.38: Proposed structure for SASL

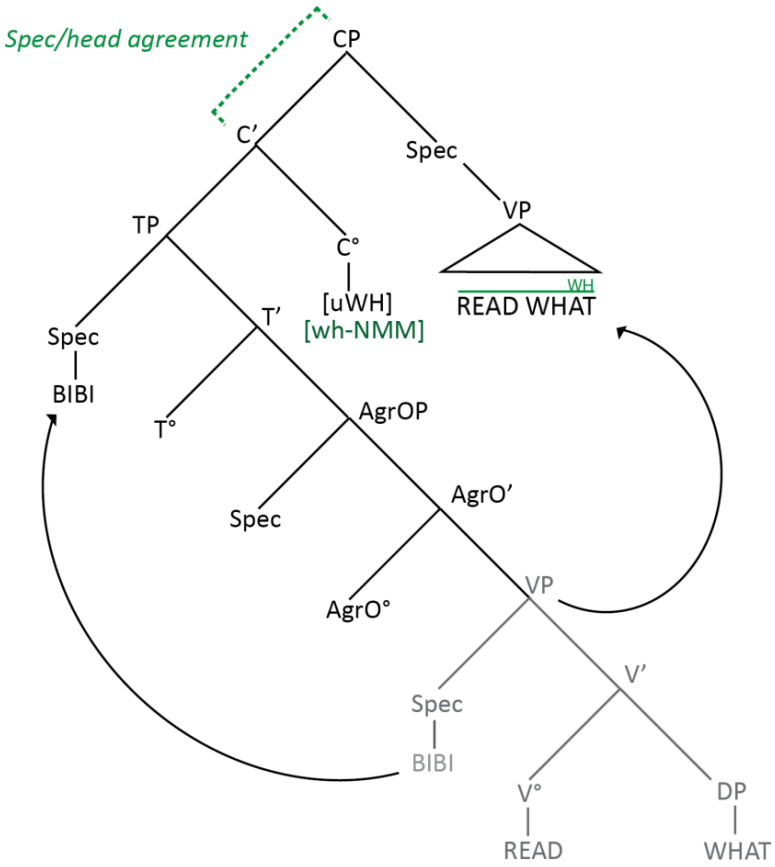
I now consider Analysis 3 with respect to construction 1 (see **Error! Reference source not found.**). To account for construction 1 using Analysis 3, we use the same process as the previous two analyses. The wh-sign does not move to Spec, AgrOP because it is inherently focussed. The wh-sign moves to the specifier of the CP where it can check the [uWH] in C°. It is in a Spec-Head relationship, which accounts the NMM spreading. As Spec, CP is on the right the correct word order is generated with the wh-sign in the sentence-final position. Thus, both the word order and the scope of the NMM is accounted for.



BIBI READ WHAT$_{wh}$
'What did Bibi Read?'

Figure 4.39: Analysis 3 - Scope over clause-final wh-sign

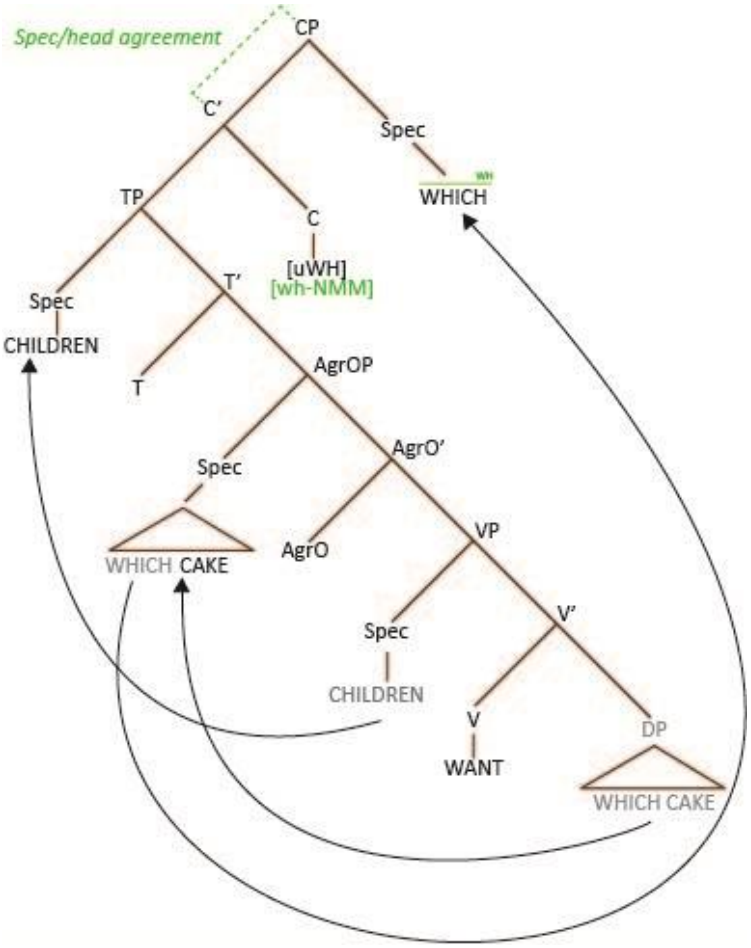
Error! Reference source not found. accounts for construction 2, using Analysis 3. First the entire VP moves to Spec, CP where the [uWH] is checked. As in Analysis 2, what essentially happens is that the DP with the wh-sign is forced to move to check the features in C°, and the VP is pied-piped along with the DP to Spec, CP. In this way, the entire VP is able to receive the scope of the NMM over the verb and the wh-sign by being in a Spec-Head configuration with C°, which contains the wh-NMM. By moving the entire VP into Spec, CP we are able to once again account for the spreading by using a single operation (Spec-Head) associated with a single feature - rather than using both the Spec-Head and c-command. Keeping the DP final generates the correct word order within the moved VP. Thus, using Analysis 3 we are again able to account for the first two constructions.



BIBI$_{TOPIC}$ READ WHAT$_{wh}$
'What did Bibi Read?'

Figure 4.40: Analysis 3 - Scope over clause-final wh-sign and matrix verb

Finally, the analysis of construction 3 depicted in *Figure 4.41* provides the final piece of evidence to support Analysis 3 over the previous two structures. Analysis 2 was unable to account for the constituent order in construction 2; to overcome this problem, Analysis 3 introduces the AgrO Phrase. The first transformation moves the DP phrase containing the object and wh-sign into Spec,AgrOP. This is because the phrase "which cake" presupposes the existence of cake in the preceding discourse. "Cake" is thus non-focussed and discourse-given. For this reason, the DP - "which cake" - must move to Spec,AgrOP in order to be licensed. However, the wh-sign is inherently focussed and so it must move to Spec,CP, stranding "cake" in Spec,AgrOP. The [uWH] feature in C° triggers the movement of the wh-sign in AgrOP to Spec, CP. Once in Spec, CP the wh-sign can check the feature as is able to receive the necessary scope. The movement of the DP to AgrOP allows us to generate the correct word order, while still maintaining the Spec-Head agreement to facilitate the scope of the NMM.



CHILDREN CAKE WANT WHICHwh
'Which cake do the children want?

Figure 4.41: Analysis 3 - Scope over clause-final wh-sign that replaced a DP

Further investigation is required to substantiate which of the possible options could trigger the movement of the object to AgrO; however, based on cross-linguistic evidence in both signed and spoken languages, the use of the functional category is a reasonable option by which to account for the constituent order in SASL.

4.8. Summary of findings

In this chapter, I first examined the properties of the manual signs and NMMs associated with wh-question formation in SASL. SASL has a full paradigm of wh-signs that are found exclusively in the clause-final position. Even in situations where other clause-final elements (e.g. negation signs) were present, the wh-signs were still the rightmost peripheral element. SASL makes use of two NMMs in wh-question formation - the 'eye brow raise' and the

'frown'. I have shown that the 'eyebrow raise'[50] is not the *main* NMM marker associated with wh-question formation in SASL – rather it is used in specific discourse-related contexts. Instead, I focused on the 'frown' as the main NMM marker used in wh-question formation (thus, it is labelled as the wh-NMM). I showed that the wh-NMM is associated with the [uWH] features found in C° and that there are two possible scope options. Either the scope can range over the wh-sign, or it may optionally spread to the verb and any intervening signs.

In order to account for these features, several analyses were considered. First, the leftward branching CP was tested with two variations – one where C° was rightward/final and the other where C° was leftward. In the former, the major concern was the use of null elements in the Spec, CP to account for word order. The use of null elements in SASL, as in other sign languages, is only licensed when the arguments (that are null) are retrievable from the context. In the data collected, most of the constructions did not satisfy this criterion; therefore, assuming the null hypothesis for SASL is problematic. The same concern was encountered when applying the second leftward analysis where C° was on the left. Unless we assume that the wh-element in Spec, CP is null for every construction (even though null elements are only licensed in sign languages by specific contexts), we cannot account for the clause-final elements that appear in SASL. This prompted the suggestion of an alternative analysis for SASL.

The inability of the leftwards CP to capture the clause-final elements in SASL was reason to consider a less conventional analysis of a rightward facing CP. Several sign languages have adopted this approach, particularly those that make use of a single wh-element in the clause-final position. Given that SASL makes exclusive use of the right periphery for wh-signs, it made sense to consider this option.

Three analyses using a rightward Spec, CP were tested with respect to SASL. Each of them was tested to account for three basic constructions, repeated below:

1. BIBI READ WHAT$_{wh}$ *(Scope over clause-final wh-sign)*
2. BIBI$_{TOPIC}$ READ WHAT$_{wh}$ (Scope over clause-final wh-sign and matrix verb)
3. CHILDREN CAKE WANT WHICH$_{wh}$ (Scope over clause-final wh-sign that replaced a DP)

[50] This non-manual should not be confused with the similar eye brow raise used for topic marking.

Analysis 1 was able to capture both the correct word order and the various scope options. It moved the wh-element to a rightward and clause-final Spec, CP to check the [uWH] feature in C° (through Spec-Head agreement). The scope was accounted for in two ways - in constructions 1 and 2, where the scope was over the manual wh-sign, *Spec-Head agreement* was used to account for the spreading; however, when the scope spanned over the verb, as in construction 2, the c-command domain of C° was used.

The concern with Analysis 1 arose due to its use of *both* these operations to account for the scope. If we assume that the wh-sign moves to Spec, CP, then to check the [uWH] that feature is deleted. When we account for scope using Spec-Head the same operation is used to check the feature – therefore, one can state that scope marking is *overtly* realised in sign languages through NMM. However, if we use a second operation, c-command, the spreading is unmotivated as there is no longer a feature to check. Analyses 2 and 3 aimed to address this problem.

Analysis 2 accounted for construction 1 in the conventional way - where the wh-sign moved to the rightward Spec, CP to check the [uWH] feature. When the spreading was over the verb, as in construction 2, the entire VP was moved to Spec, CP where the scope could be accounted for using the same Spec-Head agreement rather than through Spec, CP. Essentially, the DP was moving to check the feature and the rest of the VP was pied-piped along with it. Through this analysis, the optionality was in moving either just the DP or the VP rather than using two different operations. However, the concern with Analysis 2 was that for construction 3 the incorrect word order was generated. If we moved just the wh-sign, then CAKE came after the verb rather than before it.

Analysis 3 was essentially the same as Analysis 2, except that it included an Object Agreement Phrase, AgrO. Thus, for construction 3 the DP first moved to spec, AgrO; from there the [uWH] feature triggered the movement of the wh-sign in AgrO to Spec, CP where it was able to be checked and receive scope through Spec-Head agreement.

Analysis 3, then, was able to account for the word order in all three constructions through a rightward Spec, CP. My data suggests that having a rightward Spec, CP (and therefore rightward movement) is the best option for SASL despite it going against the linguistic

generalisation that all wh-movement is leftward. Furthermore, the overwhelming selection of the clause-final position for wh-signs in SASL, as well as the clear inability of the leftward analysis to capture this phenomenon, is *cause to reconsider* this universal. Moreover, with the addition of the AgrO, Analysis 3 could account for construction 3 where Analysis 2 could not.

Finally, Analysis 3 only relies on one operation to account for the scope of the NMM. There is a concern when using both c-command and Spec-Head to account for the spread as we expect the [uWH] feature to be deleted once the wh-sign moves into Spec, CP to check it. However, if accepting the use of c-command would warrant an additional feature, Analysis 3 is able to allay this concern by relying solely on Spec-Head agreement.

Chapter 5: *Conclusion*

This research aimed to provide a comprehensive account of wh-question formation in South African Sign Language. The literature review at the beginning of the thesis discussed the key components of wh-question formation in both spoken and sign language. I highlighted the contribution that SASL can make not only to sign language literature but also to linguistic generalisations, and I outlined the novel four-stage methodology applied in this study. The methods were designed to be sensitive to particular factors that influence elicited sign language data. These data were described at the beginning of the analysis chapter, focusing on the two key elements involved in wh-question formation - the manual wh-signs and the wh-Non-Manual Markers. The analysis had to accurately capture *both* of these elements to be deemed adequate for my purposes. I showed that the leftward analysis cannot accurately capture wh-question formation in SASL, and I instead posited a rightward analysis that makes use of an Agreement Object Phrase. I have shown that this is the best way to capture the syntax of wh-question formation in SASL.

In this final chapter I integrate the SASL data into the theoretical sign language framework. I also highlight the unique considerations involved in constructing the methodology for this study, and I outline the ways in which my methods have facilitated collection of data appropriate for an analysis of this kind. Finally, I discuss the key findings of my work, and its broader implications for current linguistic theory.

5.1. The theoretical debate

The literature dealing with wh-question formation in signed languages is complex, due largely to the confluence of two major opinions: one holds that sign languages are best represented using the 'conventional' leftward wh-movement analysis, following the protocol for spoken languages, whilst the other considers rightward wh-movement analysis to be possible.

The first of these methods was introduced by Petronio & Lillo-Martin (1997) who posit that ASL has leftward Spec, CP and clause-final C° (see Section 2.5.1). The second, proposed by Neidle et al. (1998), employs a very different analysis in which Spec, CP faces rightward (see Section 2.5.1). According to Petronio & Lillo-Martin (1997) the wh-sign may appear in the clause initial position, it may be doubled (sentence-initial and sentence-final), but it may not generally occur in the clause-final position. By contrast, Neidle et al. (1998) applied a framework in which the wh-sign may be doubled, left in situ, or may appear in the clause-final position[51]. Within the ASL data we find both support and contradiction for each of these two structures.

As the picture remains unclear when viewed through the lens of ASL, we must turn to other sign languages to shed light on the debate. Two in particular have received considerable attention in the literature – Brazilian and Italian sign languages. Nunes & de Quadros (2008) use a leftward analysis for the former (see 2.6.1), but their method is slightly different from the analysis of Petronio and Lillo-Martin (1997). They use a Kaynean (1994) all-leftward branching tree, rather than the split-head structure used by Petronio & Lillo-Martin (1997). In contrast, Cecchetto et al. (2009) posit a rightward facing Spec, CP analysis for Italian Sign Language (see 2.6.2).

Additional typological evidence comes from less well-studied sign languages. İşsever & Makaroğlu (2013) show that in TID wh-elements may move leftward or rightward (see 2.7.1). Wh-phrases target the Spec, CP which is on the left and wh-words move to C°, which is on the right. Kuhn & Wilbur (2006) studied Croatian Sign Language and proposed a similar leftward analysis to that of Petronio and Lillo-Martin (1997) (see 2.7.2). Finally, Aboh et al. (2005) examined IndSL, showing that a leftward analysis is not possible for this language. Whilst a rightward analysis is able to capture the syntax, they preferred to analyse wh-elements in IndSL as particles.

The picture still remains unclear, and the dominant sentiment among researchers in this field is that more cross-linguistic data is needed to test the robustness of these various competing claims.

[51] Neidle et al. (1998) credit the difference between their findings and those of Petronio and Lillo-Martin (1997) to the fact that these authors do not include Native signers of ASL in their study. This is a point that I pursue further in my methodology section (see Section 3.1)

In the context of South African Sign Language, contributions to this area of linguistics have been made by Vermeerbergen et al. (2007), Aarons & Morgan (2003) and De Barros (2013). However, compared to the other sign languages discussed in this section, African sign languages (including SASL) are severely under-represented not only in the literature on wh-question formation, but also in the formal linguistic literature as a whole. This dearth of understanding is what makes the present research both interesting and typologically necessary.

5.2. Methodological innovations

The methodology applied in this study can be divided into four stages (Rounds 1 – 4). Each stage aims to refine the data, focussing particularly on areas where inaccuracies have traditionally been observed to accumulate. The overall goal of the methodology was to collect a valid set of elicited data in SASL that captures the essential elements of wh-question formation, while being sensitive to various factors that affect sign language data collection.

The first task was to select the most appropriate informants. This was particularly important as the informants can have a considerable impact on the validity of the data (see Section 3.1). As most Deaf children are born to hearing parents, they are brought up in an atypical linguistic environment where they are not exposed to native sign language speakers from an early age. Many Deaf children are only exposed to signing when they first attend school. Research has shown that this may be a complication for linguistic research where native speaker competence is required – so much so that it may radically alter the data. Neidle et al. (1998) attributed the discrepancies between their own ASL data and that of Petronio & Lillo-Martin (1997) to this factor. Petronio & Lillo-Martin (1997) included these 'late learners' in their data set while Neidle et al. (1998) only used informants who were born Deaf, to Deaf parents. Thus, I selected three informants who were raised in households where SASL was the mother tongue. Two of these informants were born Deaf and one was born hearing (but to Deaf parents).

My selection of a hearing informant with ASL as their first language was to combat the second major consideration in sign language data collection: the influence of spoken language and the impact of a hearing researcher on the authenticity of the data. Past

attempts at data collection (De Barros, 2013) showed that elicitation tasks that make use of translation from English to SASL prompt the use of artificial forms of signing. Even the physical presence of a hearing researcher may lead to artificial signing. This can drastically affect the word order and sentence construction of elicited responses, and must thus be avoided. Problematically, however, traditional syntactic methodologies generally rely on elicited translation tasks.

In order to combat this concern in my study, the hearing informant (Informant A) was used in the first two stages of data collection. In Round 1 I constructed a questionnaire containing over 100 different wh-question constructions. Informant A translated the questions from English to SASL and her responses were videotaped. These data were then transcribed and reviewed, and used to design a follow-up session in which Informant A was asked to sign a number of different constructions. A combination of video clips taken from Rounds 1 and 2 formed the content for Round 3 of the data collection. In this round only the two Deaf native signers of SASL were used as informants. They were shown the collection of video clips from Rounds 1 and 2 and were asked make acceptability judgements. The informants were expected to do the following:

1. Repeat what was signed in the clip
2. Consider who they would sign like this to / who might sign like this to them
3. Consider how they themselves would prefer to sign that construction

The two informants were also encouraged to discuss, with reasons, any constructions that they found confusing. The result of Round 3 was a set of data that had been elicited using sign language alone, without the use of spoken language or a hearing researcher. This innovation allowed SASL to be the sole stimulus in Round 3, thereby improving the accuracy of the data, as well as highlighting negative data which could be identified as ungrammatical in SASL. In Round 4 of the data collection, Informant A aided in the transcription of video clips from Round 3 to ensure the accuracy of the translations, and also to provide an additional perspective on the data.

Using these data, two main elements were identified relating to wh-question formation in SASL. These two elements, in line the current literature, were the use of manual wh-sign and Non-Manual Markers.

5.3. Key findings

The first stage of my data analysis was focussed on answering my first three research questions:

1. What are the manual and non-manual markers of wh-questions in SASL?
2. How do the non-manual and manual markers of wh-questions interact in SASL?
1. In other words, what is the scope of the non-manual markers of wh-questions in SASL?
3. What is the word order of wh-questions in SASL?

The first step was to identify the different manual wh-signs used. Each sign was described according to the following criteria:

- handshape used
- position in relation to signer
- palm orientation
- movement

Although this information does not contribute directly to the syntactic analysis, I felt its collection was important given the dearth of formal research documenting the features of these signs in SASL. Next, I characterised the Non-Manual Markers that were found, again giving a description based on form. Two were identified: the 'eyebrow raise' and the 'furrowed eyebrows'. The latter was shown to be tightly linked with wh-questions and was subsequently termed the 'wh-NMM'.

All the manual wh-signs in the data were found exclusively in the right periphery of the constructions. Moreover, there was evidence that these wh-signs had been moved. This evidence comes in the form of the wh-sign occurring in the right periphery with other elements such as *negation*, which are known to typically occur in the clause-final position.

The third research question considered the distribution of the NMMs, and was thus key for this particular analysis. The NMMs are a unique feature of sign languages and syntactic studies are only beginning to describe their relation to the sequential structure of the sentence. Data for the SASL indicates two possible options for the scope of the wh-NMM. The first is that the wh-NMM occurs only over the wh-sign. This was found to be the minimal obligatory scope, and the absence of the wh-NMM was found to be completely

ungrammatical. The marker could then optionally be spread over a larger domain including the verb and wh-sign, as well as any intervening elements between the two. With the data collected in this study, I was able to begin answering the important question of which analysis best captures the syntax of wh-question formation in the SASL.

Research question 4 considers three possible analyses: leftward wh-movement, rightward wh-movement and in situ placement.

4. What is the most suitable analysis for wh-movement in SASL: leftward, rightward or in situ?

I first ruled out the third option (in situ) as, according to my data, SASL does not place the verb in situ or allow covert movement. Next, I explored the possibility of leftward analysis.

I first tested the split head CP analysis used by Petronio & Lillo-Martin (1997). The only way in which to generate a clause-final wh-sign in this structure is to assume a case of wh-doubling, in which the same wh-element is repeated in the clause initial-position as well as in the clause-final position. This is a pattern commonly seen in sign languages, though both wh-elements are usually overt and thus are realised phonetically in the sentence. Petronio & Lillo-Martin (1997) make use of this wh-doubling to account for situations in which there is only a clause-final wh-sign in ASL. They posit that the sentence-initial sign is in fact null. In sign language, the use of null elements is not uncommon, although they are typically licensed only under conditions where the null argument is retrievable via the context. Petronio & Lillo-Martin (1997) use this fact to help explain the patterns in their data. They typically found that the use of the right periphery was ungrammatical, and there were only a few examples in their data set that made use of this position. They argue that this was due to the discourse setting surrounding them; the null argument was easily retrievable from the context.

We are able to account for the word order of wh-questions in SASL if we adopt this same 'null wh-doubling' approach of Petronio & Lillo Martin (1997). In this analysis, the wh-sign moves, like in spoken languages, to the sentence-initial position of Spec, CP where it is null. Then we assume that there is a wh-sign base generated in the head of CP[52], which in this

[52] For a further explanation of the base generated double, see section **Error! Reference source not found.** on doubling in ASL according to Petronio and Lillo-Martin (1997).

analysis is clause-final. The first concern relating to the validity of this analysis for my study is that there were no instances of doubling found in SASL. However, an even greater concern is the licensing of null operators in SASL only when the argument is retrievable from prior context, or in highly lexicalised situations. Seeing as this discourse setting was not present in my study, the use of a null sentence-initial wh-element and doubling is not a satisfactory explanation for the clause-final wh-elements in the SASL data. As the word order cannot be accounted for, it becomes impossible to describe the scope of the wh-NMM using this analysis.

Even the Kaynean (1994) structure used by Nunes & de Quadros (2006) for Brazilian Sign Language is unable to account for the clause-final structure seen in SASL. This is because we again have to assume the use of null elements, which are unjustified given the context in which the data were collected. Thus, it appears that a leftward facing CP and leftward wh-movement cannot account for the word order seen in wh-question formation in SASL.

Consequently, I have structured my analysis around a rightward facing CP. This functions in the same way as in spoken language. The [WH] feature in the head of CP triggers the movement of an element containing matching features, which in this case is the wh-sign. The wh-sign moves to Spec, CP so it can be in a local checking configuration (Spec-Head agreement) with the [WH] feature in C°. This checks the [WH] feature and leaves the wh-sign in the clause-final position. Thus, using the rightward facing Spec, CP we are able to account for the basic word order in the SASL data for wh-question formation.

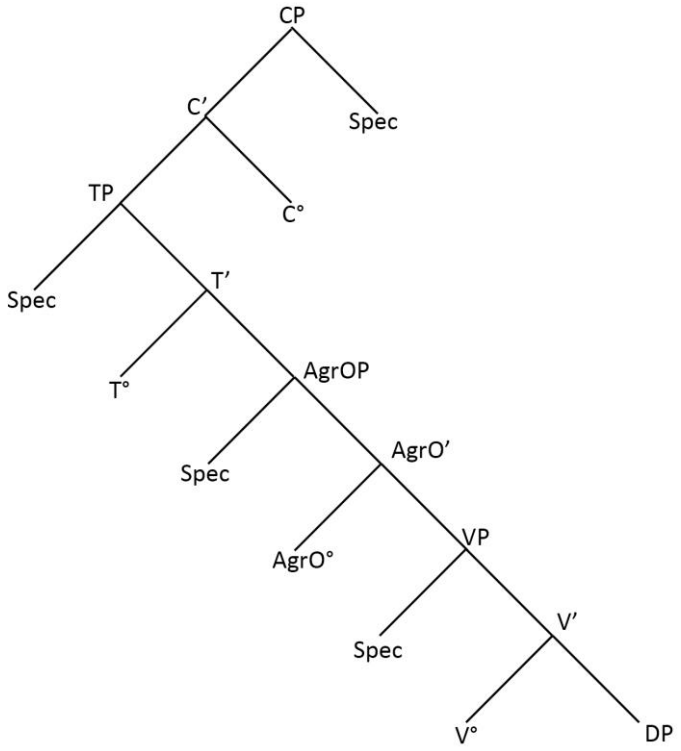


Figure 5.1: Proposed structure for SASL (Reproduction of Figure 4.38)

Once the distribution of the wh-word is described, the scope of the wh-NMM needs to be accounted for. As mentioned in Section 2.3.2, in sign languages NMMs are thought to be associated with features found in the heads of functional projections. In the case of SASL the wh-NMM would then be associated with the [WH] in C°. According to sign language literature, the scope of the NMMs can be accounted for using Spec-Head agreement or through c-command domain.

To account for the first scope distribution where the wh-NMM occurs with the wh-sign, I use Spec-Head agreement. As the wh-sign has moved to Spec, CP it is already in a Spec-Head relationship with the wh-NMM. Therefore, the spread is adequately accounted for using Spec-Head agreement. When the scope spans over the verb, we have two options. The first (see Section 4.7) is to use the c-command, which is the strategy implemented in most sign language analyses. In order to use this strategy, we would assume that the entire TP is moved to a position higher than CP – possibly a topic phrase. This puts it out of the range of the c-command domain of the wh-NMM in C°. The remaining VP then falls under the c-command domain of C°, accounting for the wider spread. The wh-NMM of the wh-sign in Spec, CP is still accounted for using the Spec-Head agreement mentioned above. However, we introduce a theoretical concern here by using two different operations: c-command and

Spec-Head agreement. These operations require a feature to motivate them. If we assume that when the wh-sign moves to Spec, CP it checks the [WH] in C°, this renders the feature unavailable and thus unable to motivate the second operation of c-command. To alleviate this concern, I make use of only Spec-Head agreement in my analysis – when the scope is over the verb the entire VP moves into Spec, CP. This allows the VP to be in a Spec-Head configuration with C° and the scope of the wh-NMM is accounted for. Moreover, by using spec-head agreement we can say that the NMMs are the overt realisation of feature-checking in SASL.

However, there are constructions in which this analysis experiences problems. When there is an indirect object, movement of the entire DP generates the incorrect word order. Thus, I posit the inclusion of the functional projection for object agreement, AgrO. This projection is frequently used in sign languages due to the high level of object/subject/verb agreement that sign languages make use of. I posit that the indirect object moves to AgrO, following which the wh-sign moves to Spec, CP where it is able to receive NMM through Spec-Head agreement. There are several possible features that could motivate the movement of the object. The most appealing is the [topic/Antifocus] as outlined by Zeller (2008).

This is an area where further research is needed, particularly relating to the following questions:

- What are the exact stipulations for the movement of objects in SASL?
- What are the features that trigger this movement?
- Is this movement always obligatory?
- How are DPs in SASL structured in detail?

My research has laid a foundation on which future work can build, and has paved the way for further enquiry about wh-question formation in SASL. It will be of interest to see how more complex structures of wh-question formation interact with the analysis. The next stage in SASL research should focus on embedded questions (wh-questions that are situated in a discourse setting where the argument is retrievable from the context), and finally, wh-islands should also be investigated.

5.4. Implications for theories of syntax and universal grammar

In this section, I review research question 5:

5. What implications does this analysis have for theories of Universal Grammar?

I will revise the theoretical debates that I have engaged with in this research project. The first was the debate regarding the extent to which current linguistic theory (based on spoken languages) can account for SASL data.

In the spoken language literature, the key component in wh-question formation is the existence of a [uWH] feature. This [uWH] is typically found the head of the complementizer phrase. This semantics [uWH] feature gives the sentences the reading of 'I request that you answer with relevant content' – thus making it a wh-question. According to Chomsky (1993), all features need to be 'checked' by an element with corresponding features. Thus, this feature causes the movement of an element, usually a wh-word, to move the specifier of the complementizer phrase. This puts the wh-word in Spec-Head agreement and allows the feature to be 'checked'. Without checking this feature, the derivation would crash resulting in the sentence being ungrammatical (see Section 2.2). According to the spoken language literature, this wh-movement is always leftward to a leftward facing Spec, CP. In Section 2.2 I used examples from English to illustrate the above principles of wh-movement. I then considered a second option for wh-question formation in spoken language by examining Chinese, which leaves the wh-word in the position where it is generated. Such languages are known as "in situ" languages. I showed that even though, in in situ languages, the wh-word remains in its base position – it still undergoes wh-movement, just at a later stage in language production. Importantly, this movement is once again leftward to a leftward facing Spec, CP.

The final question addressed by this research was, "What implications does this research hold for theories of syntax and universal grammar?" Even considering just the basic facts about feature checking in wh-question formation, it is striking how well this concept can account for sign language question formation. In my analysis, I showed that SASL makes use of the same functional categories and hierarchical structures as spoken language. In wh-

question formation, SASL includes the same [WH] feature which triggers the same wh-movement to check the feature in question. It bodes very well for current syntactic theory that two forms of language, which are produced so differently, can be captured by the same structures.

This research has shown that rightward movement is possible in SASL, and that the wh-NMM is the overt realisation of checking the [WH] feature. This gives us reason to reconsider the linguistic generalisation that wh-movement is leftward. In terms of sign language research, this research has opened the gate for further research into the grammar of SASL, which is an untapped linguistic resource. This research has not only illuminated how the operation of wh-question formation works in this understudied sign language, but also provides the first comprehensive examination of an African sign language, providing a new typological perspective. This is particularly relevant with respect to sign language literature given the ongoing leftward/rightward debate in this field. Moreover, it is a useful tool by which to inform current syntactic theories.

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Appendix 1

WH-Questionnaire

Subject-WH

1. Who saw the boy?
2. What happened?
3. Who arrived late?
4. Who wants more cake?
5. Who will buy the food?
6. What damaged the tree?
7. Who has fallen asleep?
8. Who didn't help clean?
9. Who doesn't eat cake?
10. Who signed nothing?
11. Who saw the boy who called?

Object-WH

12. What did the girl get for her birthday?
13. Who did you meet at school?
14. What did you (pl.) see in Cape Town?
15. What has the boy brought for his father?
16. Who don't you like?
17. What will you eat for dinner?
18. What is the child signing to his father?
19. Who(pl.) did you see at the shops this morning?
20. What don't you like about the food?
21. What did nobody buy?
22. What did the teacher teach yesterday?

Ditransitive with Indirect Object-WH

23. Who did you give the oranges to?
24. For whom is Mary buying the book?
25. Who are you baking the cake for?
26. For what are you buying the food?
27. Who will the teacher teach SASL to?
28. Whom haven't you given any cake yet?

Ditransitive with Direct Object-WH

29. What did you give your sister?
30. What is he teaching the students?
31. What will you show the visitors?
32. What did you forget to buy for your sister?
33. Which question haven't you asked to this child yet?

Reciprocal Verbs

34. Who did we sign to?
35. Who will the girl go there with?
36. Who haven't you met yet?
37. Who did the students argue with?

Locative

38. Where was the President born?
39. Where did the dog get this book?
40. Where are you thinking of building a house?
41. Where wouldn't you agree to move?

Temporal

42. When are you going on holiday?
43. What time did the lady arrive?
44. When will winter start?
45. What time do you want to meet?
46. When did you see the cat?

Manner

47. How did you (pl.) get here?
48. How does the baker make his chocolate cake?
49. How will they dance at the wedding?
50. How often do you not you not eat sweets?
51. How did he find out (that they were talking about him like this)?
52. How did the mechanic fix the car?
53. How often do you do nothing?
54. How is the man chopping (cutting) the firewood?
55. How often do you play tennis?
56. How quickly can you sign?
57. How carefully can you drive?

Why

58. Why is it always so hot in February?
59. Why did the teacher not set any homework?
60. Why will you not go home for Christmas?
61. What did you give the banker money for?
62. What are they inviting us for?

Which / what / how many?

63. Which student arrived late?
64. Which children want cake?
65. Which adult will buy the food?

66. Which child has fallen asleep?
67. What time is the lecture?
68. Which dress do you want?
69. The girl has a blue and red dress. Which dress will the girl pick?
70. Which book did you give your mother?
71. Which friend did you drive home?
72. Which boyfriend will she introduce to her parents?
73. The girl has two boyfriends. Which one will she pick?
74. How many guests are invited?
75. How many days are you staying there?
76. How many children do you want to have?
77. Which guy did she marry? The banker? No, the teacher.

Surprise questions

78. A: I bought it. B: You did WHAT.
79. A: The man sold the house. B: He did WHAT?
80. A: I won the lottery. B: You what? That's amazing. Congratulations.
81. A: He beat his wife up badly. B: He did WHAT?
82. What did the man buy yesterday? He bought a new car!

Embedded questions

83. The man asked what I wanted there. How rude of him!
84. Who did John say that Mary kissed?
85. My son wants to know what you would like for dinner.
86. We are wondering when they will come.
87. I don't know whom the judge will choose.
88. I asked which book the student liked. And she said the first one.
89. I don't know who will arrive first. What do you think?
90. I don't know whether they are coming to the wedding.
91. I told them where we are going.
92. I wonder what happened.
93. They asked us when to leave.
94. I noticed what time my daughter got home.
95. We are wondering whether to see the band again.
96. I wonder who Mary kissed
97. I wonder who Mary didn't kiss

Appendix 2

Consent Form

My research is focused on Wh-Question formation in SASL. It is a syntactic analysis that looks specifically at the placement of WH-words and the role that Non Manual Features play in Wh-Question formation in SASL.

Today you will be asked to complete two tasks. In the first task you will be asked to review video clips of questions in SASL. In the second task you will be asked to translate English sentences into SASL. You have the option to ask questions or to discontinue from the study at any time without prejudice.

For both of these tasks you will be video recorded to capture you signing. Extracts of these clips will be used in my thesis as well as any other publication that could result from this research.

I……..AGREE/DISAGREE to having my face shown in any of clips collected today in Courtney De Barros's Master's Thesis as well as any publications that may result from the data collected today.

Signature:
Date:

I…….. ……..DO/DO NOT want my name to be mentioned in Courtney De Barros's Master's Thesis as well as any publications that may result from the data collected today.

Signature:
Date: