

**THEMATIC STRUCTURE
AND
VERB AGREEMENT
IN
ISRAELI SIGN LANGUAGE**

By

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“One must credit a hypothesis with all that has had to be discovered in order to demolish it.”

Jean Rostand

to my parents

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Thematic Structure and Verb Agreement

In Israeli Sign Language

Abstract

The theory I propose in this work addresses two outstanding questions:

- i. Which factors can account for the seemingly diverse agreement patterns of verbs in Israeli Sign Language (ISL)?
- ii. Is verb agreement in ISL a different phenomenon than verb agreement in spoken languages, or can general linguistic theory account for agreement in all natural languages, regardless of modality?

By applying a particular componential analysis of verbs in ISL, the Thematic Structure Agreement Analysis, I show that the correct analysis of verb agreement in the language enables us to predict the agreement pattern each verb in the language takes, and at the same time pinpoint significant similarities and differences between ISL (and sign languages generally) and spoken languages with respect to verb agreement. Agreement in ISL is basically a syntactic relation, as it is in spoken languages; the difference between languages in the two modalities is attributed to the nature of the agreeing element, and to the relative ordering of the agreement process with respect to other morphological processes. It is argued that agreement in ISL is a property not of verbs, but rather of spatial predicates; and that agreement inflection is a morphological process which occurs prior to certain other morphological processes in the language.

The componential analysis is based on the morphological complexity of agreement verbs. I show that agreement verbs are comprised of two distinct morphological mechanisms, each serving a different function in the grammar. These mechanisms are the direction of the path movement and the facing of the hands. The direction of the path marks agreement with thematic notions - source and goal. The facing of the hands marks the syntactic object. This morphological complexity is the driving force underlying the Thematic Structure Agreement Analysis suggested in this thesis.

A lexical decomposition analysis of verbs in ISL shows that the agreement pattern of a verb is determined by its lexical-thematic structure. In particular, the different agreement patterns displayed by the verb classes in ISL are attributed to the presence or absence of specific predicates in the lexical structure of the verbs. The predicates which are relevant for accounting for agreement in ISL are morphemes glossed as PATH and TRANSFER. PATH is a spatial predicate which denotes a trajectory traversed by an element; it takes as its complements a source and a goal argument, and it agrees with these arguments. TRANSFER is a predicate denoting the causation of a change of possession. The prediction is then that only verbs which contain these predicates will be marked for agreement, since it is the predicates that are marked for agreement, and not the verbs themselves.

Further examination of the ways in which the two predicates interact reveals that processes applied to the spatial predicate PATH must take place prior to morphological processes which involve TRANSFER, in order to account for the morphological and syntactic properties of one of the verb classes in the language (namely, agreement verbs). This conclusion, in addition to accounting for the

agreement facts, sheds light on the nature of word formation processes in ISL, and the centrality of spatial notions and relations in these processes.

The Thematic Structure Agreement Analysis I propose emphasizes the primary role that the lexical-thematic structure plays in the morphology of agreement in ISL, since it is the lexical-thematic structure that determines the presence or absence of PATH and TRANSFER in the verb. The lexical-semantic theory employed in this thesis is that of Jackendoff (1987, 1990a), which aims to account for the distinctions of meaning systematically codified in the language, and the semantic relations among words and sentences. Although Jackendoff's theory is based mainly on facts of some spoken languages, it is especially applicable to ISL because of the central role it assigns to spatial conceptual notions, and because of the distinction it draws between spatial notions and action notions. I argue that the analysis of agreement in ISL strongly supports this theory. Moreover, since spatial notions and relations are often transparently represented in the morphology of verbs in ISL, an analysis of a sign language can make a substantial contribution to general linguistic theory. Given that the basic building blocks of the lexical conceptual structure are universal, the accessible relation between the forms of the verb components in ISL and their meaning offers special insights into the organization of conceptual structures in human languages universally.

Chapter 1

Overview

Introduction

The goal of this thesis is to provide a comprehensive explanation of verb agreement in Israeli Sign Language (ISL) and its significance for linguistic theory and universal grammar. This goal is achieved by examining ISL verb agreement from two different perspectives: the language internal perspective, and the point of view of general linguistic theory. The language internal point of view focuses on a long-lasting problem in sign language research:

- (a) Which factors can account for the seemingly diverse agreement patterns of verbs in Israeli Sign Language (ISL)?

The linguistic-theory perspective addresses the following challenge:

- (b) Is verb agreement in ISL a different phenomenon than verb agreement in spoken languages, or can general linguistic theory account for agreement in all natural languages, regardless of modality?

These two perspectives complement each other. Accounting for the ISL facts within a particular theoretical framework raises questions which help to pinpoint the essential characteristics of agreement in natural language. The analysis, in turn, poses challenges for linguistic theory, challenges which highlight the ways in which modality interacts with the structure of language.

Agreement has a strange status in linguistic theory: as a very widespread phenomenon among the languages of the world - it is almost taken for granted, and every theory

assumes it. On the other hand, the exact nature and function of agreement is left implicit or unspecified in many cases. Most theories of agreement have been constructed on the basis of examining agreement constructions in spoken languages, the diversity of which have posed many challenges to the theories. However, it seems that a different point of view altogether about the nature of agreement arises when examining languages transferred in a different physical modality, the manual-visual modality. Such languages are the sign languages, the natural languages of the Deaf communities around the world¹. One particular sign language is the focus of the present study, namely Israeli Sign Language (ISL), the natural language of the Deaf community in Israel. Verb agreement in ISL (and, in fact, in other sign languages as well) exhibits some peculiarities, that, on the face of it, make it seem like a different grammatical phenomenon from verb agreement in spoken languages. Thus, it might be claimed that the phenomenon referred to as ‘verb agreement’ in sign languages is in fact not an instance of agreement at all, but rather a different linguistic phenomenon altogether. I argue, however, that the constructions referred to as ‘agreement’ in sign languages are indeed agreement constructions, since they share the basic properties of verb agreement in spoken languages. Yet, as I will show, agreement in ISL appears very different. In this thesis I will develop a theory which will account for these apparent differences, showing that agreement is essentially a unified phenomenon in languages of both modalities, and attributing the differences to the ways in which thematic structures interact with the morphology of signed vs. spoken languages.

¹ It is a common convention to use uppercase *Deaf* when referring to a particular group of deaf people who share a language and a culture. Lowercase *deaf* is used to refer to the audiological condition of not hearing.

In this chapter I establish the claim that there is verb agreement in ISL, I describe its basic properties and the central theoretical questions it raises. I then proceed to present an overview of the main aspects of the analysis of verb agreement in ISL, and lay out the theoretical framework necessary for this analysis. The chapter is organized as follows: Section 1.1. presents the basic properties of verb agreement in general, in order to establish a common basis for subsequent discussion of the phenomenon in ISL. Section 1.2. describes verb agreement in ISL. It will be shown that agreement constructions in ISL share the basic property of verb agreement constructions in general, namely - that it is essentially the spelling out of the pronominal features of the arguments on their verb. However, the ISL constructions exhibit certain properties which seem to be unique to sign languages. These properties give rise to the two main challenges addressed in this thesis: predicting the agreement patterns of verbs in ISL, and accounting for ISL verb agreement by general linguistic principles. The main aspects of the Thematic Structure Agreement Analysis which I propose are presented in section 1.3. It is argued that agreement in both sign languages and spoken languages is a unified phenomenon, and therefore should be accounted for by general linguistic theory. By using a special lexical decomposition analysis of verbs in ISL, I show that this analysis provides answers to both of the challenges presented above. In this analysis, the various components of the lexicon play a central role. In section 1.4. the model of the lexicon as well as the theoretical frameworks assumed in this work are presented. Section 1.5. outlines the structure of the rest of this thesis.

1.1 Properties of Agreement

Agreement can be described as a linguistic phenomenon where “a grammatical element X matches a grammatical element Y in property Z, within some grammatical configuration.” (Ferguson and Barlow 1988). What this implies (as pointed out by Moravcsik 1988) is that agreement is always displaced, in the sense that the features of one element (X) appear on another element (Y), which is not inherently marked for those features. Element (X), the agreement controller, has to be a **nominal** (Lehmann 1988;58). That is, agreement is a mechanism of marking the relationship which holds between a nominal and other elements in a certain syntactic configuration. The nominal can function as the head of the configuration, and the properties of the head are marked on its dependent, as for instance in cases of agreement of an adjective with its head noun. The nominal can also be a dependent, and in that case the properties of the dependent are marked on the head². This is exemplified by cases such as agreement of a verb with its arguments, agreement of a preposition with its arguments, and agreement of the possessee with its possessor. My work focuses only on the second type of agreement, and in particular - agreement of a predicate (mainly V and P) with its arguments. The relationship between this type of agreement and other types of agreement, such as agreement between a noun and its modifier, is beyond the scope of this study³.

Traditionally, verb agreement is regarded as a mechanism of spelling out the pronominal features (also called person features, or phi features) of the syntactic

² See Nichols 1986 for an extensive survey of head marking vs. dependent marking constructions.

³ For a comparison of the two types of agreement - see Lehmann (1988) and Anderson (1992).

arguments on their verb (see Blake 1994;14, 197 and references cited there, Lehmann 1988)⁴. This definition entails the following:

- a. Agreement markers consist of the pronominal features (phi-features) or a sub-set of the pronominal features of the arguments, and as such they are part of the referential system of the language.
- b. There is a close relationship between agreement and grammatical functions (GF's) (that is, structural positions in the syntax). Although agreement is not always with specific syntactic roles⁵, syntactic roles are nevertheless at least partially involved in the description of the various agreement systems.
- c. Agreement markers do not mark the semantic relations which hold between the verb and its arguments. Semantic roles, especially spatial semantic roles such as source, goal and theme, do not seem to play a role in determining the agreement pattern of a language.
- d. Agreement is morphologically realized as inflectional affixes. As such, it is obligatory. That is to say, if a language has verb agreement, then all the verbs in the language are morphologically marked for agreement⁶. Even when the verb has no arguments (as in the case of 'weather verbs' or impersonal verbs), or when the verb has no argument to agree with (e.g. in

⁴ This definition is broad enough to include both agreement markers and pronominal clitics. The distinction between the two is not altogether clear-cut, and has been a matter of dispute in the analyses of various spoken languages, e.g., Chichewa (Bresnan and Mchombo 1987) Irish (McCloskey and Hale 1984), Hebrew and Celtic (Doron 1988), Navajo (Speas 1990)). The status of the agreement markers of ISL with respect to this matter is also unclear as yet. However, the basic questions and challenges which the ISL data raise for linguistic theory are unaffected by whether they are analyzed as agreement markers or pronominal clitics. Therefore, I leave this question open.

⁵ In Icelandic, for example, the verb agrees with the argument bearing the nominative case, which is not necessarily the subject. If the subject is marked with a quirky (e.g. dative) case, the nominative case is assigned to the object, and verb agreement is accordingly with the object (Zaenen and Maling 1982, Falk 1991).

Icelandic when there is no nominative argument in a sentence), the morphological form of the verb contains nevertheless a default agreement marker: e.g. 3P singular in Spanish *llovía* ('it rained', literally - 'rained 3P sg'); 3P singular masculine in Hebrew *hitxasek li* ('I felt like', 'I had an urge to', literally - 'was urged 3P sg to-me')⁷.

Agreement with prepositions, in those languages that have agreeing prepositions, share the above properties: the agreement markers spell out the pronominal features of the arguments; the agreement relationship obtains within a specific syntactic configuration (the head and its sisters - complements); and agreement morphology is characteristic of the whole class of prepositions in that language. There is one difference, though, namely that prepositions agree only with their complements, whereas verbs can agree with arguments that are non-complements, specifically, the subject argument.

1.2 Agreement in Sign Language Research

Sign Language researchers have identified several classes of verbs, which differ from each other on the basis of the properties of the agreement affixes attached to them. The pioneering research on the classification of verbs was conducted on ASL (Friedman 1975, Fischer & Gough 1978, Klima & Bellugi 1979, Padden 1983 among others), but subsequent research on other unrelated sign languages have

⁶ This property is not directly entailed by the definition of verb agreement above. However, the generalization seems to be descriptively correct with respect to agreement constructions in spoken languages, and is therefore listed among the properties characteristic of agreement constructions.

⁷ Corbett (1991:203-217) presents various cases of agreement constructions where the agreement controller lacks the appropriate features for controlling agreement.

identified verb classes with very similar properties, both morphologically and semantically, to those identified for ASL⁸. This similarity among unrelated sign languages is quite remarkable, and requires an explanation. One direction to pursue is to investigate whether this similarity stems from the modality through which sign languages are transmitted, i.e. the manual-visual modality. I will return to this point in chapter 8. For now, I describe research on other sign languages that is relevant for ISL without further comments about descriptive similarities.

Before describing the various verb classes, a description of ‘verb agreement’ in languages in the visual modality is in order. In other words, what does verb agreement look like in signed languages? Following the definition of verb agreement in the previous section, a verb is said to agree with its arguments if the form of the verb reflects (or is determined by) the pronominal features of its arguments. In sign languages, nominals in a clause are associated with discrete locations in space. These locations are used for anaphoric reference for the nominals associated with them, and therefore are regarded as the visual manifestation of the pronominal features of the nominals in question. Verb agreement in sign languages then takes the following form: a verb is said to agree with its arguments if its location is determined by the location(s) of its arguments. For example, the verb HELP (ISL) agrees with its subject and object: the beginning point of the sign HELP is the location of the subject, and its end point is the location of the object. If the subject is *I* and the object is *you*, the verb starts at the location of 1P (the signer’s chest) and ends at the location of the addressee; the direction of the verb’s path movement is then from the signer towards

⁸ For example, British SL - Kyle and Woll (1985), Taiwan SL - Smith (1990), Italian SL - Pizzuto, Giuranna and Gambino (1990), Danish SL - Engberg-Pederson (1993), SL of the Netherlands - Bos (1993, 1995), Japanese SL - Fischer (1996).

the addressee. If the subject is *you* and the object is *me*, then the direction of the path movement is reversed: it moves from the addressee towards the signer. In sign languages then, spelling out the pronominal features of the arguments on the verb means that the direction of the path movement of the verb is determined by the locations in space associated with these arguments.

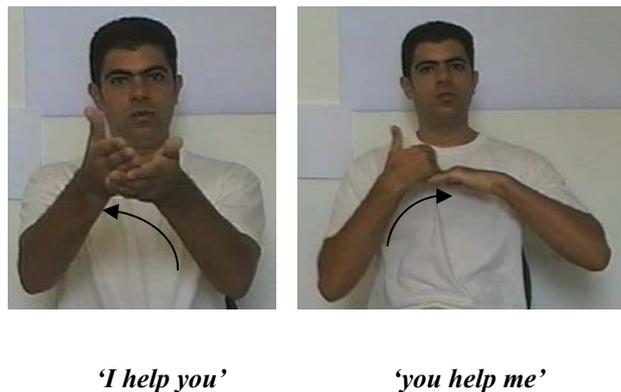


Figure 1.1: The form of agreement in ISL: inflected forms of the verb HELP.

As mentioned above, Padden (1983, 1990) identifies three classes: plain verbs, spatial verbs and agreement verbs. Plain verbs are verbs which do not inflect for agreement; i.e., the form of these verbs does not reflect the pronominal features of the arguments. Spatial verbs and agreement verbs both show agreement marking: the form of the verb, and more specifically the direction of the path movement, is determined by the location of its arguments. Hence we may say that spatial verbs and agreement verbs both agree with their arguments. However, the two types of verbs differ with respect to the arguments which control agreement. Spatial verbs agree with spatial referents, i.e., locations. For example, in the ISL sentence meaning *'John moved the cup from location A to location B'* the verb MOVE-CUP agrees with locations A and B. That is, the verb's path movement begins at the location of A and ends at the location of B.

This agreement pattern differs from that exhibited by agreement verbs: in a sentence containing an agreement verb, the verb agrees with its subject and object. For example, in the ISL sentence meaning *John gave Mary the cup*, the verb agrees with *John* and *Mary*: the path movement of the verb starts at the location of *John*, and ends at the location of *Mary*. It is important to notice, however, that in both spatial verbs and agreement verbs the direction of the path movement (which is determined by the agreement markers at either end of the sign) is from the locus in space associated with the **source** argument to the locus of the **goal** argument. The difference between the two types of verbs is that in the case of agreement verbs, the source and goal arguments are not associated with real locations (as in the case of spatial verbs), but rather with personal referents which are the syntactic arguments of the verb.

There is another important morphological difference between the two classes of verbs. In agreement verbs, but not in spatial verbs, the **facing** of the hands (that is - the direction towards which the palm or the fingertips are facing) is also determined by the locus of the verb's argument. I have argued (Meir 1995a, 1995b, in press) that the facing of the hands has a role distinct from the direction of the path movement: the direction of the path movement marks agreement with thematic notions (source and goal), whereas the facing of the hands marks the syntactic object. The motivation for drawing this distinction is presented in chapter 3.

Under this analysis, agreement verbs are regarded as morphologically complex verbs: they mark morphologically both the spatial thematic roles of their core arguments as source and goal, and the syntactic role of object, by two morphological mechanisms available in the language: the direction of the path, and the facing of the hands,

respectively. As we shall see, this morphological complexity is the driving force underlying the lexical decomposition analysis of agreement verbs suggested in this thesis. I will argue that each of these morphological mechanisms is the phonological realization of a distinct predicate which exists in the lexical conceptual structure of agreement verbs.

The ISL agreement facts are summarized below:

1. In ISL agreement is realized as the location specifications (the beginning and end points) of the verb in question. In other words, a verb is said to agree with its arguments if the direction of its path movement is determined by the location of the arguments.
2. The path movement of a verb is always from the location of the **source** argument to the location of the **goal** argument. Thus, agreement can be said to be thematically determined.
3. The facing of the hands is a mechanism distinct from the direction of the path movement. It marks the syntactic object nominal: the facing of the hand is towards the location of the nominal which is the syntactic object.
4. There are two main types of verbs in the language: one is verbs which do not inflect for agreement at all. In these verbs, referred to as plain verbs, the path movement is not determined by the location of their arguments. The other type is verbs which inflect for agreement: the direction of their path movement is from their source argument to their goal argument. This latter type is further subdivided into two classes of verbs: spatial verbs and agreement verbs.
5. Both spatial verbs and agreement verbs display a source-goal agreement pattern. But they differ with respect to the following properties: (a) In agreement verbs the

source and goal arguments also function as the syntactic subject and object, whereas in spatial verbs, the source and goal arguments function as the syntactic obliques. (b) In many agreement verbs, the facing of the hands is also determined by the location of one of the verb's arguments, specifically - the syntactic object. While in spatial verbs, the facing of the hands is not determined by the location of the arguments. (c) Variations in location that are interpreted as phonetic variation for agreement verbs are interpreted as morphologically distinct for spatial verbs.

1.3 The Analysis of Verb Agreement in ISL: Overview

The description of verb classes in ISL, and of agreement verbs in particular, raises two general questions, the first concerning the analysis of agreement in ISL (with implications for other sign languages), and the second concerning linguistic theory in general. These questions are:

- Can we predict the agreement pattern of each verb in the language? That is, can we predict which verbs will be agreement verbs, plain verbs or spatial verbs?
- Assuming that the agreement pattern of agreement verbs is determined by the thematic notions of source and goal rather than directly by syntactic roles - how can linguistic theory account for thematic agreement?

The approach taken in this thesis is that linguistic theory should be able to account for both sign languages and spoken languages, without having to stipulate different mechanisms for the two types of languages. The proposed analysis shows that agreement in both sign languages and spoken languages is a unified phenomenon, and therefore can be accounted for by the same theory. By using a particular lexical

decomposition analysis of verbs in ISL, the Thematic Structure Agreement Analysis, (in the framework of Jackendoff 1990a), this treatment provides answers to both questions posited above: it explains and account for the notion of thematic agreement in ISL without having to introduce special machinery, and at the same time - it enables us to predict the agreement patterns of verbs in ISL. The two main claims of the analysis are:

- (a) Pronominal agreement in ISL is a syntactic relation which obtains between a head and its dependents, as it is in spoken languages.
- (b) The agreement pattern of each verb in ISL is determined by its thematic structure.

A brief overview of the analysis is presented in the remainder of this section.

1.3.1 Agreement Verbs as Complex Verbs

The intuitive idea underlying my analysis is that agreement verbs are complex verbs, comprised of two predicates . These predicates are: a verb denoting ‘causing a change of possession’, or ‘transfer’ (which I gloss as TRANSFER), and a spatial predicate denoting ‘path’ (glossed as PATH). These predicates are overtly manifested by the facing of the hands and the direction of movement, respectively. That is, I regard the facing and the direction of movement as the phonological and morphological realization of the two predicates which constitute the basic building blocks of agreement verbs⁹. I show that by analyzing agreement verbs as complex verbs along these lines, the seemingly unique properties of verb agreement in ISL are accounted

⁹ Agreement verbs contain other morphemes in addition to PATH and TRANSFER. These morphemes distinguish the individual members of the class of agreement verbs from one another. An analysis of these morphemes is presented in chapter 5.

for straightforwardly, and the various agreement patterns in the language are predictable.

The benefit of a lexical decomposition analysis is that it makes it possible to focus on each component separately, and to distinguish between properties which are characteristic of one predicate from those characteristic of the other. Specifically, I will show that agreement morphology (i.e. the association of the arguments' loci with the end points of a sign) is an essential property of PATH, not of TRANSFER.

PATH is a predicate which denotes spatial relations. Predicates denoting spatial relations in ISL (e.g., BETWEEN, ON-(TOP-OF), INSIDE, TOGETHER-WITH) share the following property: their locations specifications are determined by the location of their complement(s). That is to say, these predicates are signed at a location in space which is associated with their complement(s). Since the form of spatial predicates is determined by the pronominal features of their arguments, spatial predicates can be described as agreeing with their arguments. PATH, being a member of the set of spatial predicates, also exhibits this property, in that its beginning and end points are determined by the loci of its source and goal arguments respectively.

TRANSFER, on the other hand, is a verb denoting change of possession, not a spatial predicate. As such, it does not have source and goal arguments, and its location specifications are not determined by the loci of its arguments. That is, TRANSFER on its own is not morphologically marked for agreement. It shows agreement morphology only after merging with PATH. In other words, I claim that the

agreement properties of agreement verbs are actually ‘inherited’ from their embedded predicate PATH.

Thus, by pursuing a lexical decomposition analysis of agreement verbs, the precise nature of agreement in ISL emerges: agreement is a property of spatial predicates, not of verbs per se. This is the clue for explaining the puzzling nature of agreement in ISL, both from a language internal point of view, and from a universal grammar perspective.

Form a universal grammar perspective, agreement in ISL is basically a syntactic - configurational relation which holds between a head and its dependents, as it is in spoken languages: PATH agrees with its complements. The “thematic flavor” of agreement is the result of the close semantic relationship which holds between the agreeing element and the agreement controllers: the agreeing element is PATH, which invariably assigns source and goal thematic roles to its complements (the agreement controllers). Therefore, the agreement markers are always associated with these two specific thematic roles. But the agreement relationship per se can be stated in configurational terms (head-complement) and need not make reference to thematic terms.

Let us return to the language internal puzzle - that of predicting the agreement patterns of verbs in ISL. By analyzing agreement as a property of PATH, we can make the following straightforward prediction: only verbs which contain a PATH predicate will exhibit agreement morphology, since it is only these verbs which have the morphological capability (which they inherit from PATH) to be marked for

agreement. Whether or not a verb contains a PATH predicate is determined by its semantics: only verbs denoting directed motion (motion from one point to another), whether real or abstract, contain a PATH predicate. The prediction is then that only these verbs will be marked for agreement. This prediction is borne out: verbs which denote directed motion in ISL are either spatial verbs (where the motion is real, e.g., MOVE, VEHICLE-GO), or agreement verbs (where the motion can be abstract, e.g., GIVE, SHOW, SEND, TEACH). Spatial verbs and agreement verbs both inflect for agreement. Verbs which do not denote directed motion, and therefore would not select a PATH predicate, such as BREAK, KNOW, LIVE, would fail to inflect for agreement, since they lack the element which has the morphological capability to inflect for agreement. This last type constitutes the class of plain verbs.

The morphological distinction between agreement verbs and spatial verbs (in particular, the fact that the facing of the hands changes systematically in the former but does not change in the latter) is attributed to the existence of an additional predicate in the structure of agreement verbs, but not of spatial verbs: agreement verbs, as verbs denoting an event of transfer, contain a matrix verb TRANSFER, which is realized phonologically as the facing of the hands. Other differences between the two classes of verbs will also be shown to follow from that semantic difference.

So far we dealt with each component separately. However, the two components function as one linguistic entity, denoting one unified event rather than two separate events. Moreover, the two predicates share their arguments: the source and goal arguments of PATH are also the subject and object of TRANSFER. In other words, the two predicates together have fewer arguments than the sum of the arguments of

each predicate separately. This fact necessitates an analysis which spells out explicitly the process by which the two predicates come to share their arguments. I will argue that the best way to describe this process is as a process of argument structure merger (following the analysis of causative suggested by Rosen 1989a), whereby the argument structures of the two predicates are merged into one complex argument structure. However, while working on the details of the merger process analysis, one is faced with an intriguing challenge posed by the morphology of agreement verbs: though the predicates are merged (in that they share their arguments and denote a unified event), the morphological properties of each predicate are still independently visible: the loci of the arguments are double-marked, as the source and goal of PATH (by their linear order with respect to the path movement of PATH), and as the object of TRANSFER (by the facing of the hands).

The challenge is then - how to merge the predicates lexically while retaining their morphological independence? The solution to this challenge is to assume that the various morphological processes involved in the formation of agreement verbs are ordered with respect to each other. In particular, I will argue that the affixation of the agreement markers onto PATH takes place prior to the merger of PATH with TRANSFER. That is, the arguments' loci are already morphologically marked as source and goal when the merger takes place. Hence, the merger with TRANSFER cannot obscure the morphological marking that PATH assigns to these arguments.

This analysis leads to the somewhat surprising result that agreement in ISL, or more specifically, the co-indexation between the agreement markers and the arguments, is a morphological process which occurs prior to certain other morphological processes,

e.g. the PATH-TRANSFER merger. This is in a sense unusual, since agreement inflection is usually assumed to follow derivational, and even other inflectional, processes¹⁰. I claim, though, that this rather surprising consequence of my analysis is in fact very revealing with respect to the nature of the lexicon in ISL and the role that modality plays in word formation processes, as it shows that spatial relations and notions are central to the form of words in ISL, in that they are overtly expressed whenever possible. Furthermore, this study also accentuates the factors differentiating ISL from spoken languages: it is not the agreement relation per se, but rather the nature of the agreeing element, and the relative order of the agreement process with respect to other morphological processes. Hence, the study of a particular grammatical phenomenon in one sign language has bearing on much more broader issues, such as the relationship between the structure of a language and the modality in which it is transmitted.

1.4 General Theoretical Framework

1.4.1 The Structure of the Lexicon

The analysis of verb agreement in ISL proposed in this work puts a strong emphasis on the lexicon, as its main claim is that it is the lexical-semantic structure of a verb which determines its agreement pattern. Therefore, the lexicon will figure prominently in the analysis. The assumption I make here regarding the structure of the lexicon is that it contains the following components: a component specifying the semantic structure of a lexical entry, a component specifying its syntactically-relevant argument-taking properties, and a component specifying its phonological form.

¹⁰ It is generally assumed that derivational affixes are closer to the stem than inflectional affixes. See

Following current theories of the lexicon, I assume that the lexical-semantic information is represented at a Lexical Conceptual Structure (LCS), and that the argument-taking properties are represented at the level of Predicate Argument Structure (PAS)¹¹.

LCS is a level of representation that encodes all the information necessary to generate the meaning of a lexical item, and to construct its thematic roles, selectional restrictions and argument structure. It is also intended to capture the relationship between lexical items and sentences in the language. The meaning of lexical items is rendered in terms of a number of primitive elements - conceptual units - which recur in the representations of lexical items. Similarities in the meanings of various lexical items can be captured by attributing shared elements to their LCS's (Rappaport and Levin, 1988:24).

The level of PAS (also called theta-grid) contains a list of all the arguments that a predicate licenses in the syntax. It also contains information concerning the hierarchical relationship between the arguments, and (depending on the precise details of the theory) also the manner of theta role assignment - whether the argument in question is assigned its theta role directly by V, by the VP, or indirectly by a P. This level of representation does not contain any semantic information, since such information has been argued to be irrelevant to the mapping of arguments into syntactic positions (see Rappaport and Levin 1988 and references cited there). Each

e.g., Gleason (1961:96), Aronoff (1976:2), Anderson (1992:126).

¹¹ See for example, Zubizarreta (1987), Rappaport and Levin (1988), Rosen (1989a) Booij (1992). In Jackendoff's (1987, 1990a) model there is no separate level of PAS; rather, the syntactic structure is derived directly from the LCS.

argument position in the PAS is projected into a corresponding syntactic position, determined by a set of linking rules.

The phonological specifications of a lexical entry are represented in the phonological component of the lexicon. Signs, like morphemes in spoken languages, are composed of more basic units – phonemes. The feature specifications and the properties of these units, as well as the relationship between them, are specified in the phonological component.

Surprisingly, syntax does not figure prominently in the analysis. This is surprising because agreement is taken to be basically a syntactic relation, as it encodes relations between members of a clause. However, the argument-taking properties of a word and the semantic relations between a predicate and its arguments are already represented in the lexicon. And it is these properties which lie at the core of the analysis here. The syntactic configuration/domain where this relationship obtains is defined here in the most general syntactic terms, as a relationship between a head and its dependents. More specific syntactic mechanisms or configurations are irrelevant for our purposes. Hence the analysis need not assume a specific syntactic theory. It makes use of the terminology of two current generative theories - Government and Binding (GB) (Chomsky 1981, 1986) and Minimalism (Chomsky 1995), and I assume a general knowledge of the basic terminology of these theories. However, there is nothing in this analysis that requires these specific theoretical frameworks, and it could be rendered in terms of other theories as well, such as Lexical Functional Grammar (LFG).

The analysis of ISL verb agreement sketched in the previous section requires certain prerequisites and assumptions concerning the specific nature of the three components of the lexicon, and the interaction between them. First, the analysis emphasizes the central role of spatial notions (manifested by the morpheme PATH) in the agreement process. Therefore, we need a lexical theory where generalizations can be made in terms of spatial thematic roles. The specific theoretical framework adopted here is that of Jackendoff (1987, 1990a). Jackendoff's theory seems to be the most adequate and explanatory when analyzing sign languages due especially to one particular aspect of the theory: it draws a distinction between two types of thematic roles - spatial thematic roles and action thematic roles - and it attributes each type of thematic roles to a different tier in the LCS representation. As will become evident throughout this thesis, this distinction is strongly supported by the morphology of ISL, since there are morphological processes in the languages which are best stated in terms of the spatial tier, but are not related to the action tier. In addition, this theory may enable us to draw a principled distinction between similar processes in signed and spoken languages, in that languages in each modality tend to target a different thematic tier (along the lines suggested in Meir 1997).

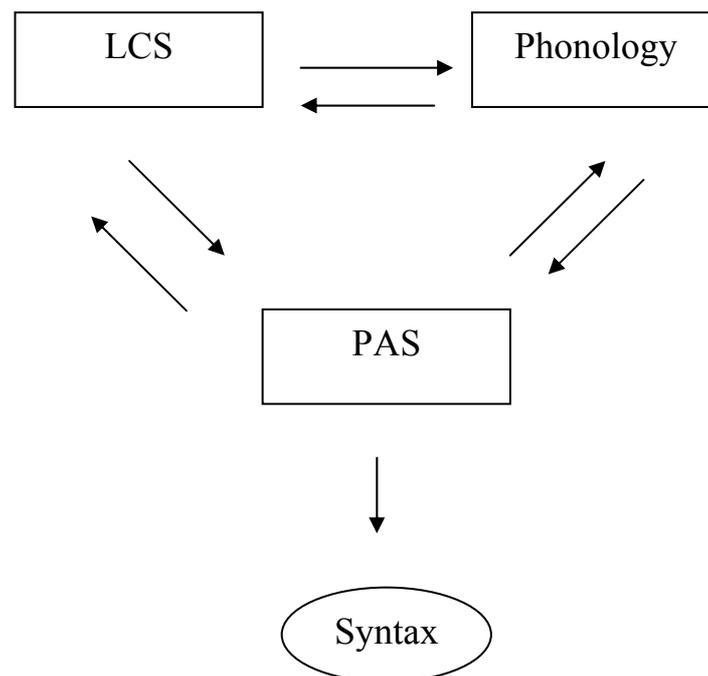
Secondly, the analysis assumes that word formation processes can take place in any one of the three components. For example, the inflection of PATH will be argued to occur at LCS, while the PATH-TRANSFER merger process is best stated in terms of a PAS process¹². In addition, the ISL data necessitates (a) that these components may freely interact with each other, in that the output of one component may serve as the

¹² This claim was made with respect to morphological processes in spoken languages as well. E.g., Booij (1992) presents evidence from Dutch, suggesting that some morphological processes are best captured in LCS terms while other processes must be assumed to be PAS operations.

input for another (so as to allow for the inflected form of PATH to serve as the input for the PATH-TRANSFER merger); and (b) that certain morphological processes are required to be ordered with respect to one another.

A representation of the model is given below:

1.



In the next section the specific theoretical frameworks assumed in this work are presented: the lexical-semantic theory of Jackendoff (1990a), the PAS (mainly based on Rappaport and Levin 1988), and the Hand Tier model of sign language phonology (Sandler 1989).

1.4.2 Lexical-Semantic Theory: Jackendoff (1990a)

In Jackendoff's theory, the level of Lexical Conceptual Structure (LCS) encodes all the information necessary to generate the meaning of a lexical item, and to construct its thematic roles, selectional restrictions and argument structure. This is achieved by

decomposing it into conceptual categories. These conceptual categories are organized hierarchically, in that major categories are elaborated into more specific categories or functions (paralleling the syntactic ‘X-bar schema’, where maximal projections consist of more basic elements). The major conceptual categories are Thing, Event, State, Action, Place, Path, Property and Amount. Each of these categories can be further elaborated into more specific functions, each of which takes another function or an argument as a complement. This is illustrated in 2:

2.

a. [PLACE] → [_{place} PLACE-FUNCTION ([THING])]

b. [PATH] → [_{path} {
 TO
 FROM
 TOWARD
 AWAY-FROM
 VIA } {THING
 PLACE }]

c. [EVENT] → {
_{event} GO ([THING], [PATH])
_{event} STAY ([THING],[PLACE]) } }

d. [STATE] → {
_{state} BE([THING], [PLACE])
_{state} ORIENT ([THING], [PATH])
_{state} EXTEND ([THING],[PATH]) } }

e. [EVENT] → [_{event} CAUSE [[THING
 EVENT]] [EVENT]]

(Jackendoff 1990a;43)

To take a specific example, the sentence ‘*John ran into the room*’ has the following LCS:

3. [Event GO ([Thing JOHN], [Path TO ([Place IN [Thing ROOM]])])] (ibid., p. 45)

The category GO takes two arguments: THING (*John*) and PATH, as is shown in (2.c.). The category PATH (which is the second argument of GO) is elaborated into the function TO, which takes as its argument a Place, shown in (2.b.). PLACE decomposes into the Place-function IN and the Thing argument (ROOM) (2.a.).

Several points should be mentioned in the present context with respect to the LCS in (3):

- (1) Jackendoff adopts a ‘localistic’ point of view, in that the basic major conceptual functions are those which encode spatial motion and location (e.g. PLACE, PATH, GO, STAY, ORIENT) (following Gruber 1976). These spatial conceptual categories are extended by abstraction to other semantic fields such as possession, ascription of properties, and temporal relations. That is, spatial relations are taken as the most basic semantic field.
- (2) Under Jackendoff’s theory, thematic roles are not considered theoretical primitives. Rather, they are defined as structural positions in the LCS: “... the names for them are just convenient mnemonics for particularly prominent configurations”, (Ibid., p.47) in much the same way as ‘subject’ and ‘object’ are convenient labels for particular syntactic positions. For example, the thematic role ‘goal’ in sentence (3) above is defined as the position of the argument of TO; and ‘theme’ is defined as the first argument of the Event-functions GO, STAY or BE.

But the meaning of a sentence or a predicate cannot be fully rendered in localistic terms. Two additional thematic roles are therefore introduced : Actor - the instigator

of an action¹³, and Patient - the affected object. The Actor is an argument that can appear in the frame 4.a. and the patient is the argument appearing in 4.b.

4. a. Actor: {What X did was}
 b. Patient: {What happened to X was...}
 { What Y did to X was....}

Jackendoff points out that ‘actorhood’ or ‘patienthood’ of a certain argument does not eliminate the possibility that the argument in question bears a localistic thematic role as well. For example, in 5.a. *the tree* is both a patient and a goal, and in 5.b. *the ball* is both a patient and a theme.

5. a. The car hit **the tree**.

goal/patient

b. Pete hit **the ball** into the field.

theme/patient

(*ibid.*, p. 125)

This situation led Jackendoff to suggest (following Culicover and Wilkins 1986 and Talmy 1985) that thematic roles fall into two tiers: a thematic (i.e. spatial (I.M.)) tier, dealing with motion and location, and an action tier, dealing with actor- patient relations (*ibid.*, p.126). Thus, he introduces another basic semantic function - AFF (“affect”), which takes two arguments, the first being the actor and the second the patient. A full LCS representation of sentence 5.a. is given in 6 (adapted from Jackendoff 1990a;127, irrelevant details omitted):

¹³ Jackendoff uses the term ‘actor’ instead of ‘agent’ since the latter usually implies volition, while an instigator of an action need not necessarily involve volition. For example, in the sentence ‘The wind rolled the ball down the hill’ *the wind* instigates the rolling of the ball, but it is not a volitional action.

6. The car hit the tree.

Spatial tier: [BE ([CAR], [AT [TREE]])]

Action tier: event [AFF ([CAR], [TREE])]

In (6), each argument occupies a position on each tier: *the car* is the argument of BE and the first argument of AFF, *the tree* is the argument of AT and the second argument of AFF. It is important to emphasize that there is no one-to-one correspondence between syntactic arguments and LCS positions: a syntactic argument can be a complement of more than one semantic function¹⁴. The meaning of each syntactic argument is derived from the combination of all the positions it occupies in the LCS representation. *The car* is both the argument in motion and the instigator of the action, and is therefore both a theme and an actor, *the tree* is both the end point of the motion and the affected object, i.e. it is both a goal and a patient. In order to ensure proper linking between positions at the LCS and syntactic positions, Jackendoff introduces a mechanism of argument binding, which obtains between the binder argument and one or more bindees¹⁵. The binder argument is notated by a Greek superscript; the bindee is notated by a Greek letter within the square brackets (ibid., p.63). According to this notation, the LCS of 5.a. is rewritten in 7:

The term ‘Actor’ is more general than ‘Agent’ in that it includes both volitional and non-volitional instigators of actions.

¹⁴ The reverse is also true: there are semantic arguments which do not surface as syntactic arguments at all. Take for example, the verb ‘to butter’: the spatial tier of the LCS is represented in (i). The argument BUTTER, which is the Thing argument of GO does not surface as a syntactic argument of the verb.

(i) [event GO ([thing **BUTTER**], [path TO ([place ON ([thing]))])]

¹⁵ The binders are usually the positions on the action tier (the arguments of AFF), and they bind positions on the thematic tier. The reason for choosing the action tier for that is that the binders’ positions are the positions which are linked to syntactic positions, since the action tier positions ‘provide a more regular mapping to the syntactic positions than the thematic tier’. (Jackendoff 1990a;145).

7. The car hit the tree.

[BE ([α], [AT [β]])]

event [AFF ([CAR] ^{α} , [TREE] ^{β})

The positions that are linked to the syntax are the positions of the binders, but the role each argument has comprises of all the positions which are bound to the same position. To illustrate this point with a more elaborate example, consider the following:

8. Bill gave Sue a book.

CAUSE ([α], [GO_{poss} ([BOOK] ^{γ} , [FROM [α] TO [β]])]

AFF ([BILL] ^{α} , [SUE] ^{β})¹⁶

As can be read from this LCS, *Bill* is the actor (the first argument of AFF), and it binds two positions on the thematic tier: the argument of CAUSE, and the argument of the Path function FROM. Therefore it is also a causer and a source. *Sue* is the affected object (the second argument of AFF), and it is also a goal (since it binds the position of the argument of TO). *A book* is the theme (being the direct argument of

¹⁶ Jackendoff claims that *Sue* rather than *a book* is the affected argument, since *a book* seems inappropriate in the sentence ‘??*What Bill did to a book is give Mary (it)*’. However, when the verb *give* takes an NP and a PP complement (*‘Bill gave a book to Sue’*) the theme is the affected argument rather than the goal (*Sue*). That is, the alternation of the ‘dative shift’ is reflected in the choice of the second argument of the action tier. In ISL there is no alternation with ditransitive verbs of possession; the only structure possible is equivalent to that of sentence (8) above (where the recipient is the affected argument). Hence, in the LCS of such verbs in ISL I adopt the structure presented in (8).

GO), and it plays no role on the Action tier. Only three positions are linked to the syntax, since there are only three binders [BILL]^α, [SUE]^β and [BOOK]^γ.

As mentioned before, in the model of grammar assumed here, LCS representations are not linked directly to the syntax, but rather to the level of Predicate Argument Structure (PAS). In what follows I present the basic properties of this level of representation.

1.4.3 Predicate-Argument Structure

Following Rappaport and Levin (1988), Rosen (1989a), Grimshaw (1990) and Alsina (1996), I assume that the positions of the binding arguments are linked to argument positions at the level of argument structure (PAS). Justification for postulating an additional level of representation is presented in these works, where it is argued that “there are generalizations which are most economically stated at that level and cannot be stated at other levels of representation.” (Rappaport and Levin 1988;33). For example, Rappaport and Levin show that PAS is the only level of representation where the notions of ‘external argument’, ‘internal argument’ and ‘direct vs. indirect arguments’ can be defined as a natural class; and since there are linguistic processes which are best described in those terms¹⁷, PAS is proved to be a linguistic entity.

The argument structure representation contains a list of all the arguments that a lexical item licenses in the syntax. As argued by Rappaport and Levin (1988) and

¹⁷ An example of such a process is the formation of adjectival passives, which is sensitive to the distinction between external and internal argument. See Rappaport and Levin (1986, 1988), and for similar examples in Dutch, Booij (1992).

Grimshaw (1990), PAS does not contain any information concerning theta role labels, since syntactic operations are not sensitive to theta role labels. However, syntactic operations are sensitive to the hierarchical relationship which obtains between the arguments¹⁸, and therefore such information is encoded in PAS representations. Also relevant for syntactic operations is the manner of theta role assignment: arguments which get their theta roles from the verb are internal arguments, whereas the argument which is assigned a theta role by the VP (via predication) is the external argument. Following the notational conventions of Rappaport and Levin (1988), the external argument is underlined, and the internal arguments are hierarchically ordered. The hierarchy which obtains among the arguments can be directly derived from the LCS representation by means of a linking principle, according to which least embedded arguments are more prominent than deeply embedded ones, and positions on the Action tier are more prominent than positions on the thematic tier (Jackendoff 1990a;258). The hierarchy is therefore as follows:

Actor>Patient/Beneficiary>Theme>Location/Source/Goal (ibid., p. 258)¹⁹.

Accordingly, the argument structure of (5.a.) above is as follows:

9. The car hit the tree.

LCS: [BE ([α], [AT [β]])]

event [AFF ([CAR] ^{α} , [TREE] ^{β})

PAS: hit < α , β >

¹⁸ For the relevance of the thematic hierarchy to syntactic operations, see for example Grimshaw and Mester (1988) for an analysis of Japanese light verb constructions, and Alsina (1992) for an analysis of causative verbs in Chichewa.

¹⁹ Grimshaw (1990) assumes a somewhat different hierarchy, where source/location/goal are placed higher than theme. I follow Jackendoff's hierarchy, since the morphology and syntax of ISL (and especially the morphology of verbs of motion) seem to suggest that the source and goal are much more

The derivation of the PAS of a ditransitive verb such as *give* is given in (10):

10. Bill gave Sue a book.

LCS: CAUSE ([α], [GO_{poss} ([BOOK] ^{γ} , [FROM [α] TO [β]])])

AFF ([BILL] ^{α} , [SUE] ^{β})

PAS: < α , β , γ >

The hierarchy between the two internal arguments is also derived from the LCS representation: argument < β > occupies a position on the action tier, and therefore is more prominent than < γ >, which occupies a position only on the thematic tier.

To summarize, the LCS contains semantic information (conveyed in terms of conceptual categories and their arguments) which is represented in two tiers - the spatial-thematic tier, and the action tier. The level of PAS represents the arguments that the predicate in question licenses in the syntax. PAS does not contain any information concerning the thematic roles each argument bears, but it represents the hierarchical relations between the arguments. This hierarchy is derived from the LCS representation by means of a linking principle which states that least embedded arguments in the LCS are more prominent than deeply embedded ones.

closely linked to the verb than the theme argument, and therefore, in such verbs the theme is hierarchically more prominent

1.4.4 The Phonology of Signs

Though phonology will not figure prominently in this work, I find it necessary to acquaint the reader with the basic phonological structure of signs, for two reasons. First, this introduction will facilitate understanding the examples referred to in the text. Second, my analysis makes several predictions regarding the phonological manifestations of agreement verbs, so that a basic understanding of ISL phonology is required in order to follow the argumentation (presented mainly in chapter 5).

Signs in sign languages, like words in spoken languages, are not holistic entities. Rather, they are built from linguistically significant yet meaningless units, like phonemes. The first work to demonstrate the existence of a phonemic level of representation in sign languages was that of Stokoe (1960). Stokoe showed that pairs of signs may differ minimally from each other in one of three categories: handshape, movement or location. For example, the signs MOTHER and NOON in ISL are distinguished by their handshapes, but their movement and location are identical, as is exemplified in figure 1.2:



MOTHER-NOON (handshape)



EAT- LEARN (location)



PERSON - GUILTY (movement)

Figure 1.2: Minimal pairs in ISL

Stokoe identified the list of handshapes, movements and locations in ASL, which he labeled ‘cheremes’, the equivalent of phonemes in spoken languages. In later works, the term ‘phoneme’ replaced the term ‘chereme’, and I will follow this terminology here. Phonemes from each category combine to form a sign. A sign, in order to be articulated, needs specifications for each of three categories: handshape, movement and location. According to Stokoe, these elements are simultaneously organized in a sign morpheme. However, subsequent works (Liddell 1984, Liddell and Johnson 1989, Sandler 1989) showed that signs have sequential structure as well, since certain phonological and morphological processes evident in sign languages can be captured only by referring to sequentially ordered units. For example, verb agreement (described in section 1.2. above) can be captured only if units are assumed to occur

sequentially (Padden 1983). The signs ${}_1\text{SHOW}_2$ vs. ${}_2\text{SHOW}_1$ ('I show you' vs. 'You show me') differ from each other only with respect to the sequential order of the location specifications of their beginning and end points: ${}_1\text{SHOW}_2$ starts at 1P locus, and ends at 2P locus. ${}_2\text{SHOW}_1$ starts at 2P locus, and ends at 1P locus. They are identical in every other respect. This and other processes motivated the development of phonological models involving sequential elements. The particular model assumed here is the Hand Tier (HT) model, developed in Sandler (1989).

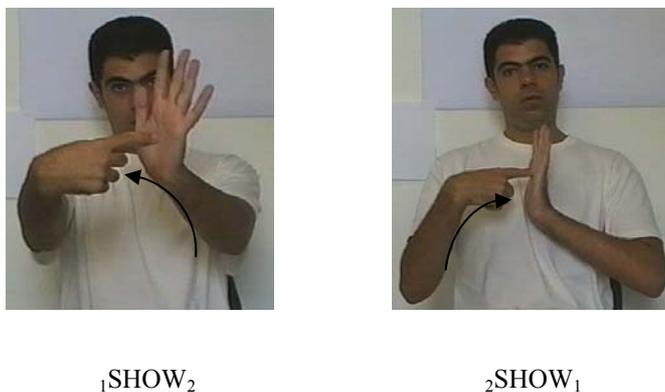
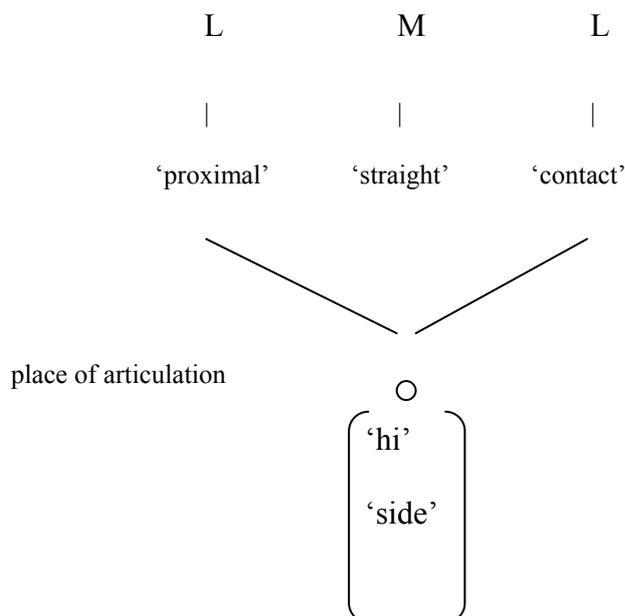


Figure 1.3: Verb agreement: the signs ${}_1\text{SHOW}_2$ vs. ${}_2\text{SHOW}_1$ differ only with respect to the linear order of location specifications.

The HT model aims at capturing the sequential properties of a sign, as well as its non-sequential (simultaneous) properties. The phonological specifications of a sign are organized in autosegmental tiers. The tiers are independent of each other, yet related in a constrained way. The basic sequential units are Location (L) and Movement (M). Typically, the hands start at one location, move, and end up in another location. This is represented as an L M L sequence. For example, in a sign such as REMEMBER, the first Location is in front of the ipsilateral side of the forehead. Then the hand

moves in a straight path and to a location on the forehead. In most signs, both locations are in the vicinity of a major body area – the head, the trunk, or the non-dominant hand. This is represented in the model as a ‘place of articulation’ node. Within each place, finer settings are specified by features such as [+/-hi], [+/-lo], [+/- ipsilateral]. Thus, [+hi] on the [head] place would be around the forehead (as in the sign REMEMBER). Furthermore, the Locations differ from each other in terms of their proximity to the body, or of their position in the vertical or horizontal dimensions. This is represented by the features such as [+/- prox] and [+/-contact]. The representations here use features where their meaning is clear, or else transparent labels shown in quotation marks.

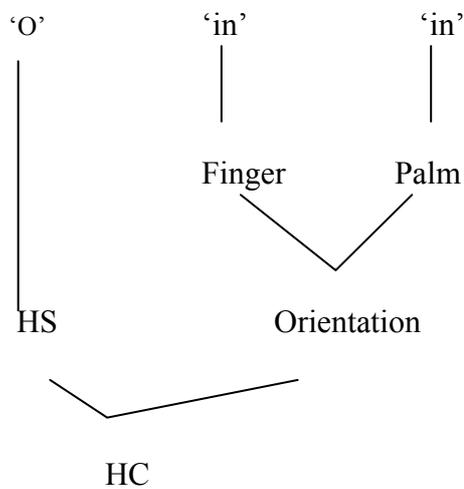
11. REMEMBER:



[head]

The other basic unit is Hand Configuration (HC), which consists of the following classes of features: selected fingers (those fingers which are involved in a specific handshape), finger position (whether the fingers are open, curved, bent or closed), and palm orientation. The HC features are associated to the LM timing tier in a non-linear way. In other words, the HC features are regarded as simultaneously characterizing the sequential location and movement of the sign. This association captures the fact that typically there is only one handshape per morpheme. The sign REMEMBER is illustrated in (12), where ‘O’ stands for a handshape in which all fingers meet at the fingertips.

12. REMEMBER:



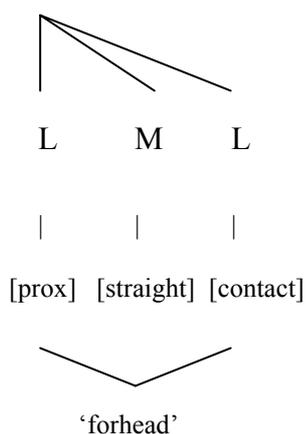


Figure 1.4: The sign REMEMBER

The representation of handshape is far more complex than (12) indicates, accommodating handshape change and other specifications (see Sandler 1995b). However, as this degree of detail is not required for our purposes, we will base our analysis on representations such as (12).

The representation in (12) departs from the HT model in one respect: whereas Orientation refers only to the palm in the HT model, I add an additional node for finger orientation. This distinction is necessary, for the following reason: one of the argument-marking mechanisms identified in the present work – the facing of the hands – is realized phonologically either as palm orientation, and/or finger

orientation. In order to predict whether the facing is realized as one or the other, the distinction between the two must be maintained (as will be shown in chapter 5)²⁰.

Each of the basic units – L, M, and HC, has its own set of feature specifications. However, underspecifications are also possible. When a unit is unspecified, it will be assigned a default value in the surface form. The default specifications I will assume here are:

- Place of articulation – neutral space, the signing space in front of the signer’s chest.
- Location – [prox], a location near the signer’s chest, and ‘medial’ (or –[-prox, -distal]), a location in medial distance from the first location (Sandler 1989;152).
- Handshape – the G handshape (extended index finger, other fingers closed) (Sandler 1996b).
- Orientation - forward.

This concludes the phonological description needed in order to follow the analysis of ISL verb agreement in this thesis, the contents of which are outlined in the next section.

1.5 The Structure of the Thesis

Chapter 2 describes two important aspects of the structure of ISL which provide a necessary background for understanding the analysis of verb agreement in the

²⁰ It might be claimed that for many signs in the lexicon, it is redundant to specify both palm and finger orientation, since the specifications of one may be predicted from the specification of the other. However, a resolution of this issue goes beyond the scope of this thesis.

language: the referential system, and the issue of verb classification in the language. The referential systems of sign languages exhibit some properties unique to languages in the visual-spatial modality. The first is a mechanism for establishing referential loci (R-loci), which is regarded here as a mechanism for assigning an overt referential index for discourse referents. The second property is the distinction between locative and pronominal use of space. This distinction results in different interpretations assigned to R-loci and the relationship between them, depending on whether these loci correspond to entities or to locations. It also plays an important role in the classification of verbs in the language, since two classes of verbs (agreement verbs and spatial verbs) differ precisely in the way in which they use space. The second part of chapter 2 deals with verb classification and verb agreement in ISL. First, the classification of verbs in the language is introduced, focusing mainly on the differences and similarities between the two classes of verbs which mark agreement, namely spatial verbs and agreement verbs. Next, the morphological realization of agreement in ISL is examined, identifying two morphological mechanisms for marking agreement: the direction of the path movement, and the facing of the hands.

Chapter 3 examines the precise nature of the morphological mechanisms identified in chapter 2. It focuses on two main questions: (a) Does the path movement mark agreement with the syntactic notions of **subject** and **object**, or with the thematic notions of **source** and **goal**? (b) Do the facing and the direction of the path redundantly mark the same system, or do they serve different functions? It is suggested that these questions can be answered only by focusing on a sub-set of agreement verbs, namely backwards verbs. By comparing backwards verbs to regular

agreement verbs, from the points of view of their morphological, syntactic and thematic behavior, the precise nature of the agreement system is revealed: agreement verbs morphologically mark both syntactic and thematic relations. This is achieved by utilizing two different phonological elements available in the language: the direction of the path movement, and the facing (as distinct from orientation) of the hands. The former marks agreement with the source and goal nominals, while the latter marks the syntactic object. This analysis reveals the morphological complexity of agreement verbs, which lies at the basis of the analysis of verb agreement in ISL.

Chapter 4 constitutes the core of this thesis, which was sketched in section 1.3. It presents the Thematic Structure Agreement Analysis, which purports to answer two significant questions: (a) How can linguistic theory account for thematic agreement? (b) Can we predict the agreement pattern of verbs in ISL? By applying a particular componential analysis of verbs in ISL, I show that the correct analysis of verb agreement in the language enables us to predict the agreement pattern each verb in the language takes, and at the same time to point out significant similarities and differences between ISL (and sign languages generally) and spoken languages with respect to verb agreement.

Chapter 5 focuses on the elements which distinguish agreement verbs from one another, and give rise to the numerous agreement verbs in the language. I show that agreement verbs fall into two classes according to their syntactic behavior: ditransitive agreement verbs, and monotransitive agreement verbs. I argue that monotransitive agreement verbs are derived by a process of noun incorporation, whereby a noun occupying the theme argument position is incorporated into the

PATH predicate. Di-transitive agreement verbs differ from each other in their ‘manner of transfer’ (e.g., transfer ‘by grasping’, ‘by letting’, ‘by releasing’ etc.), which is reflected phonologically in the hand internal movement. By analyzing the elements which distinguish agreement verbs from each other, all the morphological components of agreement verbs are identified. These components are: PATH, the agreement markers, TRANSFER and the theme argument or the manner of transfer. The last part of chapter 5 deals with agreement verbs where some of these components are not overtly manifested. It is argued that such verbs are the result of phonological clashes between some of these components. I further show that by assuming this analysis, the phonological and morphological properties of such verbs are predictable. Thus, verbs with apparently anomalous morphology do not constitute counterexamples to my analysis, but rather support it.

Chapter 6 examines the predictions made by the analysis. The predictions concern both the form of agreement verbs, and their lexical-semantic characteristics. I argue that the analysis facilitates predictions for sign languages in general, not just ISL. Possible counterexamples to the analysis are presented and examined, showing the analysis to be falsifiable but not false.

In chapter 7 the Thematic Structure Agreement Analysis is compared with others: Shepard-Kegl (1985), Brentari (1988, forthcoming), and Janis (1992). Similarities and differences are pointed out, emphasizing the advantages of the present analysis for understanding the phenomenon of verb agreement in ISL, in other sign languages, and in language in general.

Chapter 8 places the analysis of ISL verb agreement in a broader context. Though agreement in ISL has been shown to follow general linguistic principles, it still stands out as unique from a typological point of view, as no spoken language that I know of has the tri-partite verb classification which seems to characterize all sign languages. This typological state of affairs poses significant theoretical challenges for linguistic theory. Tackling these challenges from the perspective of verb agreement, I suggest that these typological facts are the result of interaction between two general cognitive principles, and the possibilities for the realization of these principles provided by the visual modality. The principles in question concern the role of iconicity as a preferred cognitive communication/strategy, and the centrality of spatial relations in our cognition and language. The uniformity of sign languages and the differences between signed and spoken languages will then be ascribed to the fact that sign languages, but not spoken languages, can represent spatial relations iconically. Spatial relations figure in the structure of all language. But the different possibilities for expressing them afforded by each of the two modalities result in significant differences in structure. This explanation, then, shows how investigation of a specific phenomenon in one sign language can further our understanding of language in general, and the ways in which language and modality interact.

Chapter 2

Reference and Agreement in ISL

Introduction

This chapter presents a survey of various aspects of the structure of ISL which are related to agreement. They provide an important background for understanding the analysis of agreement which is the core of this thesis. Two broad areas will be discussed: the referential system of ISL, and the issue of verb agreement in the language. The first part of the chapter is concerned with the referential system of sign languages. Agreement markers are part of the referential system, and therefore understanding how the referential system works is crucial for understanding the agreement mechanisms. The referential systems of sign languages seem to exhibit some properties unique to languages in the visual-spatial modality. Two of these properties will be dealt with here: the first is the mechanism for establishing referential loci (R-loci), and the second is the distinction between locative and pronominal use of space. The first is regarded here as a mechanism of establishing a referential index for discourse referents. These indices are determined in the discourse and not in the lexicon. This results in a pronominal system where each nominal is uniquely identified within a stretch of discourse, rather than being categorized as belonging to a group of nouns in the lexicon on the basis of some lexical feature (e.g. gender). Agreement markers, which are members of the referential system, also exhibit this property: they refer to each nominal individually rather than referring to a whole class of nominal.

The distinction between locative and pronominal use of space results in different interpretations assigned to R-loci and the relationship between them, depending on whether these loci correspond to entities or to locations. It will be shown that this distinction plays an important role in the agreement patterns found in sign languages, since two classes of verbs (agreement verbs and spatial verb) differ precisely in their use of space.

The second part of this chapter deals with several topics concerning verb agreement in ISL. First, I introduce the classification of verbs in the language. This classification is based on Padden's (1983, 1990) analysis of verbs in ASL. Padden identifies three classes of verbs: plain verbs, which do not inflect for agreement, agreement verbs, which mark agreement with subject and object, and spatial verbs, which mark agreement with locations. I will focus mainly on the differences and similarities between the two classes of verbs which mark agreement, namely spatial verbs and agreement verbs.

After discussing the morphological properties of verbs which inflect for agreement, I turn to the morphological realization of agreement. I show that apart from the direction of the path movement, there is another morphological factor involved in the agreement process, namely the facing of the hands (which is distinguished from the term 'orientation'). The analysis of non-manual agreement markers (Bahan 1996) is also briefly presented and discussed.

The last subsection deals with several constructions which are often referred to in the literature as 'agreement with a single argument'. By examining these constructions, I

will be able to pinpoint what I refer to as ‘agreement’ in this work, and to determine which constructions fall within the boundaries of my analysis.

2.1 The Referential System of ISL

The referential system of a language is essential for the discussion of its agreement system, since agreement is defined as the spelling out of the pronominal features of a nominal on its head or its dependents. Pronominal features, or ‘phi-features’ as they are often called, are those features by which the referential properties of a noun are identified. These properties, which usually consist of person, number and gender or noun class, can be regarded as ‘filing labels’ which serve to track a nominal over a stretch of discourse. Agreement markers are part of that system: they can be regarded as marking all the characteristics of the nominal in question (its qualities, actions and states) by means of the same set of features which serve to identify that nominal, i.e. its phi-features. Hence, the basic criterion for defining an affix as an agreement marker is whether or not it encodes the phi-features of the controlling nominal.

Turning to ISL, we ask the question - what is the list of phi-features in the language, and how are they expressed? Investigations of various unrelated sign languages show that the referential systems of sign languages differ in some important respects from referential systems of spoken languages. The main differences are: 1. In sign languages nominals are not grouped together on the basis of a shared lexical feature (e.g. their gender¹). Rather, each nominal is associated with a distinct location in

¹ The term ‘gender’ is used here as referring to noun classes in general, and not just to the restricted masculine/feminine systems found in some language families. For an extensive cross-linguistic survey of gender and noun classes, see Corbett (1991).

space, which functions as its referential index. 2. Loci in space may have either a locative or a pronominal interpretation. The use of the signing space in each of these interpretations is very different: in its locative use, the signing space is analogous to real-world space. In the pronominal use, on the other hand, space is used in an arbitrary, non-analogous way.

In this subsection I address these two topics. First, I describe the mechanism for establishing reference points, and analyze it as the phonological realization of the phi-features of nominals in the language. Then I show that agreement in the language can be described as a process of ‘copying’ these phi-features onto the agreeing elements. Next I present the differences between the two uses of space (locative vs. pronominal), examine the question of whether they should be regarded as two distinct systems and suggest a possible direction for explaining these differences.

2.1.1 Establishing Reference Points

A referent introduced into the discourse is assigned a point in the signing space which remains constant throughout that stretch of discourse. I call this point (following Lillo-Martin and Klima 1990) a referential locus, R-locus for short. If the referent is present in the signing situation, the actual location of the referent determines its R-locus. For example, the R-locus of 1P is the signer’s chest; the R-locus of 2P is the location of the addressee; and the R-locus of any 3P referent present in the signing situation is the actual location of that referent.

If the referent is not present, it is assigned an arbitrary point in the signing space (provided that other NP's have not already been assigned that point). For example, one can associate 'John' with a point to the right of the signer, and 'Mary' with a point to the left of the signer. Once an R-locus has been established for a specific referent, subsequent reference to that locus is equivalent to pronominal reference; i.e. pointing again to that locus has the function of referring back to the NP associated with it.

The association of a referent with a locus (that is, establishing an R-locus for a referent) can be done in one of several ways: 1. The signer can sign an NP, and then point towards a specific point in space. 2. The signer can sign an NP and direct his/her gaze towards a specific point in space. (It is possible to use both strategies in one clause, as is exemplified in (2) below). 3. The signer may use verb agreement affixes, by associating the beginning or end point of agreement or spatial verbs (see section 2.2 below) with a certain locus in space, and then sign the NP associated with that R-locus. These devices are exemplified here:

1. **BABY_a INDEX_a I₁ SPOON-FEED_a**

'I fed the baby with a spoon.'

2. **----gr---** **-----ga-----**

STORY_a INDEX_a I ALREADY READ I

'I read the story.'

(**gr-** gaze at referent; **ga-** gaze at addressee)

3. I ₁GIVE₃ MALE CHILD BOOK

‘I gave the boy a book.’

**BABY_a****INDEX_a****Figure 2.1: Establishing a reference point.**

The procedure of establishing an R-locus for a referent lies at the heart of the pronominal system of ISL (and, in fact, of any well-studied SL that I am aware of). All pronominal references are made with respect to the R-loci. Pronouns in ISL, as in languages in general, can be used both deictically – to refer to a referent present in the signing situation, and anaphorically – to refer back to a referent introduced earlier in the discourse. In the deictic use, the signer points (or gazes or directs a verb) towards the actual location of the referent in question. If pronominals are used anaphorically, the signer points towards an R-locus which has been previously established in the discourse, thus making reference to the NP associated with that R-locus.

Thus, in a sense, R-loci function as a mechanism for establishing linguistic identity for entities introduced into the discourse model. Unlike in many spoken languages, where nominals are grouped on the basis of a shared lexical feature (e.g., gender), in sign languages nominals are not grouped into noun classes. Rather, the mechanism is

that of pairing a referent with a location in space. In that, R-loci resemble indexing, used in linguistic theory and analyses in order to capture inter alia co-reference between NP's, or between pronouns or anaphors and their antecedents². The basic properties characterizing R-loci, listed below, make them look more like indices than like personal pronouns:

1. Infiniteness: There seems to be an infinite number of R-loci in ISL, since there are infinite numbers of points in space, and each one can be established as an R-locus for a nominal. This seems to be very different from spoken languages, where pronouns constitute a closed class with a restricted number of members.
2. Discourse determined: Here sign languages differ from spoken languages as well. Pronominal features in spoken languages group nominals on the basis of some shared lexical features. Such features remain stable over the various contexts in which these nominals may appear. For example, the Hebrew feminine pronoun *hi* ('she') groups together all the nominals which have the feature 'feminine'. In English, the pronoun *it* generally refers to those nominals who have the feature 'inanimate'. In ISL, on the other hand, there are no features shared by various referents that consistently lead them to be grouped together (as is pointed out by Janis 1992;88 with respect to ASL). The locus with which a referent is associated is discourse determined, and not lexically determined. That is, there is nothing in the lexical properties of a specific nominal which determines what locus it will be assigned. The same referent may be associated with different loci in different contexts, and a specific locus may be associated with two or more different referents over various contexts. Moreover, if two interlocutors refer to the same

² Lillo-Martin and Klima (1990) point out that "The difference between ASL and English, then, is that

entity, they use the same R-locus, that is, the same location in space within a specific discourse³. Hence, in ISL the specific location an R-locus takes is determined by the discourse and may vary from one discourse to another, rather than by the lexicon.

3. Non-ambiguous: Pronouns in spoken languages are often ambiguous, since each pronoun refers to a group of nominals sharing a specific feature. Thus, if two nominals of the same group appear in the same discourse stretch, the pronoun may refer to either one, which would cause ambiguity. R-loci in sign languages, on the other hand, are often said to be non-ambiguous: each locus in space is associated with a unique referent in a given stretch of discourse. In a specific discourse there is one to one correspondence between referents and loci⁴.

2.1.2 The Referential Morpheme

Since the referential properties of a nominal are expressed as a locus in space, I regard R-loci as a distinct morpheme, which may be called ‘a reference system morpheme’ (following Janis 1992;158), or simply ‘an index’. Semantically, this morpheme denotes the assignment of referential properties to a nominal, which can also be referred to as ‘indexing’. Phonologically, this morpheme has only location specifications, which consist not of concrete values, but rather of a variable⁵. When

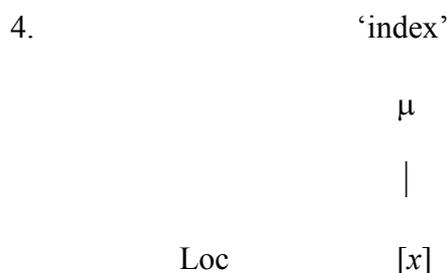
in many cases what are unspoken referential indices in English are overtly manifested in ASL”.

³ I am in debt to Yehuda Falk for pointing this out to me.

⁴ Janis (1992) argues convincingly that the referential system of ASL is not altogether non-ambiguous, but rather it is ambiguous in a different way. In ASL, an R-loci is ambiguous between a referent and its location. Thus, pointing to an R-locus could mean either referring to a referent, or to its location. Therefore, ‘when discussing a referent as part of a spatial milieu, it is necessary for the locus of the referent and the locus of the referent’s location to match. Thus, in these contexts, loci are obligatorily ambiguous.’ (ibid., p.120).

⁵ In Janis’s terms, the reference system morpheme consist of an unspecified location slot, which she calls an open position tier.

this variable is phonologically realized, it gets associated with a specific location in space, under the condition that within a specific discourse, morphemes which bear the same index will be associated with the same location (as suggested in Lillo-Martin and Klima 1990;199).



Since this morpheme is necessarily a bound morpheme (as it has phonological specifications only for location, and not for other phonological features - handshape and movement⁶), it must be combined with other morphemes in order to be realized. Morphemes which combine with the index morpheme are pronouns (personal, reflexive and possessive) and predicates carrying agreement morphology, which are predicates denoting spatial relations⁷. What all these signs have in common is their referential ability, that is - the ability to express co-reference with a nominal by their form. This, in fact, is equivalent to the definition of agreement in chapter 1: ‘the marking of the phi-features of a nominal on another lexical item’. In the next subsection I describe the agreement process as ‘copying’ the location specifications of the index onto the phonological representation of the agreeing elements⁸.

2.1.3 Agreement as a ‘Copying’ Procedure

⁶ According to Sandler (1989), all free morphemes in ASL (and this holds for ISL as well) have to be characterized by some handshape, location and movement features. Thus a morpheme which does not have specifications for all the above categories is necessarily a bound morpheme.

⁷ The concepts of ‘spatial predicates’ and ‘spatial verbs’ are quite similar, though not identical. I will explain what spatial predicates are in chapter 4.2.1.

From a morphophonological point of view, agreement can be regarded as a ‘copying’ process, where a morpheme representing the identity of a nominal is copied onto another lexical item which stands in specific syntactic relations with that nominal. (Aronoff 1988;2). Apart from the syntactic conditions on the agreement relation, agreeing elements must also be capable morphologically of carrying agreement markers, that is, of inflecting for agreement. I claim that in ISL this morphological feature is that agreeing signs have empty location specifications (empty location tier)⁹: elements which carry referential features (e.g., pronouns and spatial predicates) have full specifications for their hand configuration and movement features. However, they do not have any specifications for their location features. They can be said to have empty location slots in their phonological representations. These empty slots are filled in by copying the location specifications of the index of the nominal they are associated with. Thus, agreement markers in ISL can be regarded as morphemes with an open location slot.

Take for example a personal pronoun in ISL: it has a G handshape; the movement is straight path movement; and the finger orientation has a value correlated with the direction of movement. The location specifications of that movement, though, are not specified. In principle, this pointing movement can be directed to any point in space. However, in order to be interpreted, the pronoun has to be co-referential with a nominal. This co-reference is done by copying the location specification of the index

⁸ In regarding the process of agreement as basically a copying procedure I follow the analysis of agreement in Aronoff (1997).

⁹ This is very similar to Janis’s (1992) analysis of referential signs in ASL. The main differences between our analyses is that she does not regard agreement as a copying procedure, but rather as a process of combining the reference system morpheme with other morphemes. I prefer to describe

associated with the noun onto the empty location slot of the pronoun. This is represented below:

5.

(i) A nominal N is introduced into the discourse.

It is associated with index j $N^{+}_{[j]}$

Index $_j$ is associated with location a in space $N_{[a]j}$

(ii) A pronominal sign PRONOUN is co-referential with N_j

Syntax: The indices of N and pronoun match $\text{PRONOUN}_{[j]}$

Phonology: The location specifications of the index are copied to the empty slot of the agreement marker:

$\text{PRONOUN}_{[j]} + [a]j \Rightarrow \text{PRONOUN}_a$ (a PRONOUN sign pointing at location a , expressing co-reference with nominal N_j)

The most unusual aspect of this system is the open position in the phonological representation of the agreement morpheme. This is unusual since we expect to be able to give a full phonological representation of a morpheme which will be context independent, or - in the case of allomorphy, to be able to specify the environment where each allomorph appears (the list of allomorphs is finite, and usually quite restricted). In the case of sign languages, however, there is no finite set of values to choose from. Furthermore, the different locations in space cannot be regarded as allophones, since a choice of one over the other results in a change of meaning: PRONOUN_a has a different meaning than PRONOUN_b .

agreement as a copying process because this allows a unified treatment of this agreement system with

In spoken languages, the morphemes representing the phi-features of the nominals in a language usually include a rather restricted set of morphemes. Even in languages which have a large number of gender groups, the number usually does not exceed fifteen¹⁰. In sign languages, on the other hand, each nominal in a way represents its own gender class and its own set of phi-features, which are discourse determined. Hence the number of concrete values that the agreement marker gets is in principle infinite.

Though this state of affairs seems unique to sign languages, there are some cases in spoken languages where the value of the agreement marker is discourse determined, and therefore it must contain an open position in its phonological representation. One such case is found in the west-African language Bainuk¹¹. In Bainuk there is a large number of gender classes. Each gender class is marked by a special morpheme (usually a CV sequence, though in two classes it is just a V), which is prefixed to the noun. Words agreeing with a specific noun, such as adjectives, pronouns and demonstratives, ‘copy’ the gender prefix, for example *si-* in 6.a., and *gu-* in 6.b.

6. a. **si-** de:n **si-**wuri
 pirogue long
- b. **gu-**sol **gu-**fær
 tunic white (Dobrin 1996)

that found in some spoken languages (e.g., Bainuk, to be described shortly).

¹⁰ See Corbett (1991) for an extensive description of various gender systems in spoken languages.

¹¹ Bainuk is an Atlantic (Niger-Congo) language spoken in Senegal and Guinea. My description here is based on Dobrin 1996. I thank Mark Aronoff and Wendy Sandler for bringing the Bainuk data to my attention and for pointing out the relevance of this to the analysis of sign languages.

However, not all nouns in Bainuk have a gender marker prefix. That is, some nouns are unprefixes. Agreement with unprefixes nouns follows one of two patterns (though, Dobrin points out, it is not possible to predict which pattern any unprefixes noun will take). In the first pattern, there is an agreement marker with a constant form with two allomorphs: *a-* or *-no* (depending on the nature of the agreeing element). It is the second pattern, though, that is of relevance to the issue at stake here: in many unprefixes nouns, the agreement process ‘copies’ the first CV sequence of the noun; this sequence is not a prefix in these nouns, but rather part of the stem:

7. a. **kata:ma** **ka-wayi**
 river large
- b. **dapon** **da-wuri**
 grass long
- (ibid., p.139)

In these cases, the agreement marker does not contain information about a gender class, but rather about the identity of a single noun. The agreement marker then cannot have a full phonological representation in the lexicon, nor is its form selected from a restricted set of morphemes. Rather, it has some kind of a variable in its phonological representation, where the exact phonological value for this variable is determined by the noun heading that phrase in each particular discourse.

Thus, in Bainuk and in sign languages, the agreement marker ‘copies’ a certain phonological feature of the nominal controlling agreement: in Bainuk it is the first CV cluster of the noun (irrespective of whether it is a gender marker or not), and in sign

languages it is the location features of the index assigned to the noun. In both cases, the result is that the agreement marker refers not to a class of nouns, but rather to a single noun. Hence ambiguities are much less likely to occur in these systems. Ambiguity in Bainuk can arise only if two nominals in a given discourse begin with the same CV sequence. In sign languages, ambiguity arises only when two nominals are assigned the same R-locus¹².

Summary: In ISL the phi-features of a nominal are expressed as a distinct location in space (called an R-locus), which is assigned to that nominal when the nominal is first introduced into the discourse. Subsequent reference to that location is interpreted as expressing co-reference or agreement with that nominal. Signs which can express co-reference includes pronouns and spatial predicates. These signs contain an empty location slot in their phonological representation. The process of agreement is described as copying the specific location value of the R-locus assigned to the noun onto the empty location slots of the agreeing element.

2.1.4 Pronominal vs. Locative Use of Referential System

In the previous sections, I have described the properties of the referential system of sign languages, focusing mainly on the pronominal use of pointing signs (that is, the properties of pointing signs as personal pronouns). There is, however, another use of pointing signs - as **locative** pronouns. The distinction between locative pronouns and personal pronouns corresponds to a much more general distinction, between a locative

¹² This is a rather rare, but not an impossible situation. For example, Janis (1992;114) points out that

The difference between the two types of pronouns emerges when the signer points to point C, a location close to, but not identical with point A. In the case of (ii), this phonetic variation does not result in a change of the meaning of the sentence. As long as point C is closer to A than to B, the sentence would still mean ‘John is happy’. In the case of (i), however, the sentence would have a different meaning: ‘I live in a place between Haifa and Jerusalem which is closer to Haifa’. The difference between (i) and (ii) when pointing to C rather than to A, highlights the differences between the two types of pronouns. These differences are:

1. Phonetic variations: variations in the actual forms of the pronouns are regarded as phonetic variations in the case of personal pronouns, but as meaningful distinctions in the case of locative pronouns (this was mentioned by Padden 1983 as the most salient criterion for distinguishing between agreement and spatial verbs, but holds of pronouns as well, as pointed out by Janis 1992).
2. Expression of spatial relations: locative forms express spatial relationship, whereas personal pronoun forms do not. Therefore, loci assigned to personal referents do not imply any spatial relations between these referents; but with locative referents, the relative position with respect to each other is representative of the spatial relations between them.
3. The space between two loci: Since locative forms express spatial relations, establishing two locative loci expresses the fact that there is space between them. Thus the notion ‘between x and y’ is implicitly expressed (as pointed out by Janis 1992;137). In other words, the space between two locative pronouns is meaningful, and can be later referred to in the discourse, while in the case of personal pronouns, the space between two pronouns is non-meaningful.

¹³ This example is based on Janis’s example for ASL (Janis 1992;135), but it holds for ISL as well.

4. Introducing a new locus: Since the space between two locative pronouns is meaningful and in a sense implicit, there is also the implication that there are other loci in that space. Hence, when the signer points at a new locus not mentioned previously (such as point C in the example above), this locus is interpreted with respect to the already established spatial relations which hold between A and B. That is, it is interpreted as a point (or a location) between A and B, but closer to A. The situation is different when A and B are associated with non-locative arguments: the space between A and B is not meaningful. Therefore, no other loci are implicated. Hence, when a new locus is pointed at, there are two possibilities:
- a. the new point is construed as one of the existing loci (if it is closer to one than to the other); or
 - b. the new locus is uninterpretable since the locus has not been associated with a referent.

All the above differences point to the following generalization: the difference between the two pronominal systems can be characterized as **continuous** vs. **discrete** use of space. The locative system is continuous: reference points are part of a continuum, so that establishing reference points at the same time establishes the continuum between them. The relationship between different points along the continuum (the 'between' sense), and other points on this continuum, are all implied in that system. The non-locative system, on the other hand, is discrete: each reference point represents a discrete independent unit. Therefore, what matters is the factor distinguishing one unit from the other, but the spatial arrangement or relationship among the units is irrelevant. The non-locative pronominal system 'cuts' the space into discrete, well defined, unrelated units, whereas the locative pronominal system relates to space as a whole.

2.1.4.2 Problems with the Distinction

Although the distinction between a locative and a non-locative use of space seems to be real, there are some cases of uncertainty, where it is difficult to determine which use of space takes place:

1. When referents are present, pointing signs are directed towards their actual location. In such cases, phonetic variations of the pointing signs (i.e., pointing in a direction close to the location of a referent) are more likely to be interpreted as distinctive than when the referents are not present. That is, though the signs are used to refer to persons and not to locations, the use of space seems to be continuous rather than discrete in these contexts.
2. Padden (1983;163-164) points out that a referent's locus may be shifted, if, in a given discourse, that referent changes his/her location. For example, a person (e.g., 'JOHN') may be associated with a locus A. The signer may then tell us that John went to the library, located at B. From that stage in the discourse, JOHN ceases to be associated with locus A, and is associated with locus B instead. In such cases, then, the association of a person to a locus is changed because of a change in the **location** of that person, not because a different person is assumed.
3. Liddell (1990) points out that if a referent mentioned in a discourse is significantly taller or shorter than the signer, that referent is associated with a high or low locus, respectively. For example, if the signer signs the verb ${}_1\text{ASK}_3$, and the person associated with the 3P locus is much taller than the signer, the sign will move upwards (rather than the usual horizontal movement). This holds whether the referent is present or not. If the referent is present, the sign will be directed towards

his/her chin (since the verb ASK (ASL) is located at the chin). If the referent is not present, the sign will be directed towards the imagined place of the referent's chin, which will be higher than the signer if the referent is taller. In such cases, again, the choice of a pronominal locus is determined by the location or position of the referent in question.

Examples 1-3 above are examples of cases where loci which are associated with persons seem to be determined by actual locations, or seem to exhibit locative-like properties. It might be argued that some of these cases are the result of ambiguity: an R-locus associated with a person is ambiguous between the person and that person's location. Cases 1 and 2 might be explained as ambiguous between referring to persons (a discrete use of space) and referring to their locations (a continuous use of space). For example, in the case of locus shift, it might be claimed that at first, when establishing JOHN in locus A, the pronominal use of space is functioning. But when expressing the fact that JOHN changed his location, the signer focuses on *John's* location, not on *John* himself. This explanation, however, cannot account for example 3, where locus A seems to be the location of a person, but the signer refers to the properties of the referent as a person (e.g., that person's height), and not as an abstract location.

These examples are problematic, since a theory which regards the two uses of space (locative and pronominal) as distinct cannot account for them. On the other hand, a theory which does not draw a distinction between the two uses of space, cannot account for the significant and general differences mentioned in the previous subsection. Moreover, if this distinction is not recognized, cases of ambiguity cannot be

explained; if there is no distinction, then it is impossible to assign two interpretations to a given form. Hence, I find it necessary to adhere to the distinction between two uses (or two interpretations) of space: as consisting of discrete units, and as a continuum. But it is also necessary to develop a theory which would allow these two uses to interact, and which would be able to formalize this interaction.

Though this task is beyond the scope of the present work, I will briefly outline an approach which I find worth considering. I suggest developing a theory of semantic fields, along the lines of Jackendoff (1976, 1990a), which is based on the work of Gruber (1976). Jackendoff notes that the mechanism for encoding concepts of spatial location and motion can be generalized to many other semantic fields (Jackendoff 1990a;25). For example, the preposition *to* can express locative relations (the goal of motion), but also transfer (*'I gave the book to Bill'*), or change of properties (*'The light changed to red.'*). Each of these semantic fields uses the same basic machinery, but each field may impose its own restrictions. Most noticeably, the semantic field of spatial relations makes use of many more prepositions and distinctions than the more abstract semantic fields. For example, one may go *to a place*, *towards a place*, *in the direction of a (certain) place*, etc. But when turning to another semantic field, such distinctions are non-functional: one may *give a book to Bill*, but not *towards Bill* nor *in the direction of Bill*.

The distinction between locative and pronominal use of space may be seen as a reflection of the difference between two different types of semantic fields: locative vs. non-locative semantic fields. Non-locative semantic fields are more abstract, and since they represent a discrete system (the linguistic system) they impose a discrete

use of space. The locative semantic field, which represents a continuum (real-world space), does not impose such restrictions.

There may be cases where two semantic fields interact. Take for example a sentence such as ‘*Mary handed Harry the book.*’ This sentence involves both a change of location and a change of possession. It might be the case that sentences like this are precisely the ‘trouble makers’ in sign languages, since they exhibit properties of both semantic fields. Thus, developing a theory of semantic fields, and allowing for interaction between those fields, may enable us to account for the distinction between the two uses of space as well as the for the problematic cases mentioned above.

2.1.5 Summary

The referential system of ISL is based on a mechanism of establishing R-loci for discourse referents. These R-loci are realized as distinct locations in space. Co-reference with a nominal is achieved by ‘copying’ the location specifications of the nominal in question into the empty location slot of the co-referring word (a pronoun or an agreeing predicate). R-loci may refer to entities or to locations, each imposing a different use of space.

This part of the chapter constitutes the basis for the understanding of the referential system of sign languages. In section 2.2. these basic properties of the referential system will be shown to be reflected in the behavior of certain verb classes in ISL, as well as in the similarities and differences among these classes.

2.2 Verb Agreement in ISL

Verb agreement in ISL is morphologically realized as two open location slots at the two end points of the verb. These open slots are then filled by copying the location specifications of the R-loci (the phi-features) of the arguments of the verb. The result is that these R-loci determine the direction of the path movement of the verb: the verb moves from an R-locus associated with one argument to an R-locus associated with another.

Not all verbs in the language inflect for agreement. Following is a description of the different verb classes in ISL, focusing on the two verb classes which are marked for agreement: agreement verbs and spatial verbs.

2.2.1 Verb Classes in ISL: Plain, Agreement and Spatial

In this section I describe the three main verb classes in ISL. The description is based mainly on Padden's analysis of verb classes in ASL (1983, 1990). It turns out that Padden's classification of ASL holds of ISL as well, and in fact, of many other unrelated sign languages. The fact that this classification seems to characterize sign languages in general calls for an explanation, and it will be discussed in chapter 8. The purpose of the present chapter is to describe the properties of the different verb classes in terms of the agreement patterns they display, in order to lay the descriptive background for the analysis of agreement in ISL, which constitutes the heart of this work.

The description here is stated in Padden's terminology, in order to keep this preliminary presentation simple. However, some of her basic assumptions (in particular, the description of agreement verbs as agreeing with subject and object) will be challenged in chapter 3.

2.2.1.1 Plain Verbs

Plain verbs are verbs which do not inflect for pronominal features. That is to say, the form of the verb is not determined by the phi-features of the arguments. Examples of plain verbs in ISL include: BEG, BEGIN, BUY, CRY, DECIDE, EAT, FINISH, HAVE-FUN, KNOW, LIKE, LOVE, ORDER, POSTPONE, THINK, WAIT.

Many plain verbs are body anchored, e.g., CRY, DRINK, EAT, HAVE-FUN, KNOW, LOVE, RUN, THINK, WAIT. Yet, other plain verbs are not body anchored, e.g., BEGIN, BREAK, EXAMINE, FINISH, POSTPONE, PROVE, WORK. Hence, one cannot attribute the lack of person and number inflection solely to a phonological factor, such as body anchoring.



EAT**HAVE-FUN****EXAMINE****Figure 2.2: Plain verbs in ISL****2.2.1.2 Agreement Verbs and Spatial Verbs**

In both agreement verbs and spatial verbs the direction of the path movement of the verb is determined by the R-loci of the arguments of the verb. In agreement verbs, the relevant arguments are the subject and object, while in spatial verbs, the relevant arguments are oblique arguments - the source and goal. Therefore the former is said to inflect for person, and the latter for locative relations. Apart from this difference, there are other differences described in the literature. I shall first describe the properties of each class, and then discuss the differences between them.

Agreement verbs

Agreement verbs can be described as consisting of a linear movement (path movement) on the horizontal plane, with agreement markers for subject (S) and object (O) on either end: the beginning point of the sign is the S-agreement marker, and the end point - the O-agreement marker¹⁴. This is illustrated in 9.a-d., by the verb SHOW (ISL) :

9. a. ₁SHOW₂ 'I show you.'
 b. ₂SHOW₁ 'You show me.'

¹⁴ There is a subset of agreement verbs in which the direction of the path movement is from the locus of the object towards the locus of the subject. These verbs are called 'backwards verbs', and will be

- c. $_1\text{SHOW}_3$ 'I show him.'
 d. $_3\text{SHOW}_2$ 'He shows you.'

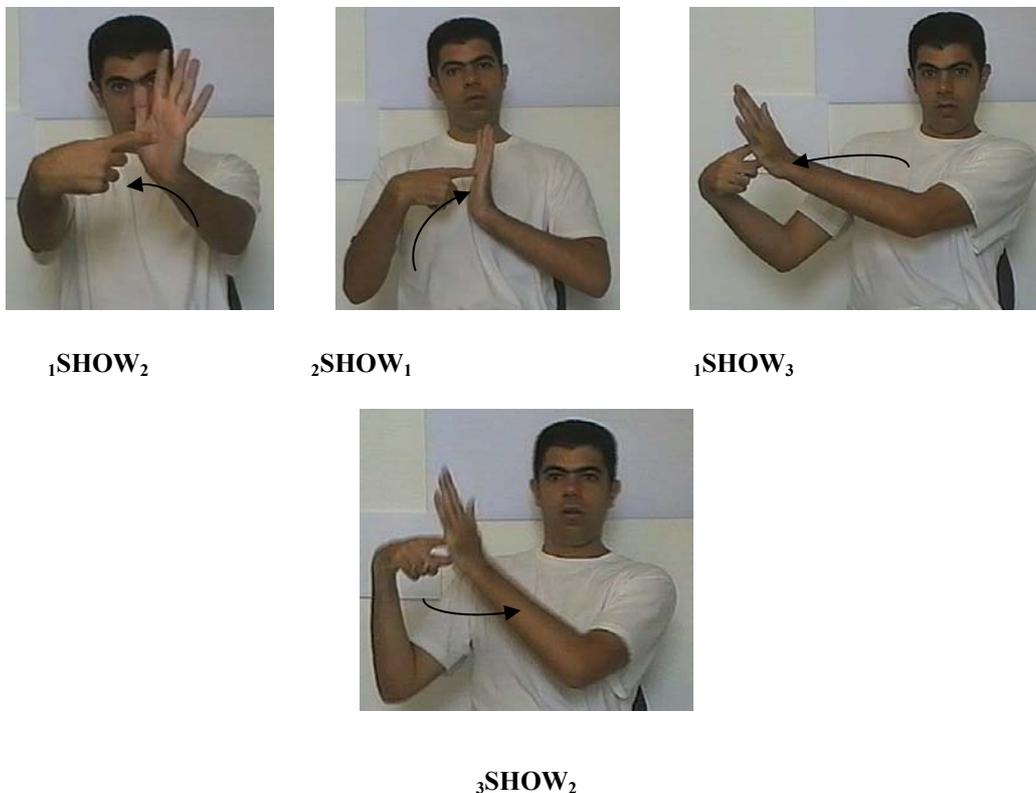


Figure 2.3: Inflected forms of an agreement verb

The verb forms in 9.a.-d. all share the same 'root' (consisting of Hand Configuration, Location, and type of Movement), and a mutable part - the **direction** of the path movement. The direction of the path movement changes in accordance with the arguments of the verb: it originates at the reference point assigned to the S (S-locus) and ends at the reference point assigned to the O (O-locus). Thus, in (9.a.) the S is 1st person (1P) and the O is 2nd person (2P). Accordingly, the path movement moves from 1P-locus (near the signer's chest) to 2P-locus (the location of the addressee). In

analyzed in chapter 3. What is important to our present discussion is that in both types of agreement

(9.b.) the direction of the path is reversed, since the S is 2P and the O is 1P. In (9.c.) the path moves from 1P-locus (the S-locus) to a reference point assigned to the location in space associated with the 3 person pronoun (3P-locus), and in (9.d.) the path movement originates at 3P-locus and ends at 2P-locus.

It has been noticed (Friedman 1975, Fischer & Gough 1978, Meier 1982, Valli & Lucas 1992 among others) that for some, but not all, agreement verbs, the change in the direction of the path movement (determined by the locations established for the arguments) is accompanied by a change in the orientation of the palm¹⁵. SEND (ISL) is such a verb:

10. a. $_1\text{SEND}_2$ ‘I send you.’

b. $_2\text{SEND}_1$ ‘You send me.’



$_1\text{SEND}_2$



$_2\text{SEND}_1$

Figure 2.4: Inflected forms of an agreement verb, with a change in palm orientation.

verbs the direction of the path is stated in terms of the **syntactic subject and object**.

¹⁵ Fischer & Gough (1978:28) refer to the changing of the orientation of the hand(s) as reversibility, whereas the change in the direction of the path movement is referred to as directionality. They point

In (10.a.), the path movement is from a point near the signer's chest towards the addressee, and the orientation of the palm is outwards (i.e. also towards the addressee). In (10.b.) the direction of the path movement is reversed, and so is the orientation of the palm: it faces inwards (i.e. towards the signer).

Spatial verbs.

Spatial verbs are described by Padden (1990) as verbs which have locative affixes. In other words, the beginning and end points of these signs are associated with actual locations - the source of motion (the beginning point) and the goal of motion (the end point), as in the following sentences:

11. CUP INDEX_a I_aCL:C_b 'I moved the cup from location A to location B.'

12. I PAPER I_aSCISSOR-CUT_b 'I cut the paper from one end (A) to the other(B).'



Figure 2.5: A spatial verb: $_a$ CL:C $_b$ 'move cup from location A to location B'.

out that there are directional verbs which are not reversible, and there is at least one verb which is reversible but not directional (OWE (ASL)).

Spatial verbs are often highly polymorphemic, and fall into one of several possible subclasses, depending on which type of morphemes are affixed to the verbal root. Many spatial verbs contain a classifier morpheme (a noun-classifier morpheme or an instrumental classifier), e.g., CARRY-BY-HAND, VEHICLE-MOVE, PERSON-MOVE (glosses taken from Padden 1990;119). A large subclass of spatial verbs, namely ‘verbs of motion and location’ is described in details in Supalla (1982). The important point here is that in all spatial verbs, the location specifications of the path movement are determined by the R-loci of the source and goal arguments of the verb; the R-loci of the subject and object are irrelevant for determining the form of these verbs.

Agreement Verbs vs. Spatial Verbs

Agreement verbs and spatial verbs are similar in that the form of the verb, in particular - the direction of the path, is determined in both classes by the R-loci of two of the arguments of the verb. But there are also several important differences between the two classes:

1. The use of space: the most important difference between the two classes of verbs is that each class uses space differently: in agreement verbs, loci are perceived discretely, while in spatial verbs, they are perceived continuously. This different use of space between agreement and spatial verbs corresponds to a broader difference which exists in the language between pronominal and locative use of space, noted by Janis (1992), which I presented in section 2.1.4. above. Important to our case here is that variations in the form of the verbs are regarded as phonetic variations in the case

of agreement verbs, but as meaningful phonological differences in the case of spatial verbs. Consider the following sentences:

13. BOOK INDEX_a I₁GIVE₂ 'I gave you this book.'
14. BOOK INDEX_a I_aCL:C↑_b 'I moved the book from location A to location B.'

These two sentences can be signed in a slightly different way, where the end points of the verb are not 2P and B, but rather two points in space (2P' and B', respectively) which are close to, but not identical with 2P and B. Notice that though the phonetic change is the same in both sentences, meaning-wise the result is different:

15. BOOK INDEX_a I₁GIVE₂' 'I gave you this book.'
16. BOOK INDEX_a I_aCL:C↑_b' 'I moved the book from location A to location **B''** (which is close to, but not identical with location B).'

The phonetic change caused no difference in meaning between sentences (13) and (15) but did cause a change in meaning between sentences (14) and (16): the location 2P' is still associated with the R-locus of the addressee, that is - it is interpreted as phonologically identical to 2P. The location of B', on the other hand, is interpreted as a distinct location, and therefore sentences (14) and (16) have different meanings: in (14) the book was moved to one location, and in (16) - to another.

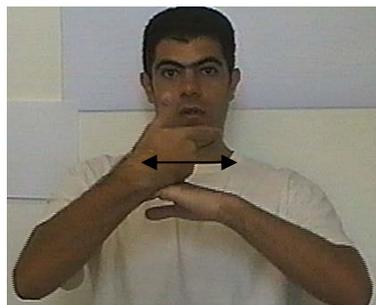
2. The role of orientation: In the case of agreement verbs, the change in the direction of the path movement in order to mark agreement, is in many cases accompanied by a

change of the orientation of the hand (palm or fingers. See section 2.2.1.2. above). That is, agreement can be manifested phonologically by orientation, in addition to the direction of the path movement. In the case of spatial verbs, on the other hand, orientation is not involved in the agreement process: agreement is expressed solely by the initial and final location of the path movement. This was noted by Janis (1992) with respect to ASL and holds of ISL as well. I develop an analysis of the role of orientation in the agreement process in chapter 3.

3. Classifier morphology: Both Padden (1990) and Janis (1992) note that person agreement cannot co-occur with classifier morphology in ASL. That is, agreement verbs cannot contain a classifier morpheme as well. This is in contrast with spatial verbs, which are rich with classifier morphology.

I have found that this generalization does not hold for ISL: there are verbs in ISL which exhibit pronominal agreement, yet they do contain instrumental classifiers. Examples are: SHOOT-WITH-GUN, SPOON-FEED, VIDEO-CAMERA (shoot), as in the following sentences:

- | | |
|--|---|
| 17. BABY INDEX ₃ I ₁ SPOON-FEED ₃ | ‘I spoon-fed the baby.’ |
| 18. YOU ₂ VIDEO-CAMERA ₁ | ‘You shot me (with a
video-camera.)’ |

**₁SPOON-FEED₃****₂VIDEO-CAMERA₁****Figure 2.6: Agreement verbs with classifier morphology:**

In these examples, the agreement markers correspond to pronominal R-loci, rather than to locative ones (the location of the food in (17) and the location of the video-camera in (18)).

In some cases, even verbs containing a theme classifier ('noun-classifier' in Padden's terms) which usually exhibit locative agreement, can exhibit pronominal agreement in certain contexts. For example, if there are several people, and I want each of them to hand me a different object, the following sentence is appropriate:

19. YOU_a CUP INDEX_i _aCL:C₁. YOU_b BOOK INDEX_j _bCL:C₁↑₁. YOU_c
 PAPER INDEX_k _cCL:F₁.¹⁶

'You (over here) - give me the cup; you (over there) - give me the book; you (over there) - give me the paper.'

Though there are only a few agreement verbs which contain classifier morphology (in contrast with spatial verbs, most of which contain classifier morphology), I do not

find that Padden's and Janis's generalization holds of ISL. In other words, in ISL pronominal agreement and classifier morphology are not mutually exclusive.

4. Modulation of the movement morpheme in the verbs: Engberg-Pedersen (1993) points out another difference between the two types of verbs in Danish Sign Language: in spatial verbs (which correspond more or less to her 'polymorphemic verbs') the movement morpheme of the signs could be modulated in various ways, to express different types of motion or different types of manner of motion, e.g., an arc movement (to denote motion around something), move-circles (to express 'move around somewhere'), move-(specific shape) such as zig-zag (to denote specific shapes of paths) (ibid., p. 260-261). In the case of agreement verbs (her 'non-polymorphemic verbs'), the movement morpheme cannot combine with other more specific movement morphemes, such as manner of movement or shape of movement, to express different types of motion (ibid., p.313).

This generalization holds for ISL as well: the movement morpheme of agreement verbs is stable in its phonological specifications. That is, agreement verbs inflect for agreement, but they cannot undergo any process that would alter the quality of their movement. The only modulations possible for the movement morpheme of agreement verbs are aspectual modulations, for denoting temporal aspects such as durational or iterative.

¹⁶ The sign YOU has three different indices to indicate that there are three different addressees in this discourse.

In spatial verbs, on the other hand, the root M may be augmented with several morphemes, denoting different shape of motion (in an arc, in circles, zig-zag, randomly, upwards/downwards etc.).

Summary: Agreement verbs and spatial verbs, though similar in the mechanism of agreement, exhibit different properties and behavior: agreement verbs treat space as discrete, while spatial verbs regard space as a continuum. Agreement verbs may express agreement phonologically by the direction of the path as well as by the orientation of the hands, whereas spatial verbs express agreement only by the direction of the path. Only a few agreement verbs contain classifier morphology, while many spatial verbs do. And in spatial verbs, the root M can attach to other morphemes, denoting manner and shape of motion, whereas in agreement verbs the root M is stable.

Although these distinctions seem quite general, it turns out that there are cases where the distinction between the two classes of verbs is not all that clear-cut. Therefore, some researchers have suggested that this distinction should not be regarded as a dichotomy, but rather as a continuum, with ‘typical’ agreement verbs on one end, and ‘typical’ spatial verbs on the other. There are clusters of properties that go with each end of the continuum, and other verbs fall in between. Engberg-Pedersen (1993), for example, describes the distinction between agreement and spatial verbs as corresponding to the ‘morphological weight’ of the verbs in question: the more morphemes a verb contains, the more likely it is to exhibit certain properties which characterize spatial verbs (or a continuous use of space); while a verb that contains

fewer morphemes is more likely to exhibit the cluster of properties characteristic of agreement verbs.

In section 2.1.4. I mentioned some problems for drawing a distinction between locative and pronominal use of space. Yet I argued that this distinction cannot be dispensed with, since it enables us to account for a variety of phenomena. I suggested, therefore, that problematic cases should be dealt with in terms of interaction between these two uses, rather than by eliminating the distinction altogether. This line of argumentation holds for spatial vs. agreement verbs as well. My approach is that the distinction between the two classes is valid, and that cases of ambiguity or indeterminacy should be accounted for in terms of an interaction between the semantic fields in which the two classes of verbs are involved: the locative/spatial field, and the field of possession.

2.2.2 The Physical Realization of Agreement

The classification of verbs in the previous subsection was based on the morphological properties of the verbs in the language: a verb is regarded as carrying agreement inflection if its beginning and end points are determined by the R-loci of its arguments. Hence, agreement is phonologically realized by the direction of the path movement of the verb ('directionality'). The question that I address in this subsection is whether agreement is physically realized only by the direction of the path, or whether there are any other physical manifestations of agreement. As I mentioned earlier, it has been pointed out that orientation is also relevant for agreement. And it has also been claimed that agreement may be realized non-manually (Bahan 1996 and

references cited there). In what follows I examine the role of orientation in agreement morphology, claiming that the relevant term should be ‘facing’ rather than ‘orientation’. Then I briefly present Bahan’s proposal for non-manual agreement markers. Since his analysis does not have any direct implications or consequences for my analysis, further investigation as to the relation between manual and non-manual realization of agreement is beyond the scope of this work.

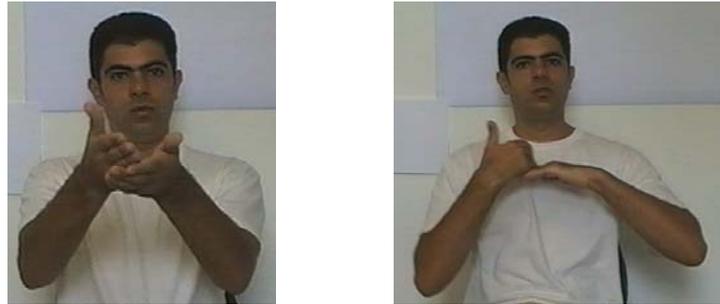
2.2.2.1 Orientation vs. Facing

As was mentioned in 2.2.1.2. above, in some agreement verbs the change in the direction of the path movement to mark agreement is accompanied by a change in the orientation of the palm (e.g. SEND (ISL) above). There are also some verbs in which agreement is marked only by orientation, e.g., ISL - BLAME, VIDEO-TAPE and LOOK-AT-(with admiration). Therefore it is generally assumed that agreement may be expressed either by directionality (the direction of the path) or by reversibility (the orientation of the hands)¹⁷. The relation of orientation to agreement is, however, more complex than meets the eye, since orientation features may be associated with different parts of the hands, e.g., palm or fingers. Therefore, the question that arises is, which orientation features are relevant for agreement.

The works which mention the reversibility of agreement verbs (Friedman 1975, Fischer & Gough 1978, Meier 1982, Valli & Lucas 1992 among others), describe it in terms of change of the orientation of the palm. Other works (e.g., Bos 1993) mention that agreement can be realized by either palm or finger orientation. However,

it seems to me that orientation is not the relevant phonological element for characterizing reversibility. Rather, it is the **facing** of the hands (to be defined shortly).

Consider, for example, the verb HELP (ISL):



${}_1\text{HELP}_2$

${}_2\text{HELP}_1$

Figure 2.7: Inflected forms of the verb HELP

In the form ${}_1\text{HELP}_2$ the fingertips of the hands point towards the 2P locus, whereas the orientation of the palm of the dominant hand is sideways (to the left). In the form ${}_2\text{HELP}_1$ the fingertips point towards 1P locus (i.e. towards the signer's chest), whereas the orientation of the palm is sideways (to the right). Clearly, it is the direction the fingertips are pointing to which marks the agreement with 2P and 1P, and not the orientation of the palm.

Hence, HELP is a verb which marks agreement by the orientation of the fingertips (as well as by the direction of the path movement). Palm orientation in this verb is irrelevant for agreement.

¹⁷ As I mentioned in 2.2.1.2., this holds only of agreement verbs. Spatial verbs mark agreement only by

In the verb HATE (ISL), on the other hand, agreement is marked by the direction of the path movement and by palm orientation . The fingertips point upwards, and do not mark agreement.



₁HATE₂

₂HATE₁

Figure 2.8: Inflected forms of the verb HATE

A third possibility is exemplified by the verb SEND (ISL): agreement is marked by both palm and finger orientation (as well as the direction of the path movement).

Thus, it seems that two kinds of distinctions should be drawn: (1) a distinction between palm orientation and finger orientation¹⁸, and (2) a distinction between orientation features which mark agreement, and those that do not. As we saw above, agreement can be associated with either palm or finger orientation, or both.

the direction of the path movement.

¹⁸ The necessity for drawing a distinction between palm orientation and finger orientation in order to provide an accurate representation of the sign has been pointed out in various works, e.g., Kegl and Wilbur (1976) Wilbur (1979) and works cited there. Wilbur (1979) points out that finger orientation is better defined with respect to the metacarpals (rather than the fingertips), because “the fingers may bend in toward the palm, thus obscuring the direction in which they would be pointing if they were extended straight. A line extending from the metacarpals is used to define finger orientation, whether the fingers are extended or bent.” (ibid., p.64).

I suggest (following Liddell and Johnson (L&J) 1989) that orientation features which mark agreement should be referred to as **facing**. L&J exemplify the distinction between orientation and facing with the verb STARE (ASL), where the facing of the fingertips changes in accordance with the loci assigned to the arguments of the verb, while the orientation of the palm is downwards for all inflected forms of the verb¹⁹(*ibid*, p. 234). Note that this example (STARE (ASL)) equates facing with finger orientation. While this is the case for STARE, it need not necessarily be so: e.g. HATE (ISL), where facing is realized on the palms, and the orientation of the fingertips remains constant in all inflected forms of the verb. Thus the difference between orientation and facing cannot be defined in terms of the part of the hand on which they are realized, but rather in terms of those orientation features that do or do not change in accordance with the reference points assigned to the arguments of the verb. Facing is determined and constrained by the loci assigned to the arguments of the verb, whereas orientation is not constrained in such a way^{20, 21}.

Since facing plays a crucial role in the analysis of agreement verbs suggested in the following chapter, I shall give a tentative definition of the term.

¹⁹ Note that the orientation must still be represented for STARE, to distinguish it from PERSON-LYING-DOWN (ASL) (Wendy Sandler, personal communication). Thus, it seems that the orientation is relevant for the lexical characterization of the sign, while facing is relevant for describing its agreement pattern.

²⁰ It was pointed to me by Susan Fischer that facing need not necessarily be constrained by the loci of the arguments; the main difference between orientation and facing is that facing changes whereas orientation is constant. While this is true in many cases, in some verbs orientation also changes as a result of the change in facing. For example, in HELP (ISL), facing is realized on the fingertips, but the palms change their orientation as well, because in that sign it is physically impossible to change the facing of the fingertips without changing palm orientation. The fact that palm orientation is in many cases determined by fingertips orientation was noted Greftegreff (1992), with respect to indexical signs in Norwegian SL.

²¹ This definition of the terms ‘facing’ and ‘orientation’ is different from L&J’s use of the terms. They suggest that “...facing... ‘points’ a part of the hand at a location. ...Orientation proper ... usually indicates which part of the hand is pointing towards the ground.” (Liddell & Johnson 1989;234). It is also different from what van der Hulst calls ‘Hand Position’, which “...specifies how the hand is

20. **FACING**: the direction towards which the fingertips or palm are oriented in agreement verbs²², as determined by the reference points assigned to the arguments of the verb²³.

Henceforth, the terms facing and orientation encode the following distinction: facing would be used when referring to those orientation features which are determined by the R-loci of the arguments of the verb. Orientation would be used for those orientation features not involved in the agreement process.

2.2.2.2 Non-manual Agreement Markers

The agreement markers discussed so far are expressed physically by the hands: the location of the hands, and the facing of the hands. Bahan (1996), developing ideas introduced earlier by ABKN (1992), argues that agreement (in ASL) can be expressed by non-manual markers as well. Specifically, he claims that head tilt and eye gaze are the non-manual expressions of syntactic agreement. In transitive clauses, head tilt is usually used to mark subject agreement - the head tilts into the direction of the R-locus of the subject argument, while eye-gaze marks object agreement - the

placed vis-à-vis the movement or point of contact (i.e., side of the hand, fingertips or flat side of the hand)". (van der Hulst 1996:134).

²² I make no claim here about whether facing must be specified for signs other than agreement verbs, or whether specification of orientation is sufficient.

²³ Whether facing is realized on the palms or fingertips can be predicted from the orientation features of the citation form of the verb: facing is realized on that part of the hand which is specified for outward orientation in citation form. This predicts that if no part of the hand is specified for outward orientation - facing would be phonologically neutralized. I will return to this point in chapter 5.

gaze is in the direction of the R-locus of the object. In intransitive clauses, either device can be used to mark subject agreement.

The main difference between Bahan's analysis and other analyses of agreement in sign languages (mentioned in 2.2.), apart from the physical expression of agreement markers, is that Bahan claims that non-manual agreement markers characterize all the verbs in the language, irrespective of their morphological properties as plain, agreement or spatial verbs. That is, all clauses in the language contain agreement markers, and hence the characterization of plain verbs as verbs which do not inflect for agreement is misleading: plain verbs do not express agreement manually, but clauses containing plain verbs mark agreement non-manually²⁴.

Non-manual agreement in ISL:

In ISL, head tilt and eye gaze are associated in many cases with the phi-features (i.e., the R-locus) of one or more arguments in a clause. However, from a very preliminary study of these markers in ISL, their behavior does not seem to be as regular as that

²⁴ Bahan claims that the basic sentence structure of all clauses in the language is essentially identical, with an AGR-S node containing the phi-features associated with head tilt (subject agreement marker), and the AGR-O node containing the phi-features associated with eye gaze (object agreement marker). Bahan further claims that these non-manual expressions of agreement suffice to license null subjects and objects. Since non-manual agreement occurs with agreement as well as plain verbs, the same mechanism licenses null arguments for both verb classes. In both cases, null arguments are licensed by rich agreement, and therefore are analyzed as *pro*.

This analysis of the licensing of null arguments in ASL contradicts the analysis suggested by Lillo-Martin (1991), who assumes that syntactic agreement is restricted only to clauses containing verbs that display morphological agreement. Clauses with plain verbs do not contain AGR-P's, and therefore, null arguments co-occurring with plain verbs could not be licensed by rich agreement. Lillo-Martin argues that such null arguments are licensed by Topic, as in Chinese (following Huang 1984). She supports her analysis by showing that the two types of null arguments (those licensed by agreement, and those licensed by Topic) have different properties and distribution, and therefore it is justified to analyze them as two distinct types of null arguments (*pro* and *variable*).

As the subject of licensing of null elements in sign languages has no direct consequences to the analysis of manual agreement in ISL (which is the main issue of my thesis), I do not attempt here to resolve the conflict between these two analyses.

described for ASL by Bahan, and it is not at all clear at this stage of the study whether they can be characterized as syntactic agreement. The first noticeable fact about head tilt and eye gaze in ISL is that there are differences and variations among signers. Data collected from two ISL native signers show that whereas one signer gazes frequently towards the loci of referents in the sentence, the other signer focuses his gaze almost solely on the addressee. Similarly, head tilt is used much more by one signer than by the other.

Apart from these individual differences, when studying the function of these markers, the following descriptive generalizations emerge:

1. Eye gaze seems to be used as an indexing device, that is, as a device for establishing an R-locus for a referent, instead of, or in addition to pointing signs. Once the locus is established, the signer shifts his gaze back to the addressee. Hence, in many clauses, eye gaze does not span over the articulation of the syntactic object, and therefore it is not so evident that it could be described as an object agreement marker, as the following sentences illustrate (gr-gaze towards referent; ga-gaze towards the addressee)²⁵:

21. ---gr--- -----ga-----
 ROAD_a INDEX_a I ALREADY CROSS. 'I crossed the road.'

22. ---gr--- -----ga-----
 GIRL₃ INDEX₃ I MEET INDEX₃ ALREADY GONE

²⁵ In these sentences I have not included other non-manual markers (e.g. brow-raise, eye-squint) since they are not relevant to our point here. But see Nespor and Sandler (to appear) who suggest that such markers are comparable to intonational melodies in spoken languages.

‘The girl I met went away’

2. Head tilt seems to correspond to prosodic constituents in the clause. A tilt of the head in one direction usually spans over a prosodic constituent, in many cases co-occurring with other non-manual markers which span over a prosodic constituent, such as the position of the brows and the squinting of the eyes (Nespor and Sandler to appear). But so far I have not found evidence for the claim that the direction of the tilt is towards the R-locus of the subject.

The relationship between head tilt and eye gaze and agreement in ISL is beyond the scope of this thesis. As this subject has no bearing on the analysis of manual agreement in ISL, I shall leave the subject open for future research.

2.2.3 ‘Single Argument Agreement’

Many works describing agreement patterns in various sign languages mention that verbs may agree with one or with two arguments. Agreement with two arguments is straightforward from a morphological point of view: the two agreement markers are associated with the beginning and the end points of the signs²⁶. What is meant by ‘agreement with one argument’ is much less clear, as there are various different constructions which might deserve that name. In what follows I briefly survey several

²⁶ If agreement is marked only by the facing, then the R-loci of the two arguments are identified by the direction of the facing (both the facing of the palm or fingertips, and the facing of the back of the hands).

constructions which are referred to as ‘agreement with one argument’. The purpose of this brief survey is to make clear which constructions are related to the phenomena discussed in this thesis, and are therefore part of my investigation and should be accounted for, vs. those constructions which exhibit different properties altogether, and hence fall outside the scope of the thesis. I show that in one case - verbs marked for initial body contact - what we have is actually agreement verbs which fail to show agreement with one of the arguments (for phonological reasons) and therefore end up agreeing with only one argument. The other cases are constructions which are substantially different from the pattern exhibited by agreement and spatial verbs, and are thus outside the scope of this work.

2.2.3.1 Verbs Marked for Initial Body Contact

There are many verbs in ISL which behave like typical agreement verbs in that they consist of a path movement, the end point of which is determined by an argument of the verb. They differ from typical agreement verbs in that the beginning point of the verb is marked for being located at some body-part (mainly some part of the face) and therefore it is not determined by the R-locus of the other argument of the verb. A partial list of these verbs in ISL is: ASK (mouth), ANSWER (mouth), SEE (eye), VISIT (eye), CARE-(for) (forehead), TELEPHONE (ear). Since the beginning point of the movement is not associated with the R-locus of an argument, these verbs have only one agreement slot - their end point, and therefore may be referred to as ‘agreeing with one argument’. The only forms of these verbs (in ISL) which agree with two arguments are those that inflect for 1P object. In such cases, the verb form

has a complex path movement: it begins with the R-locus of the subject, moves to the specified location, and then to the 1P locus (the signer's chest).

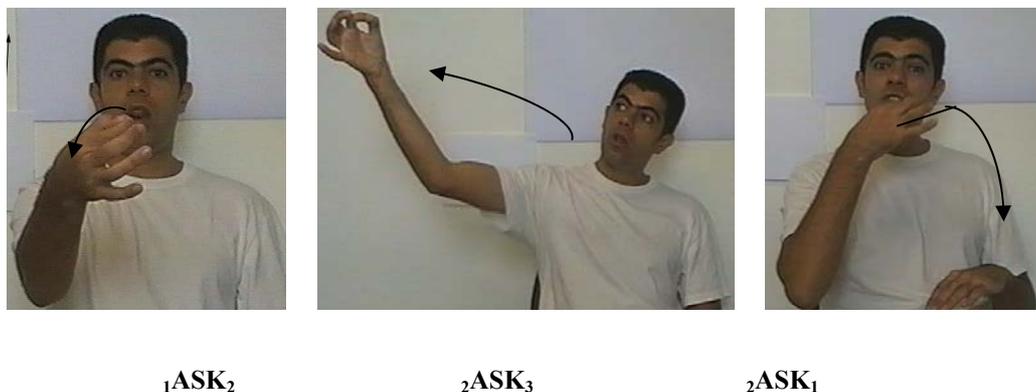


Figure 2.9: A verb marked for initial body contact: ASK

As these verbs can agree (in some forms) with two arguments, they are phonologically well-defined, and they share most properties of typical agreement verbs (most noticeably in their semantic and thematic structure, as I will show in subsequent chapters), I regard them as agreement verbs, with a defective inflectional paradigm because of phonological factors, which will be described in more details in chapter 5.

2.2.3.2 Plain Verbs Articulated in Different Loci in Space: Discourse-Level vs. Sentence-Level Phenomena

Many plain verbs are body-anchored, and therefore cannot be articulated in loci in space which are associated with the arguments of these verbs. However, not all plain verbs are body-anchored. Padden (1990) points out that non-body-anchored plain

verbs in ASL may be articulated in different points in space, which are related to the R-loci of one of the arguments of these verbs²⁷. Hence, it might be claimed that some plain verbs as well inflect for person and number, since the location specifications of the verb are determined by the R-loci (i.e., the phi-features) of the arguments. In what follows, I describe the properties of such constructions, and claim that there are in fact two constructions involved: one, a discourse level phenomenon, and the other, a sentence level phenomenon. Then I examine several analyses suggested to account for these constructions. The main purpose of this subsection, however, is not to suggest an analysis of these forms, but rather to draw a distinction between these forms and the agreement pattern exhibited by agreement verbs (as discussed earlier). This distinction is necessary, since the analysis of agreement suggested in this thesis is intended to account only for the agreement pattern of agreement and spatial verbs, and not necessarily for other phenomena which might or might not be properly described as agreement. Therefore, after distinguishing these phenomena from each other, I shall not further discuss here the phenomenon of the articulation of a verb in a specific locus.

The properties of the constructions:

A. Locus may be associated with either subject or object: Padden (1990) gives an example of a plain (non-body-anchored) verb, which may be articulated at different loci in space:

23. WOMAN WANT_a; MAN WANT_b.

‘The woman_i is wanting and the man_j is wanting, too.’

‘The woman wants it_i and the man wants it_j.’ (Padden 1990;121-122)

²⁷ Fischer & Gough (1978;18) and Engberg-Pedersen (1993) make similar observations with respect to

As is evident from the translation, the ASL sentence is ambiguous. The cause for this ambiguity is the fact that the loci at which the verbs are articulated may be the R-loci of the subject arguments **or** the object arguments of the verbs in question. This kind of ambiguity does not arise in the case of agreement verbs: each agreement slot is associated with one particular argument²⁸. This sort of ambiguity is reported to occur in similar constructions in Danish SL as well (Engberg-Pedersen 1993).

B. The construction is not specific to verbs: Padden (1990) points out that the ability of signs to be articulated at different loci in space is not characteristic only of verbs; nouns and adjectives can occur in such a construction as well:

24. a. (ASL) I SEE DOG_a DOG_b DOG_c

‘I saw a dog here, there and there too.’ (Padden 1990;122)

b. (ISL) (I saw two men) TALL_a SHORT_b

‘...one was tall and the other - short.’

Again, this is in contrast with agreement verbs, the agreement pattern of which is a property only of agreement verbs, and not of other signs in the language.

C. The location of the hands tends to be at the locus of the internal argument:

Somewhat in contrast to point A above, I have noticed that in ISL, when a plain verb

ASL and Danish SL, respectively.

is articulated in a non-contrastive context, the hands tend to be located at the R-locus of the internal argument of that verb (or adjective):

25. a. STICK INDEX_a CL:F-BREAK_a ‘The stick broke.’
 b. STICK INDEX_a INDEX₁ CL:S-BREAK_a ‘I broke the stick.’
 c. FISH INDEX_a INDEX₃ FISH_a ‘He caught that fish.’
 d. POLICEMAN INDEX_a THIEF INDEX_b CATCH_b
 ‘The policeman caught the thief.’
 e. INDEX₁ PERSUADE₃ INDEX₃ ‘I persuaded him.’
 f. BOY INDEX₃ GROW-UP₃ ‘The boy grew up.’
 g. BOOK INDEX_a INDEX₃ BUY_a ‘He bought that book.’

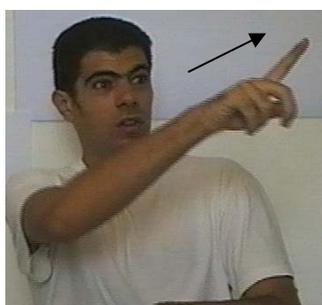
INDEX_a policemanINDEX_b thiefCATCH_b

Figure 2.10: POLICEMAN INDEX_a THIEF INDEX_b CATCH_b

In all of the above sentences, the hands are located at the R-locus of the internal argument, whether it is the sole argument of an intransitive predicate (BREAK (intr.))

²⁸ The precise definition of each argument will be dealt with in chapter 3. But the important point here is that in agreement verbs each slot is unambiguously associated with one argument.

and GROW), or the second argument of transitive predicates²⁹. Similar observations (though sporadic, and not necessarily in those terms) have been made in the literature with respect to other sign languages. For example, Fischer and Gough (1978;18) report that the verb OWE (ASL) is usually articulated at the location of the patient. Kegl (1990;156-157) cites two sentences with a transitive and intransitive use of the verb BREAK, where in both the hands are located at the R-locus of the patient, which is the object in one sentence, and the subject in the other. Pizzuto et.al. (1990;87) give a list of verbs for which “the verb point of articulation marks the semantic patient corresponding to, respectively, the subject of intransitive verbs, and the object of transitive verbs” (e.g. BREAK, BURN, COOK, COMB, FINISH, FIX, OPEN, STOP, TEAR, WRITE).

The observation in C, namely that the hands tend to be located at the internal argument’s locus, seems to contrast with the observation in A, namely, that the verb’s location may be linked either to the subject locus or to the object locus. How can these two contrasting observations be reconciled? I think that for ISL at least, one must consider an additional factor: the sentences in A appear in what seems to be a comparison set. That is, space is used to compare, or to highlight the distinction, between several participants in the discourse. The sentences in C, on the other hand, are not associated with any specific discourse function, and may appear as sentences in isolation as well. Thus it seems that we are dealing here with phenomena of two types: the first is a discourse level phenomenon, the second – a sentence level

²⁹ I use the term ‘internal argument’ and not the term ‘patient’ since not all internal arguments are necessarily patients. For example, it is not altogether clear whether *the boy* in the sentence ‘*The boy grew up*’ qualifies as a patient or not. The notion of theme is not helpful either, since the complements of CATCH and PERSUADE are not themes (in the sense of Jackendoff 1990a). Therefore I think that the generalization is better stated in terms of ‘internal argument’.

phenomenon. Though both phenomena exploit the same physical means (the location of the hands), they can be distinguished from each other, since they have different properties. The discourse level phenomenon is characterized by the following: (i) The discourse function of the construction is to mark comparison, or to highlight the distinction between the participants in the discourse. It seems that what the signer does is divide the signing space into smaller chunks, assigning each chunk to a different discourse participant. (ii) In many cases there is also a torso tilt or body shift towards that locus. This further indicates that it is not only the location of the hands which serves to mark comparison, but rather the division of the signing space into several sub-parts. (iii) The location of the hand is the R-locus of one of the arguments of the verb, the argument which is being compared (but not necessarily of an argument with a specific semantic or syntactic role). At the sentence level, the location of the hands are associated with a specific argument – the internal argument of the predicate, there is no body shift towards that location, and no particular discourse function is involved.

To the best of my knowledge, this distinction has not been previously mentioned in the literature. Different analyses of these constructions are usually directed towards one construction, but they do not explicitly mention which construction they account for³⁰. Two analyses will be briefly presented here: Padden (1990) and Engberg-Pedersen (1993). Both of these analyses refer only to the discourse level phenomenon.

³⁰ Another possibility is that this distinction does not exist in other sign languages, and that only one of the two constructions exists in sign languages other than ISL. It seems to me though, on the basis of sporadic examples from ASL and Danish SL at least, that the location of the hands may have both a sentence level and a discourse level function. Whether these functions are the same as in ISL is an issue which deserves further study.

3. Padden (1990). Padden analyzes the discourse level phenomenon as a construction containing pronominal clitics rather than agreement morphology. Her argumentation is based on the observations that sentences such as (23) and (24) above have paraphrases with explicit pronouns, articulated by the non-dominant hand and that lexical items other than verbs may appear in that construction. In other words, the morpheme in question is non-selective with respect to its host. Such behavior is characteristic of clitics, not of inflectional affixes: “(Clitics) exhibit a low degree of selection with respect to their hosts while affixes exhibit a high degree of selection with respect to their stems.” (Zwicky and Pullum 1983). Thus, Padden concludes that a pronominal clitic analysis would be more consistent with these facts.
4. Engberg-Pedersen (1993): Engberg-Pedersen points out that Padden’s pronominal clitic analysis cannot explain the ambiguity of these forms, that is – that the pronominal clitic may refer to the subject or the object of the verb. She argues that this is an agreement construction, albeit a different type of agreement, which she refers to as **pragmatic agreement**. She uses this term in order to make a clear distinction between these cases and the agreement pattern exhibited by agreement verbs (which she calls ‘semantic agreement’). She points out the following differences between the two types of agreement: 1. Semantic agreement reflects the semantic relations between the verb and its arguments³¹, whereas pragmatic agreement shows that there is some kind of relationship between a predicate and its argument, but the exact semantic relation is not specified by the agreement

³¹ According to Engberg-Pedersen’s analysis, the agreement markers of agreement verbs are associated with the Agent argument and the Patient\indirect object argument of the verb, rather than with syntactic notions such as subject and object, as suggested by Padden (1983).

markers. In other words, semantic agreement is determined by the semantic roles of the arguments, while pragmatic agreement is not semantically determined. 2. Verbs inflected for semantic agreement (i.e. agreement verbs) agree with two arguments, whereas verbs inflected for pragmatic agreement agree only with one argument. 3. In semantic agreement, agreement is marked by orientation (as well as the location of the hands), while pragmatic agreement is marked only by the location of the hands; orientation does not play any role. Engberg-Pedersen notes that pragmatic agreement is not determined by a particular grammatical context, but it is used for specific discourse purposes, especially contrast: “Pragmatic agreement is a matter of choice. It is used to underline the relationship between the content of a predicate and the referent of the locus in question, often, but not always, as distinct from or in opposition to some other referent.” (ibid., p. 217). Such an explanation can account for some of the properties of pragmatic agreement: since the function of the construction is to highlight an argument (**any** argument which is important to the discourse), the exact semantic or syntactic relations between that particular argument and its predicate are irrelevant from a discourse point of view. Furthermore, it is to be expected that only one argument is to be marked by the construction, since usually one argument is focused on at a time.

I shall not attempt to evaluate these two (somewhat contrasting) analyses, as the construction in question falls beyond the scope of this dissertation. Furthermore, I cannot provide an analysis of the sentence level phenomenon at this preliminary stage of investigation. What is important for us here is that both constructions are substantially different from the agreement pattern of agreement verbs: pragmatic

agreement is a discourse level phenomenon, it marks only one argument, and this argument does not hold specific semantic or syntactic relations with its predicate. Agreement verbs, on the other hand, are part of sentence level grammar, they mark two arguments, and the semantic relationship between the arguments and the verb is predictable. The ‘internal argument marking’ (i.e. the sentence level construction) differs from agreement verbs in that it characterizes not only verbs but nouns and adjectives as well, it marks one argument (and not two), and this argument is best stated in terms of the argument structure of the verb (the internal argument) and not in syntactic or semantic terms. Hence, throughout the remainder of this thesis, the term ‘agreement’ will refer to the agreement pattern of agreement (and spatial) verbs. It is significant for my analysis that such agreement will be called ‘source-goal’ agreement, for reasons which will become clear in chapter 3. I leave for future research the questions of whether the constructions described in this subsection are also instances of agreement, and what the relationship between them and source-goal agreement is.

2.2.3 Summary

Verb agreement in ISL is morphologically realized as two open location slots at the two end points of the verb. These open slots are then filled by copying the location specifications of the R-loci (the phi-features) of the arguments of the verb. As such, the form of an agreeing verb (in particular - the direction of the path movement) is determined by the phi-features of its arguments. Two classes of verbs mark agreement in this way: spatial verbs and agreement verbs. Morphological similarity notwithstanding, these two classes differ substantially from each other, most

noticeably in the way they use space: spatial verbs use space as a continuum, while agreement verbs use space discretely. Other differences follow from this basic dichotomy.

Another phonological feature associated with the R-loci of the arguments is the **facing** of the hands, that is, those orientation features which are determined by the phi-features of the arguments. Facing plays a role in the morphology of agreement verbs, but not of spatial verbs.

Some agreement verbs have a defective paradigm: the beginning point is marked for a specific location, and therefore cannot agree with the R-locus of an argument. The result is that in many of its forms such a verb marks agreement only with one argument. Nonetheless, in other respects they behave like typical agreement verbs. Other cases of what might be referred to as ‘agreement with a single argument’ show different properties, and are therefore outside the scope of the analysis which I suggest in subsequent chapters.

This concludes the preliminary presentation of verb classes and verb agreement in ISL. The next chapter challenges some of the basic assumptions which underlie these traditional descriptions. In particular, I will argue that the description of agreement verbs as agreeing with syntactic functions (subject and object) is only partial and somewhat misleading, and that the relationship between the two phonological realizations of agreement, namely the direction of the path and the facing, is much more complex than has previously been suggested.

Chapter 3

Agreement Mechanisms:

Direction of Path and Facing of the Hands

Introduction

The previous chapter presented the basic classification of verbs in ISL, and identified two mechanisms for marking agreement: the direction of the path movement (as determined by the beginning and end points of the path) and the facing of the hands. This chapter involves a thorough examination of their precise nature. The two mechanisms interact only in the morphology of agreement verbs; in spatial verbs the facing is not operative. Therefore I focus on agreement verbs in this chapter. Two questions will be addressed:

1. Do the agreement affixes attached to the verb's path movement correspond to the syntactic notions of **subject** and **object**, the usual case in agreement systems, or to the thematic notions of **source** and **goal**, as has been suggested by some sign language researchers?
2. What is the relationship between the facing and the direction of the path? Do they redundantly mark the same system, or do they serve different functions in the language?

I will claim that agreement verbs in ISL (and apparently other sign languages) exhibit morphological marking of both syntactic and semantic/thematic structure, by

utilizing the two different mechanisms available in the language: the direction of the path movement , and the facing of the hand(s).

In previous studies (Friedman 1975, Fischer & Gough 1978, Meier 1982, Padden 1983, Brentari 1988), these two mechanisms have not been identified as serving different functions in the language. Either the facing of the hand(s) was not mentioned at all, or both mechanisms were regarded as having more or less the same grammatical function. However, their different functions become more visible by focusing on a small sub-set of agreement verbs, the so-called ‘backwards verbs’, to be defined shortly. The importance of backwards verbs to the analysis proposed in this chapter is twofold: first, by deviating from the general morphological pattern of agreement verbs, backwards verbs draw our attention to the distinction between the two mechanisms mentioned above; and secondly, they make more perspicuous the relationship between the semantic/thematic structure of the verb and its syntactic structure .

The chapter is organized as follows: first, backwards verbs are described, and are compared to regular agreement verbs with respect to their morphological, syntactic and semantic properties (section 3.1.). This comparison reveals that backwards verbs differ from regular agreement verbs in their morphological and semantic properties, but pattern like regular agreement verbs in their syntactic behavior. Previous analyses of backwards verbs could not account for all of their properties (section 3.2.) because they have not fully identified the role of the facing in the morphology of agreement verbs. A different analysis is then presented, one in which the facing and the direction of the path serve different functions in the language: the facing marks

syntactic relations, while the direction of the path marks thematic notions. This analysis suggests that the form of all agreement verbs (both regular and backwards) is determined by two principles, namely the Agreement Morphology Principles (AMP's) (section 3.3). The exact nature of the direction of the path and the facing is further discussed. It is argued that the direction of the path is determined **solely** by the **spatial** thematic notions of source and goal, while other thematic roles (such as agent and patient) are not involved in the agreement process (section 3.4). The analysis of the direction of the path is followed by an analysis of the facing of the hands. I suggest that it is better analyzed as a case marker rather than an agreement affix (3.5). Finally, the consequences and implications of this analysis for linguistic theory in general are examined (3.6).

3.1 Agreement Verbs: Regular vs. Backwards Verbs

3.1.1 General Description

In the previous chapter, agreement verbs were described as consisting of a linear movement (path movement) on the horizontal plane, with agreement markers for subject (S) and object (O) on either ends: the beginning point of the sign is the S-agreement marker, and the end point, the O-agreement marker. This agreement pattern is the **regular** or **typical** agreement pattern in ISL (and in ASL as well), and it characterizes the majority of agreement verbs in these languages. A partial list of regular agreement verbs in ISL is given in (1) (for a more comprehensive list - see appendix A):

1. Regular agreement verbs:

ASK, ANSWER, DEFEND, FEED, GIVE, HELP, INFORM, LIE-TO, LOOK- AT,
SEND, SHOW, PAY, TEACH, TELL, VISIT.

There is, however, a sub-set of agreement verbs which follows a **backwards** or **atypical** agreement pattern: the path movement of these verbs is from the locus of the **object** towards the locus of the **subject**. TAKE (ASL and ISL) is a member of this subset of verbs:

2. a. ${}_2\text{TAKE}_1$ 'I take from you.'

b. ${}_1\text{TAKE}_2$ 'You take from me.'



${}_2\text{TAKE}_1$ (initial)



${}_2\text{TAKE}_1$ (final)



${}_1\text{TAKE}_2$ (initial)



${}_1\text{TAKE}_2$ (final)

Figure 3.1: Inflected forms of a backwards verb: ${}_2\text{TAKE}_1$ ${}_1\text{TAKE}_2$

Some other verbs which follow this backwards agreement pattern are:

3. Backwards verbs:

ISL: ADOPT, COPY, CHOOSE, EXTRACT, IMITATE, INVITE, IDENTIFY-(with), MOOCH, SUMMON, TAKE, TAKE-ADVANTAGE-OF.

ASL: COPY, EXTRACT, INVITE, MOOCH, STEAL, TAKE, TAKE-ADVANTAGE-OF, TAKE-OUT. (Padden 1983).

Other sign languages have been shown to have backwards verbs as well, consisting of almost identical lexical items (Italian SL - Pizzuto, Giuranna and Gambino 1990; Taiwan SL- Smith 1990).

To summarize, then, agreement verbs are verbs which mark agreement with their arguments by the beginning and end points of the path movement. In regular agreement verbs the initial point marks agreement with the subject, and the end point - agreement with the object. In backwards verbs the reverse is true: the initial point marks agreement with the object, and the end point - agreement with the subject.

3.1.2 The Syntactic and Semantic Structure of Agreement Verbs

Backwards verbs, then, form a distinct morphological set, characterized by reverse agreement morphology, i.e., by a path movement that originates at the locus of the object, and ends at the locus of the subject. Semantically, they also seem to have something in common which differentiates them from regular agreement verbs: the subject of backwards verbs is understood to be the **goal** in some sense, while the

object is associated with the notion of **source**¹. These notions are relevant for distinguishing between pairs of verbs such as *give* and *take*. Consider for example, the sentences (4) and (5), and their Lexical Conceptual Structure representations (LCS) in (6) and (7):

4. BOOK INDEX_a ₁GIVE₂ ‘I gave you the book’.
5. BOOK INDEX_a ₂TAKE₁ ‘I took the book from you.’
6. Spatial tier: CAUSE_{possession} ([α], [GO ([BOOK]^y, [FROM [α] TO [β]])])
 Action tier: AFF ([I] ^{α} , [YOU] ^{β})
7. Spatial tier: CAUSE_{possession} ([α], [GO ([BOOK]^y, [FROM [β] TO [α]])])
 Action tier: AFF ([I] ^{α} , [YOU] ^{β})

In both sentences, the **theme** (i.e., *the book*) changes its (physical) position and its possessor. Moreover, in both sentences, the causer of this change is *I*, and the argument affected by it is *you* (as can be seen from the identical action tiers of the LCS’s of both verbs). The difference between the two sentences lies in the direction of movement of the theme argument: in (4), *the book* is transferred from *I* to *you*, hence *I*, the syntactic S of the sentence, is the **source**, and *you*, the syntactic O, is the **goal**. In 5, on the other hand, *I* is the S but the **goal** while *you* is the O and **source**.

¹ I use the notions **source** and **goal** in the sense of Gruber (1976). Gruber introduces these notions for describing the semantic structure of ‘verbs of motion’, where the term ‘motion’ is used in “a physical or in an abstract sense, indicating a change of position, possession, identification, activity etc.” (ibid., p. 18). Verbs of motion are associated with three nominals: the **Theme** - “the entity

Backwards verbs then (e.g., TAKE in 5), have the following property: the nominal which designates the **goal** of motion is associated with the **S** of the verb, and the **source** nominal is associated with its **O**. The reverse is true for ‘regular’ verbs such as GIVE².

Thus, backwards verbs differ both morphologically and semantically from regular agreement verbs. There is, however, a syntactic phenomenon in which backwards verbs pattern like regular agreement verbs: it has been observed that the S-agreement marker is optionally deleted. This was first described in Padden (1983) as Agreement Marker Omission³. As Padden points out, the S-agreement-marker of a verb may be optionally deleted, whether it is realized as the beginning point of the verb (as in regular verbs) or as its end point (as in backwards verbs). When the S-agreement-marker is deleted, Padden notes, “the resulting form has a reduced linear movement” (ibid. p. 117). The omitted agreement marker is indicated by the “0” subscript:

8. a. ₁INDEX ₀HELP₂ ‘I’m helping you’.
 b. ₁INDEX ₂TAKE₀ ‘I’m taking from you’.

In (8.a.) the path movement does not begin at the S-locus, but rather in neutral space.

In (8.b.), the path movement ends in neutral space. In both cases, it is the S-agreement-marker which is omitted.

which is conceived as moving or undergoing transitions”(ibid., p.18), the **Source** nominal - the originating point of motion, and the **Goal**, the ultimate destination of the motion.

² The mapping of the argument positions of the LCS’s to syntactic arguments is done directly from the positions on the action tier: the first argument of AFF is linked to the subject position, and the second argument of AFF - to the object position. Since in both verbs the action tier is identical, the mapping into the syntax is also identical for both verbs.

Summary: Backwards verbs form a distinct set from both a morphological and a semantic point of view: morphologically they exhibit a backwards agreement pattern (i.e., they differ from regular agreement verbs in the linear ordering of affixation), and semantically the S of backwards verbs is associated with the notion of **goal** while their O is understood as the **source**. In their syntactic behavior, however, with respect to the phenomenon of Agreement Marker Omission, they do not differ from regular agreement verbs. The question that arises is how to account for both the similarities and the differences between regular and backwards agreement verbs. I turn to this in the next section.

3.2 Previous Analyses

One possible analysis, to which I refer as the ‘semantic analysis’, was suggested by Friedman (1975). This analysis is based on the observation that in both regular and backwards verbs the direction of the path movement is **from the source NP to the goal NP**. Friedman suggests that the notions of **source** and **goal** are essential to the analysis of agreement verbs in ASL⁴, since the form of these verbs (in particular the direction of the path movement) is a visual representation of these notions. She claims that the direction of path movement in the ASL verb system should be stated

³ Padden(1983) describes Agreement Marker Omission in ASL. I have observed this phenomenon in agreement verbs in ISL as well.

⁴ Friedman refers to these verbs as **multidirectional verbs**, and she includes in this class of verbs all verbs in which the direction of the path movement is mutable; i.e., Padden’s (1983) Spatial Verbs are also included in this class.

in semantic terms, i.e., as moving from **source** to **goal**. Under Friedman's analysis, the syntactic notions of Subject and Object are irrelevant for characterizing the agreement pattern.

9. Semantic Analysis (following Friedman 1975): In both regular agreement verbs and backwards verbs, the path movement is from the source NP to the goal NP.

This analysis can predict the direction of the path movement in both regular and backwards verbs in a single statement. That is, under this analysis, there is no need to make reference to backwards verbs, since it holds for all agreement verbs, both regular and backwards⁵.

Notice, however, that such an analysis would need two distinct statements to account for the Agreement-Marker-omission phenomenon, since it does not refer to the notions of S or O: it would need to state that for regular agreement verbs the source-agreement-marker may be deleted, whereas for backwards verbs it is the goal-agreement-marker that can be deleted. Moreover, this analysis provides no explanation as to why it is the source that can be deleted in regular agreement verbs, but the goal that is deletable in the case of backwards verbs.

This led Padden (1983) to suggest a different analysis, which I refer to as the 'syntactic analysis'. Padden claims that the direction of the path movement should be stated in syntactic terms, i.e., as moving from S-locus to O-locus, in order to be able

to account straightforwardly for Agreement-Marker-Omission. She suggests that the atypical morphology of backwards verbs should be taken care of in the lexicon; i.e., backwards verbs should be marked as morphologically “backwards” in the lexicon.

10. Syntactic Analysis (Padden 1983): The path movement of agreement verbs is from **subject-locus to object-locus**. Backwards verbs are marked in the lexicon as morphologically “backwards” (their path movement moves from **object-locus to subject-locus**).

This analysis can capture neatly the phenomenon of Agreement-Marker-Omission: in both cases, it is the subject-agreement-marker that is deleted. However, it clearly misses an important generalization, namely that backwards verbs share a common semantic structure, which is reflected in their morphology. Under Padden’s analysis, backwards verbs have to be marked ad-hoc in the lexicon, without any explanation as to why these particular verbs exhibit backwards morphology. Thus, it seems that a semantic analysis such as suggested by Friedman (1975) misses a syntactic generalization, while an analysis in syntactic terms (Padden (1983)) misses a semantic generalization⁶.

Brentari (1988) notices this “double faced” behavior of backwards verbs, which led her to suggest an analysis in both syntactic and semantic terms. She points out that the direction of the path movement reflects the transitivity relation which holds between the arguments of the verb: when the theme is transferred from S to O, the

⁵ An analysis of verb agreement in terms of source-goal is argued for in Shepard-Kegl (1985), where she argues that there are indeed no backwards verbs, since they do not differ from regular agreement verbs (*ibid.*, p.422).

⁶ Meier (1982;65) and Janis (1992;318) make a similar observation.

path moves **from** the locus of the S (i.e., “regular” verbs), and when the theme is transferred from O to S, the path movement moves **towards** the subject. In other words, when the subject is understood as the thematic **source**, the path moves away from the S-locus. And when it is understood as the thematic **goal**, the path moves towards the S-locus. Brentari’s analysis is stated as the ‘Direction of Transfer Rule’ (DTR):

11. Direction of Transfer Rule (Brentari 1988:22):

“When the transfer of a theme is away from the subject, the Path will move away from the spatial locus associated with the signer (in the default case) or away from the overtly marked subject spatial locus. When the transfer of theme is toward the subject, the Path will move toward the spatial locus associated with the signer (in the default case) or toward the overtly marked subject locus.”

The DTR is an improvement over previous analyses in that the direction of the path movement of agreement verbs falls out of the theory without any further stipulations, and need not be arbitrarily marked in the lexicon. And the regular syntactic behavior of backwards verbs follows from the fact that in both parts of the DTR the direction is marked with respect to the locus of the **subject**⁷. But, it is important to notice that under the DTR, backwards verbs are still treated as a special case, and are accounted for by special machinery, namely the second part of the DTR. That is to say, the DTR does not account for the behavior of both regular and backwards verbs by the same

⁷ Notice that although the DTR is not stated in terms of the notions of **source** and **goal**, these notions are implied in it, since the **theme** is transferred **from** or **towards** the subject. Thus, implicitly, the subject is understood as the semantic **source** in one case, and as the semantic **goal** in the other.

mechanism. Rather, each part of the DTR accounts for only one set of verbs: the first part of the DTR is relevant only for regular agreement verbs, whereas its second part relates only to backwards verbs⁸.

Yet another different analysis of backwards verbs is presented in Janis (1992). Janis also maintains that both a semantic and a syntactic component are needed to account for the morphology of agreement verbs. Her analysis is intended to account for all the verbs in the language, not for backwards verbs in particular. In this chapter I present her account of backwards verbs. A more detailed presentation and discussion of her analysis is given in chapter 7.

Janis's approach is that agreement is not a property of the verb per se, but rather a property of the nominals associated with the verb. In order to see whether a given nominal may control agreement, it is necessary to: (a) identify the controller features (i.e., those features that allow a nominal to control agreement). (b) examine each nominal in a given sentence as to whether it has the required controller features; nominals with controller features will control agreement, and nominals without any controller features will not.

The controller features relevant for determining the association of nominals with agreement slots (i.e., the end points of a verb) are stated in terms of semantic roles (SR's), and presented in the following hierarchy:

⁸ The DTR has also some empirical problems in that it makes wrong predictions with respect to the form of reflexive verbs (in ISL) and it does not make specific enough predictions with respect to the direction of path movement. A fuller account of these points, as well as an extensive comparison between the DTR and my analysis is presented in Meir (in press).

12. source\agent < experiencer < theme < goal\recipient

(Janis 1992;347)

This feature hierarchy is supplemented by the following principle:

13. Using the SR hierarchy

(a) associate slot 2 (the end point of a verb) with the highest available controller.

(b) associate slot 1 (the beginning point of the verb) with the lowest available controller. (ibid., p. 347)

Let us examine how this machinery can account for regular agreement verbs and for backwards verbs:

A. Regular agreement verbs:

14. _aGIVE _b 'He gave her (a book)'.

Here, the highest available controller is the goal argument (*'her'*), and hence it is linked to slot 2 (the end point). The lowest available controller is the agent\source (*'he'*), which is linked to slot 1. The association of the agreement slots with syntactic functions "follows automatically from the outcome of principle 1: subject is associated with slot 1 since source\agent nominal happens to be a subject; IO is associated with slot 2 since goal happens to be an IO." (ibid., p.348). Therefore, in

regular agreement verbs the path movement is from subject to object, as is indeed the case.

B. Backwards verbs:

15. _aTAKE_b ‘He took (the book) from her.’

Here again, the goal nominal, which is the highest available controller, is linked to slot 2. The agent\source nominal, according to Janis, is the lowest available controller, and therefore is linked to slot 1. The association of agreement slots with syntactic functions follows (as in the case of regular agreement verbs) “automatically from the outcome of principle 1: subject is associated with slot 2 since in the case of backwards verbs, the subject is the goal; IO is associated with slot 1 since, in the case of backwards verbs, IO is the source.” (ibid., p.349). Therefore, in backwards verbs the path movement is from object to subject.

However, this seemingly straightforward analysis of backwards verbs is more problematic than meets the eye. The problem arises from the assumption that the SR of source is always linked to the SR of agent, and that this combined semantic role of source\agent is the lowest on the controllers’ hierarchy. In the case of backwards verbs these two semantic roles are dissociated. In the sentence ‘*I took the book from you*’, the nominal *you* is the source, but not the agent. The agent is *I*, the subject, which is also the goal⁹. It turns out, then, that the hierarchy as such cannot be applied

⁹ This could be proved by applying Jackendoff’s (1983) test for agenthood: the agent is the nominal that can be inserted into the position of X in the following construction: ‘*What X did was....*’ In the sentence ‘*He took the book from her*’ the subject nominal, but not the IO nominal, can be inserted into that position:

(i) *What he did was take the book from her.*

to backwards verbs, since in this case the SR **agent** is associated with **goal**, not with **source**. It is not clear whether the SR goal\agent is the lowest controller (since agent is the lowest controller), or the highest controller (because goal is the highest controller). If we follow the first option, we end up with two lowest controllers - source, and agent\goal, clearly an undesirable situation, since the hierarchy is then non-applicable. If we follow the second option (that it is the highest controller, because goal is the highest controller), then we get the right results, since source will always be linked to slot 1 and goal to slot 2; that is, the path of agreement verbs is always from source to goal. The problem with this option, though, is that the agent SR is completely redundant, as it does not play any role in determining the association of SR's with agreement slots: in both regular and backwards verbs, the slots are linked to the SR's of **source** and **goal**¹⁰.

Summary: Each of the analyses presented here suffers from a different drawback: a semantic analysis misses a syntactic generalization, whereas a syntactic analysis misses a semantic generalization. Even analyses stated in both syntactic and semantic terms cannot fully account for the facts. Yet it is obvious that we need both the syntax and the semantics in order to fully account for the behavior for both types of verbs. The problem is though - to find two agreement mechanisms in what seems to be one morphological system. My analysis shows that indeed two different mechanisms are active here, and that the distinction between them is supported by the morphological shape of the verbs.

(ii) **What she did was that he took the book from her.*

3.3 Proposed Analysis: Two Agreement Mechanisms in a Verb

The analysis I suggest is based on the observation that agreement verbs mark the relations that hold between their arguments not only by the direction of the path movement, but also by the facing of the hand(s). This observation is mentioned in Friedman (1975), Fischer & Gough (1978), Klima & Bellugi (1979), Meier (1982), Valli & Lucas (1992) among others. The following is from Fischer & Gough (1978):

“If in addition to or instead of a change in direction of movement in a verb to show who is doing what to whom, there is also a change in the orientation of the hand(s), the verb is reversible, since the hands can reverse or change their orientation. Not all directional verbs are reversible, and there is at least one reversible verb that cannot change direction.” (p.28).

The above description shows that Fischer & Gough regard reversibility and directionality as two distinct but related phenomena, both reflecting the same notion, namely the grammatical relations among the arguments of the verb¹¹. I claim, however, that directionality and reversibility serve different functions in the language: the direction of the path movement marks the semantic (or thematic) relations among the arguments of the verb, while the facing of the hand(s) marks the

¹⁰ Another possibility is to eliminate the SR ‘agent’ from the hierarchy. However, such a step is problematic for Janis, since ‘agent’ plays an important role in her analysis of other verbs, e.g., SHOW, as I illustrate in section 3.4.

¹¹ Fischer & Gough are not explicit as to whether they refer to syntactic notions of S and O, or to thematic notions such as recipient, agent etc.

syntactic relations between the arguments of the verb¹². I suggest that the form of an agreement verb in ISL is determined by the following two principles:

16. Agreement Morphology Principles (AMP's):

(a) The direction of the path movement of agreement verbs is **from source to goal** .

Linear order: 1. source. 2. goal.

and

(b) The facing of the hand(s) is **towards the object of the verb**^{13,14} .

To see how these principles interact in determining the form of agreement verbs in ISL, consider the following verb forms:

17. ₁SEND₂ 'I send you.'

18. ₂SEND₁ 'You send me.'

19. ₂TAKE₁ 'I take from you.'

In (17), the source of the transfer of the theme is *I* , and the goal is *you* . According to principle (a) of the AMP's, the path movement is from 1P locus to 2P locus. The object of the verb is *you* , and so according to principle (b), the hands are facing 2P

¹² Uyechi (1994), in her dissertation on ASL phonology, has independently arrived at the conclusion the direction of the path movement and the facing of the hands have two different functions.

¹³ Not all agreement verbs change facing. In some cases the facing change is phonologically blocked. I shall return to this point in chapter 5.

¹⁴ As many agreement verbs are di-transitive, it is imperative to state which of the verb's objects is marked by the facing. I prefer not to use the terms 'direct object' and 'indirect object', since it is not clear to me how these terms apply to ISL. However, the object controlling the facing in di-transitive

locus (i.e., they are facing outwards). In (18), the source is *you* while the goal is *me*. Thus, the path movement is from 2P locus to 1P locus. The object of the verb is *me*, and so the hands are facing 1P locus (i.e., inwards). In (19), the source and goal are *you* and *I* respectively, determining that the direction of the path movement is from 2P locus to 1P locus. The object of the verb is *you*, and so according to principle (b), the hands are facing towards 2P locus (i.e., outwards).

Sentences (18) and (19) have the same thematic structure : in both verbs the source of the transfer is 2P and the goal is 1P. As predicted by principle (a), both forms have the same direction of path movement (from 2P locus towards the signer's chest). Sentences (17) and (19), on the other hand, have the same syntactic structure: in both, the subject of the verb is *I* and the object of the verb is *you*. As predicted by principle (b), in each form, the hands are facing the same reference point - that of 2P; i.e., in both forms, the facing is towards the same R-locus, but the direction of the path movement is opposite¹⁵.

These facts are presented in (20):

20.

	source	goal	subject	object	morphological form
₁ SEND ₂	1P	2P	1P	2P	1P $\supset \rightarrow$ 2P
₂ SEND ₁	2P	1P	2P	1P	1P $\subset \leftarrow$ 2P
₂ TAKE ₁	2P	1P	1P	2P	1P $\supset \leftarrow$ 2P

verbs is the equivalent of the English indirect object, that is – the recipient object, and not the theme object.

¹⁵ It was pointed out to me by Susan Fischer that the ASL verb pair LEND/BORROW might constitute a problem for this analysis, since in some dialects BORROW is only optionally reversible, i.e., the facing changes only optionally while the movement shifts.

→ Direction of path movement.

⊃ Facing.

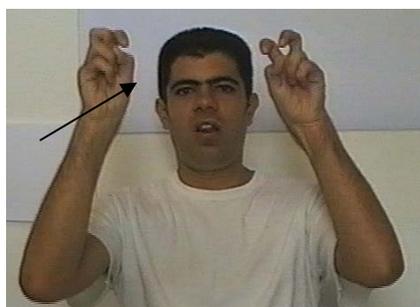
The interaction between the direction of the path movement and the facing of the hands is illustrated in figure 2. But since SEND and TAKE (ISL) have internal movements, it is easier to see the facing change with two parallel verbs - HELP and TAKE-ADVANTAGE-OF:



$_1$ HELP $_2$ · 'I help you'

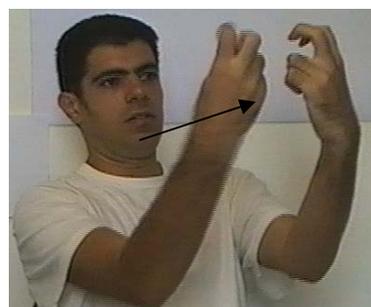


$_2$ HELP $_1$ · 'You help me'



$_2$ TAKE-ADVANTAGE-OF $_1$

'I take advantage of you'



$_1$ TAKE-ADVANTAGE-OF $_2$

'You take advantage of me'

Figure 3.2: The interaction between the path movement and the facing in the forms of a regular agreement verb (HELP) and a backwards verb (TAKE-ADVANTAGE-OF).

Under this analysis, the behavior of backwards verbs seems less mysterious: their regular syntactic behavior is marked by their regular syntactic morphology. In backwards verbs, as in regular agreement verbs, the facing of the hand(s) is towards the reference point of the object. The morphology of their thematic structure also follows the general principle that holds of regular agreement verbs as well; the direction of the path movement is from source to goal. The “backwardness” (or, in more neutral terms, the markedness) of backwards verbs stems from the **less typical association** between the syntactic and thematic roles: in language in general, it is less typical for subjects to be associated with the notion of **goal** (as in backwards verbs) than with the notion of **source** (as in regular verbs)¹⁶.

The AMP’s proposed here can account straightforwardly for the points that were problematic for previous analyses. This is made possible by the fact that the AMP analysis identifies **two** agreement mechanisms: the direction of the path movement, which marks semantic/thematic agreement, and the facing of the hand(s), which marks the object. By admitting two distinct mechanisms, both the semantic properties and the syntactic behavior of agreement verbs fall out from the theory, with no need for any ad-hoc stipulations.

Let us see how this analysis accounts for the points which were problematic for previous analyses. The Agreement-Marker-Omission phenomenon, which had to be

¹⁶ It seems that subjects are more readily associated with **source** than with **goal**, because both notions (i.e., subject and source) are associated with the notion of **agent** (Yehuda Falk, personal communication). Agents tend to be realized grammatically as subjects (in the unmarked case), and agents tend to be situated at the source point of the action, in order to exert control (as pointed out in Shepard-Kegl 1985:424). Anderson (1971:173) notes that in many languages (e.g., Latin, Old English, German, Tibetan), sources and agents (which he calls Ergatives) are marked superficially by the same morphological case or preposition.

accounted for by two separate statements under the Source/Goal analysis, can be handled in one statement in AMP terms:

- 21. Agreement-Marker-Omission, in AMP's terms:** The agreement marker (i.e., reference point) which is not marked by the facing of the hands can be deleted.

Formulating the Agreement-Marker-Omission in AMP terms not only correctly captures the generalization, but has an additional advantage: it is stated in morphological terms, referring to the morphologically unmarked R-locus, rather than in purely syntactic terms. From a morphological point of view, it is not a coincidence that it is the unmarked locus which is deleted. From a syntactic point of view, however, the fact that it is the S-locus rather than the O-locus which is deleted, is purely arbitrary.

Furthermore, backwards verbs need not be marked ad-hoc in the lexicon for reverse morphology, as in the syntactic analysis, since their morphology follows the general principles that hold for regular agreement verbs. That is to say, the morphology of both types of verbs is accounted for by one and the same mechanism. The analysis thus also obviates the need for two independent mechanisms as is required by the DTR analysis.

The AMP's also avoid the problems faced by Janis's analysis, namely that the semantic role (SR) hierarchy is inapplicable in the case of backwards verbs because the hierarchy stipulates that the notions of 'agent' and 'source' are always linked. The AMP's state the direction of the path solely in source-goal terms, therefore rendering

the analysis both descriptively adequate and theoretically more economical (as less semantic roles are needed to capture the generalization). The AMP analysis thus highlights the special role of spatial-thematic roles in the agreement system, a point which I shall return to in section 3.4. below.

Additionally, my analysis can explain the backwardness of backwards verbs. This backwardness is identified not by the direction of the path movement (towards or away from the signer), but rather in the different possibilities of interaction between the path and the facing. These possibilities are shown in (22):

22.

NP ₁	NP ₂	
source	goal	
subject	object	a. regular agreement verbs
source	goal	
object	subject	b. backwards verbs

(22.a.) is the more typical type, both from the point of view of its sublexical structure, and its morphological manifestation: just as it is more typical for S to be associated with source, and O with goal, than vice versa, so it is more typical morphologically for a forward movement (rather than a backwards movement) to be co-articulated with forward facing of the hands. Thus, the backwardness of backwards verbs is attributed to the less typical association between their thematic and syntactic

structures. Neither of these components by itself is in any sense ‘backwards’. It is only the special combination of them which results in this backwardness. This explanation is clarified by the analysis presented here, and obscured by an analysis which recognizes only one agreement mechanism in the language.

Summary: My analysis treats agreement verbs (both regular and backwards) as morphologically complex. Each agreement verb is comprised of two morphological devices: the direction of the path movement and the facing of the hands. Each device has a distinct and independent function in the language: the direction of the path marks agreement with the **source** and **goal** nominals. The facing of the hands marks the syntactic **object**. The two types of agreement verbs (regular and backwards) are the result of the two possible ways that these devices interact: if the source nominal is the syntactic subject and the goal nominal is the syntactic object, then the result is a regular agreement verb. If the source nominal is the object, and the goal nominal is the subject, then the verb is a backwards verb.

I showed that the distinction drawn between these two mechanisms is essential in order to account for the morphological, syntactic and semantic properties of the two types of verbs. An analysis that maintains this distinction not only accounts for the data, but also **explains** the differences and similarities between regular and backwards verbs.

The next two sections further examine the nature of these two mechanisms. First I address the question of which thematic roles are involved in determining the path movement. Crucial to my analysis is the fact that the thematic roles which determine

the direction of the path movement are **source** and **goal**, that is, only those thematic roles which are associated with the spatial tier of the LCS level, and not thematic roles associated with the action tier (agent and patient). My claim is that the morphology of ISL (and presumably sign languages in general) necessitates maintaining the distinction between the two types of thematic roles (action and spatial thematic roles), and that an analysis which fails to draw this distinction will not be able to account for the facts (e.g., Janis 1992). I then examine the nature of the second mechanism - the facing - arguing that it is better analyzed as a case marker rather than an agreement marker.

3.4 Spatial Thematic Roles and Agreement

The Semantic Role hierarchy (posited by Janis 1992), which was designed to capture the generalization regarding the direction of the path in agreement verbs, was stated in terms of the following semantic roles: source\agent, experiencer, theme, goal\recipient. As was pointed out earlier (in section 3.2.), the association of agent and source does not hold in the case of backwards verbs, and therefore this hierarchy could not fully account for the data. One might suggest then, to eliminate the SR 'agent' from the hierarchy, thus avoiding the problem altogether. According to this suggestion, the hierarchy would take the following form:

23. source<experiencer<theme<goal\recipient

In both backwards and regular agreement verbs, the source is the lowest controller and the goal the highest, and therefore the path is predicted to be from source to goal

in both cases. However, eliminating ‘agent’ from the hierarchy is problematic for Janis, since the SR of agent plays a role in her analysis of various other verbs e.g., SHOW, as in the following sentence:

24. _a SHOW ₁	CLOWN	‘(Someone)	showed	me	the	clown.’
		Subj\agent		IO\experiencer		DO\theme

(ibid. p. 351)

According to Janis, the verb SHOW assigns the following semantic roles: agent, experiencer, theme. A SR hierarchy which lacks the notion of ‘agent’ would fail to ensure the correct linking of the arguments to their agreement slots. Therefore the notion ‘agent’ is crucial for determining the agreement pattern of some verbs, yet it is altogether redundant in the case of other verbs. So it seems that for some verbs (e.g., GIVE, TAKE, LEND, BORROW) only the SR’s of source and goal are relevant for determining the agreement pattern, whereas for other verbs (e.g., SHOW) a different set of SR’s is relevant - agent and experiencer. Yet the hierarchy is intended to account for all verbs, which was the reason for including both types of SR’s in it. Unfortunately, it is precisely the inclusion of both types of SR’s in the hierarchy which makes it non-applicable in certain cases¹⁷.

The AMP’s differ from Janis’s analysis in this respect: they are stated only in terms of source and goal, and not in terms of any other thematic roles. The path movement is

¹⁷ In a later paper (Janis 1995), Janis tries to simplify her analysis, by stating the hierarchy only in terms of agent and recipient, and eliminating the SR of source and goal. But this simplification does

always from the source nominal to the goal nominal, and the agentivity of the nominals plays no role in determining the direction of the path. That is, source and goal are the factors determining the path movement of agreement verbs, of **all** agreement verbs.

A source-goal analysis seems straightforward enough in case of di-transitive agreement verbs (e.g., GIVE, TAKE, SEND, GRAB, etc.), where an entity is being transferred from one referent to another, and therefore these referents could be referred to as the source and goal of transfer. But what about other agreement verbs, where it is not so obvious that an event of transfer is taking place (such as SHOW)? Is it possible to claim that the notions of source and goal are still relevant for an accurate description of the lexical structure of these verbs? My claim is that this is indeed the case: even in verbs where the transferred entity is abstract (as in TEACH, for example) or even lexicalized in the verb (e.g., HELP), these verbs nevertheless convey an event of transfer of an entity, and therefore the notions of source and goal are an essential part of their lexical structure.

Let us take the verb SHOW as an example. I follow Jackendoff (1990a) who argues that the meaning of SHOW involves the transfer of information: “The information transfer *show* and *teach* belong in this class along with *tell*. Evidently perceiving something and learning something counts as kinds of possession, as argued early on by Gruber 1965.” (p. 297, fn. 4). Along these lines, the verb SHOW has the meaning of ‘transfer the image of z from x to y ’. A possible LCS for SHOW is given below:

not solve the problem of backwards verbs, since in these verbs the agent is the recipient as well, thus

25. SHOW:

spatial tier CAUSE ([α], [Go_{poss} ([IMAGE (of γ)), FROM [α] TO [β]])

action tier AFF ([] ^{α} , [] ^{β})

As was explained in chapter 1, Jackendoff distinguishes between two types of thematic roles: spatial thematic roles (source, theme and goal, which are the arguments of the semantic functions FROM, GO and TO, respectively), and action thematic roles (agent and patient, which are the first and second arguments of AFF(affect) respectively). These two types of thematic roles are represented on two different tiers - the thematic tier, and the action (affected) tier. An argument may be associated with positions on both tiers, thus allowing for the possibility of an argument being an agent and a source (as in SHOW), or an agent and a goal (as in TAKE).

Janis's SR hierarchy does not distinguish between the two types of thematic roles - spatial vs. action. It is stated in terms of both types. This causes inaccuracy on the one hand, since the hierarchy could not be applied to backwards verbs, and redundancy, since for each given verb only a subset of the SR's on the hierarchy are relevant: source and goal in the case of e.g., GIVE and TAKE, and agent and experiencer in the case of e.g., SHOW. In contrast, my analysis claims that the direction of the path movement of **all** agreement verbs need be stated solely in terms of the thematic roles of source and goal. Hence, there is no redundancy in the choice of the relevant

thematic roles, and both types of agreement verbs (regular and backwards) are accounted for straightforwardly.

My analysis of agreement verbs, developed in the context of Jackendoff's theory, makes the following claims:

- i. The direction of the path movement is directly linked to the spatial thematic tier of the LCS of agreement verbs; in fact, it could be described as a visual representation of this tier. The action tier and the thematic roles associated with it play no role in the process.

Implied in this claim is another claim:

- ii. The LCS of all agreement verbs contains a spatial tier with the semantic function PATH, which takes a source argument and a goal argument.

This implied claim is rather strong, and need be further elaborated and justified. This will be done in the next chapter. The point to be emphasized here is that it is necessary to distinguish between two types of thematic roles in order to give an accurate and efficient account of the morphology of agreement verbs.

Accounting for the direction of the path solely in source-goal terms has another theoretical advantage: it allows for a unified account of both agreement and spatial verbs with respect to the direction of the path. Recall from the description of verb classes in sign languages (in 2.2) that both spatial verbs and agreement verbs agree with two arguments, linked to the beginning and end points of the path. The relevant arguments for spatial verbs were shown to be the source and goal arguments. I have shown in this chapter that these are precisely the notions relevant for agreement verbs as well. Hence, the generalization is that agreement with two arguments is stated in

terms of source and goal for all agreeing verbs. As we shall see in chapter 4, this unified account of the morphology of the two classes of verbs is supported by a lexical-semantic analysis as well. The differences between the two classes of verbs are located in other factors: the role of the facing of the hands, and the different use of space.

Summary: In this section I showed that in order to account for the direction of the path movement in both regular and backwards verbs, it is necessary to make a clear distinction between two types of thematic roles: spatial thematic roles and action thematic roles. Only spatial thematic roles (source and goal) are relevant for determining the direction of the path movement. Thus, the morphology of agreement verbs provides strong support for a theory of thematic roles which differentiates formally between these two types of thematic roles (e.g., Jackendoff 1987, 1990).

3.5 Facing - An Agreement Marker or a Case Marker?

The principle governing the facing of the hands is principle (b) of the AMP's, which states that the facing of the hands is towards the object. Notice that this principle is stated in terms of "object" only; it does not make any reference to the subject NP. It follows then that the subject is unmarked morphologically, whereas the object is morphologically marked. This leads to the conclusion that object-marking takes

precedence over subject marking. This conclusion is further supported by the following observations:

1. Subject-Agreement-Marker Omission (Padden 1983), described in section 3.2., where the subject agreement marker, but not the object marker, may be omitted; i.e., the object agreement marker is obligatory.
2. The form of reflexive verbs (in ISL, see also Janis 1992:338 for ASL) shows object agreement rather than subject agreement.

The prominence of the object marking over the subject marking is problematic if the facing of the hands is regarded as an agreement marker. Crosslinguistically, it is very unusual for a language to have object agreement without subject agreement; rather, the universal implicational hierarchy of agreement markers is that the existence of object agreement in a language implies the existence of subject agreement as well (Croft 1988:164). Case marking, on the other hand, works out reversibly: in nominative-accusative languages, there are ample examples where the nominative case (usually assigned to the subject) is morphologically unmarked, while accusative or dative case (usually assigned to the object)¹⁸ are morphologically marked (e.g., Hebrew, Turkish, Hindi, Spanish, Rumanian)¹⁹. I therefore suggest that the puzzle of the prominence of the object marking in ISL can find a natural solution if the facing is regarded as a case marker rather than an agreement marker. ISL then would follow the regular pattern of nominative-accusative languages, where the case of the object is morphologically marked, while the case of the subject is morphologically unmarked.

¹⁸ There are cases where the linking between morphological case and syntactic functions is not so straightforward. Icelandic is often cited as an example of a language where subjects can be assigned cases other than nominative, while the object in some cases is assigned a morphological case other than accusative or dative (see Schutze 1993 and reference cited there).

¹⁹ See Blake (1994) for a survey of the various types of case systems and the case hierarchy.

If the facing is indeed a case marker, the question then arises as to which case it marks. Since the argument marked by the facing is an object, the two possibilities are accusative case as a structural case, or dative case as an inherent case. Structural case, as implied by the name, is a case assigned to a specific structural position; its assignment is determined by the syntactic configuration, irrespective of the specific lexical items which occupy this position in a given clause. Inherent case is a lexical property of the verb, and it is more closely associated with theta-role assignment: a verb can assign an inherent case only to a nominal which it also theta marks, and each inherent case is linked to a restricted range of thematic roles. I suggest that the facing is the morphological realization of the dative case²⁰. The reason for that is that the argument marked by the facing is associated with a specific thematic role, namely the argument affected by the act of transfer (the patient argument of verbs of transfer). Cases which are associated with specific thematic roles are usually inherent cases, and the case usually assigned to these specific thematic roles is the dative case²¹.

Summary: I suggested here that the facing of the hands is to be re-analyzed as a case marker rather than an agreement marker. This suggestion is motivated by the fact that object agreement in ISL seems to be more prominent than subject agreement, which is a very marked situation cross-linguistically. I further suggested that the facing is a dative case marker, since the argument it marks is associated with a specific thematic role, namely the argument affected by the act of transfer.

²⁰ In this point I depart from Meir (1995a,b), where the facing was analyzed as the accusative case marker.

²¹ In many languages the dative is assigned only to recipients (the object of *give*-type verbs), and not to 'source- possessors' (the object of *take*-type verbs). The latter may be marked by a preposition. But in some languages arguments bearing these two thematic roles exhibit the same syntactic behavior and are both assigned the dative case, e.g., Modern Greek.

3.6 Consequence and Implications

The analysis of the morphology of ISL agreement verbs presented in this chapter shows that ISL differs from spoken languages in two important respects:

- i. In ISL the arguments are morphologically double marked, for syntactic function and for spatial thematic roles.
- ii. Agreement is stated in terms of thematic notions rather than syntactic functions.

It is important to examine the theoretical implications and consequences of these claims, since, on the face of it, it is not clear how general linguistic theory can account for such constructions. In what follows, I describe each point in more detail, emphasizing the theoretical challenges they pose. The solution to these challenges will be proposed in the analysis of verb agreement in ISL, presented in chapter 4.

3.6.1 The Double Marking of the Arguments

We have seen that in ISL, the verb, in addition to marking the syntactic status of its arguments, also overtly theta-marks them. In spoken languages, it is usually the case that subjects and direct object are not overtly theta-marked for their theta-roles as source and goal. Let us focus on subjects to make this point clear: subjects are not marked by prepositions for being a source or a goal. In many cases, the thematic role of the subject is part of the meaning of the verb. For example, the subject of the verb *buy* is understood as **goal**, while the subject of *sell* is the implied **source**. But there is no overt theta marking on the subject. There are verbs, however, where the theta role

of the subject is not lexicalized; e.g., English *rent* and (nonstandard) Hebrew *lehaš'il* ('lend/borrow'). In such cases, we can infer the theta role of the subject via the marking on the indirect (or prepositional) object of the verb. Consider the following:

26. a. I rented the house to your American cousin.
 b. I rented the house from your American cousin.
 c. I rented the house.

In (26.a.) the prepositional object is marked as goal, hence we can deduce that the subject is the source, while the reverse is true for (26.b.) In (26.c.), however, there is no prepositional object , and thus we do not know whether the subject is the source or the goal. ISL differs from spoken languages such as Hebrew and English in that respect: the subject (and the object as well) of an agreement verb is overtly theta marked as source or as goal, and hence no ambiguity as in (26.c.) can occur. Thus, in ISL the subject and the object of agreement verbs are overtly and independently marked for both their theta role and their syntactic position, by the direction of the path movement and the facing respectively²².

Note that these two types of morphological markings are different in nature: the direction of the path marks **two** arguments; while the facing marks only **one**. Furthermore, with respect to the direction of the path, both arguments are of equal

²² It might be suggested that inherently case-marked subjects and direct objects (e.g., dative subjects and dative objects) are also double-marked in some sense: the morphological case marker is tied to their thematic role, while their structural position determines their syntactic function. See Schutze (1993) for an analysis which argues for the necessity to dissociate morphological case from structural positions.

prominence in a sense. With respect to the facing, however, they are unequal, as only one argument is singled out.

The situation of double marking imposes the following theoretical questions:

1. Assuming that both the thematic roles and case are assigned by the same element (the verb), how is it that the arguments are treated so unequally by each type of marking?
2. Are both types of markings assigned at the same level of representation? If not, what levels are involved and what is their relationship to each other?

3.6.2 The Problem of Thematic Agreement

Of the two morphological mechanisms identified in the analysis suggested in this chapter, only one mechanism is regarded as marking agreement - the direction of the path movement. The other mechanism, the facing of the hands, is a case marker rather than an agreement marker. The direction of the path is determined by principle (a) of the AMP's: the path moves from the **source** argument to the **goal** argument. The implication is then that agreement in ISL is stated in terms of spatial-thematic notions, rather than in terms of syntactic functions. This is problematic, both from a cross-linguistic perspective and from a theoretical point of view.

No spoken language I am aware of associates agreement with **spatial** thematic roles. Rather, agreement is related to syntactic functions (subject, object, and in some cases indirect object). In few cases it has been suggested that the relevant notions are agent and patient (e.g., Lakhota, in Mithun 1991;515-516). But in no agreement system

other than that of sign languages do the thematic roles **source** and **goal** play a role in determining agreement. Though the notions of agent and patient are also thematic in nature, these thematic roles correspond to syntactic functions in a much more straightforward manner than the thematic roles of source and goal (in GB, for example, agent and patient correspond to D-str subject and object). Therefore, the agreement system of sign languages is unique.

In fact, agreement which is thematically determined is very problematic for linguistic theory. In Government and Binding (GB) and in Minimalism, for example, agreement is a syntactic relation, defined over specific syntactic configurations. It is generally assumed, and has been well motivated, that thematic roles (that is, the semantic contents of thematic roles) do not play any role in syntactic processes (see e.g., Rappaport and Levin 1988, Grimshaw 1990). Thematic role labels are important for determining the hierarchical relations between arguments, which are reflected in the positions these arguments hold at the level of Predicate Argument Structure (PAS). But PAS does not contain any semantic information, since syntactic processes and generalizations can be stated (and are better captured) without making any reference to the thematic-semantic role of the NP's involved.

The situation in ISL clearly poses a problem for this theoretical assumption. One possibility is to argue that this assumption does not hold, at least in the case of sign languages, and to allow for theta roles to participate in syntactic processes. Such a move, however, proves to be untenable. In both GB and Minimalism, the agreement features are contained within specific functional heads (AGR-P's or TP, respectively). Moreover, the features of subject agreement and for object agreement are associated

with two distinct syntactic positions (AGR_S-P and AGR_O-P, or TP and VP). In ISL agreement verbs, the nominals bearing the thematic roles of source and goal can be **either** the subject **or** the object, depending on the semantics of each verb. Therefore the agreement features associated with each of these thematic roles cannot be located in a particular position in the syntactic configuration. Hence these features cannot be assigned or checked (depending on the terminology of the theory) in the syntax²³.

It seems that the thematic agreement displayed by agreement verbs cannot be accounted for by the existing general linguistic theory. We have to assume then, one of the two following possibilities:

- i. The direction of the path movement in ISL is in fact thematic agreement. Therefore, certain amendments have to be introduced in universal grammar and linguistic theories, in order to account for the existence of thematic agreement in sign languages.

or:

- ii. Agreement is basically a syntactic relation, and therefore there can be no such ‘thing’ as ‘thematic agreement’. Hence, the direction of the path movement in ISL is either not an agreement mechanism, or it is an agreement mechanism, but it is not thematically determined.

Possibility (i) is undesirable because it is ad hoc and not explanatory. Possibility (ii) contradicts the analysis presented in this chapter, where I strongly argued that the **only** notions relevant for determining the direction of the path are those of source and

²³ Though I mentioned here only GB and Minimalism, thematic agreement is problematic for other theories as well, e.g., LFG (e.g., Bresnan 1982) and Relational Grammar (e.g., Perlmutter 1983)) both of which draw a strong connection between agreement and syntactic functions.

goal. In the next chapter I show that this contradiction can be resolved, by assuming that it is not the verb per se which is marked for agreement, but rather a specific spatial predicate (PATH) which is part of the lexical and morphological structure of agreement verbs. The relationship between this predicate and the nominals it agrees with is captured in syntactic terms (head-complement relationship). In this way, the view that agreement is a syntactic relation stands.

3.7 Summary

This chapter has focused on the two argument marking mechanisms of verbs in ISL, namely the direction of the path and the facing of the hands. It has addressed the following questions: a. Is the direction of the path syntactically or thematically determined? And b. What is the relationship between the two argument marking mechanisms?

Regular agreement verbs provide no conclusive evidence for either question. Such evidence, however, is provided by backwards verbs, which function as a test-case, since they manifest a different combination of the same ‘ingredients’.

By examining the properties of backwards verbs and comparing them with regular agreement verbs, the analysis presented in this chapter has provided evidence for the following claims:

- (1) ISL has two argument marking mechanisms; one is marked morphologically by the direction of the path movement, the other, by the facing of the hand(s).

(2) Each of these systems encodes different grammatical relations, namely the semantic/thematic structure and the syntactic argument structure, respectively.

(3) The morphological realization of these systems reflects two possible associations between them: one of them, the ‘typical’ one, is characteristic of regular agreement verbs (source-goal with subject-object respectively); while the other, atypical, possibility characterizes backwards verbs (source-goal with object-subject, respectively).

Thus, the ‘backwardness’ of backwards verbs is attributed to the less typical association between their thematic and syntactic structures. Neither of these components by itself is in any sense ‘backwards’. It is only the special combination of them which results in this ‘backwardness’.

The analysis I proposed was shown to be both descriptively adequate and explanatory, since it distinguished between two mechanisms that were lumped together as one in previous analyses. However, this analysis poses both problems and challenges to general linguistic theory, as it reveals that ISL (and sign languages in general) are unlike spoken languages in two important respects: the arguments of agreement verbs are double-marked for both their thematic and syntactic roles, and the agreement mechanism of the language is thematically rather than syntactically determined. These challenges will be addressed and solved in chapter 4.

Chapter 4

The Analysis of Verb Agreement in ISL

Introduction

The description of verb classes in ISL in chapter 2 and of the agreement mechanisms in chapter 3 raises two general questions, the first concerning linguistic theory in general, and the second concerning the analysis of agreement in ISL (with implications for other sign languages). These questions are:

- (i) Assuming that the AMP analysis is correct, and that the agreement pattern of agreement verbs and spatial verbs is determined by the thematic notions of source and goal, how can linguistic theory account for thematic agreement?
- (ii) Can we predict which verbs will be agreement verbs, plain verbs or spatial verbs?

Answering these questions is the goal of this chapter.

One way to approach the first question is to modify linguistic theory so that it can accommodate the notion of thematic agreement. This means adding new machinery to the theory, and admitting two significantly different types of agreement mechanisms in human languages, which implies, in turn, that sign languages differ substantially from spoken languages. A more parsimonious approach requires linguistic theory to account for both sign languages and spoken languages, **without** having to stipulate different mechanisms for the two types of languages. Under such an assumption, thematic agreement would have to be accounted for in different terms: either as a

construction which is not an agreement construction, or as an agreement construction which is not thematically determined.

The second approach, if it can account for the same range of data, is theoretically preferable, as it does not complicate the theory. It would also be more explanatory, since the observable differences between sign languages and spoken languages would need to be accounted for and explained by using the same theoretical apparatus, thereby pinpointing the causes for these differences. There is good reason to pursue this approach. Theoretical research on sign languages has demonstrated that seemingly intractable problems can be solved by involving general linguistic theories, such as autosegmental phonology, prosodic morphology, feature geometry (Sandler 1989, 1993b, 1996b), dependency phonology (van der Hulst 1993, Brentari forthcoming), Government and Binding theory (Lillo-Martin 1991, ABKN 1992, Janis 1992, Fischer 1996, Bahan 1996, Petronio and Lillo-Martin 1997).

The Thematic Structure Agreement Analysis I propose here follows this approach as well. It assumes that agreement in both sign languages and spoken languages is a unified phenomenon, and therefore should be accounted for by the same theory. This analysis provides answers to both questions posited above: it will explain and account for the notion of thematic agreement in ISL without having to introduce special machinery, and at the same time it will enable us to predict the agreement patterns of verbs in ISL.

The proposed analysis takes as its point of departure the main conclusion of the AMP analysis in chapter 3, repeated here for convenience:

- The direction of the path and the facing of the hands are two distinct mechanisms, which serve different functions in the language, and follow different rules: the direction of movement marks agreement with the source and goal arguments of the verb (the movement is from source to goal); the facing of the hands marks the syntactic object (the facing is towards the object).

The analysis here takes these morphological facts seriously. It assumes that each of the morphological mechanisms identified is an independent morpheme, with its own set of phonological, morphological and semantic properties. One morpheme, the path movement, is a predicate denoting a path or a trajectory that an element traverses. The other, the facing, is a predicate denoting transfer. Agreement verbs, therefore, are comprised of two morphemes which I gloss as PATH and TRANSFER respectively. The morphological complexity of agreement verbs is taken as an indication of their semantic complexity. This semantic complexity is best captured at the level of LCS (Lexical Conceptual Structure, see chapter 1.4.2.), where each of these predicates appears as an independent conceptual function. A lexical decomposition analysis along these lines enables us to focus on each component separately, and to distinguish between properties which are characteristic of one predicate from those characteristic of the other. Specifically, I will argue that agreement morphology (i.e., the association of the arguments' loci with the beginning and end points of a sign) is an essential property of the PATH predicate, not of the TRANSFER predicate. I show that by analyzing agreement verbs as complex verbs along these lines, the seemingly unique properties of verb agreement in ISL are accounted for straightforwardly, and the various agreement patterns in the language are predictable.

A componential analysis of agreement verbs has to specify not only the properties of each component independently, but also the process which collapses these components into one complex linguistic element. This process involves a change in the argument-taking properties of each of the predicates, since, as a unified linguistic element these predicates come to share their arguments; in other words, the arguments of an agreement verb are shared by the two predicates of which that verb is comprised. I argue that this change in the argument structure of the two predicates is best captured at the linguistic level of PAS (Predicate Argument Structure, see chapter 1.4.3.), which highlights the argument taking properties of predicates and does not make reference to the semantic content of these arguments. Hence, the two linguistic levels which are relevant for the analysis presented here are LCS, which highlights the componential nature of agreement verbs, and PAS, where the two components are merged into one (complex) argument-taking predicate.

The Thematic Structure Agreement Analysis, therefore, has two steps: lexical decomposition, and merger. However, it is based on several novel ideas and assumptions, which require justification and elaboration. Even the existence of the two predicates which are the basic building blocks of this analysis is an assumption which requires justification. The merger process is complicated by the special morphology of agreement verbs in ISL, and it therefore requires further elaboration of the theory of argument structure merger. Detailed argumentation is needed to support an analysis of this sort, and the required degree of elaboration runs the risk of not being able to see the forest for the trees.

For the sake of keeping a clear, unified analysis on the one hand, and supplying the necessary argumentation to support this analysis on the other hand, this chapter is organized as follows: the first section (4.1.) presents an overview of the analysis. The main steps of the analysis are pointed out, as well as its relevance and implications for the two problems (i) and (ii) posited at the beginning of the chapter. After being presented with the general picture, the reader interested in the finer points of the linguistic analysis can delve into a more detailed discussion of each of the steps and assumptions of this analysis in the sections that follow. Section 4.2. provides support for postulating the two predicates PATH and TRANSFER, and examines their properties. Section 4.3. presents the process of merging the two predicates as an argument structure merger at the level of PAS (following Rosen 1989a). It is further pointed out that the complex morphology of agreement verbs in ISL requires two additional steps in the theory: argument fusion, and the ordering of the merger and agreement processes with respect to each other. Section 4.4. goes back to the two main problems which this analysis sets out to explain. Agreement in ISL is basically a configurational relation between a head and its dependents, as it is in spoken languages (section 4.4.1). However, it is argued that agreement is a property not of the verbs themselves, but rather of spatial predicates (PATH, in our case) contained in these verbs, which explains the close relation between the agreement controllers and the thematic roles they bear. In 4.4.2. I argue that the key to predicting the agreement pattern of a verb in the language is its thematic structure. In particular, the different agreement patterns displayed by the verb classes in ISL are attributed to the presence or absence of the PATH and TRANSFER predicates in the lexical structure of the verbs.

4.1 The Thematic Structure Agreement Analysis

4.1.1 The Derivation of Agreement Verbs

The intuitive idea underlying my analysis is that the morphological complexity of agreement verbs is a reflection of their inherent lexical complexity. Agreement verbs are complex verbs, comprised of two predicates: a predicate denoting ‘causing a change of possession’, or ‘transfer’ (which I gloss as TRANSFER), and a spatial predicate denoting ‘path’ (glossed as PATH). These predicates are overtly manifested by the facing of the hands and the direction of movement, respectively¹. That is, I regard the facing and the direction of movement as the phonological and morphological realization of the two predicates which constitute the basic building blocks of agreement verbs.

The idea that verbs may consist of more than one predicate is not unique to sign languages. For example, various analyses of causatives (Baker 1988, Rosen 1989a, Falk 1991, Alsina 1992 among others) regard morphological causatives as complex verbs consisting of two predicates - a base predicate, and a predicate denoting causation (‘*cause*’), the base predicate being the complement of *cause*. Take, for example, the following Turkish sentence:

1. Adam-a kapı-yı aç-tır-dı-k
 man-DAT door-ACC open-CAUS-PAST-1PL
 ‘We made the man open the door’. (Zimmer, 1976;400)

The Turkish verb *aç-tır-dı-k* consists of a causative affix *-tır*, which attaches to a base verb root *aç-* ('open'). The resulting verb stem *aç-tır-* ('make-open') is both morphologically and semantically complex: morphologically, it consists of a stem and an affix; semantically, it denotes the causation of an opening event.

The difference between causative verbs and agreement verbs lies in the nature of the predicates involved. In agreement verbs, the predicates have a narrower meaning than in ordinary causative predicates: the matrix predicate of agreement verbs denotes the causation of a transfer event (rather than causation in general), and the base predicate is very specific - a predicate denoting path (unlike causatives, where the base verb is not restricted at all). However, the important theoretical point is that natural languages include verbs that are semantically componential.

According to the analysis I propose, the agreement verb GIVE in sentence (2) has the LCS representations as in (3):

2. BOOK INDEX_a ₁GIVE₂ 'I gave you this book'.

3. GIVE:

spatial tier: CAUSE_{poss} ([α], [GO_{poss} ([BOOK]^y, [PATH [α] [β]])])

action tier: AFF ([I] ^{α} , [YOU] ^{β})

¹ The facing will be subsequently analyzed as the overt manifestation not of the predicate itself, but rather of the dative case which TRANSFER assigns (in accordance with the analysis of facing suggested in chapter 3.5.).

As is exemplified in (3), agreement verbs are derived from a conceptual structure which contains two predicates: a matrix predicate, CAUSE_{poss}, and an embedded predicate PATH. The matrix predicate, CAUSE_{poss} is a special kind of a causative verb in that it denotes causation in the semantic field of possession. I gloss this verb as TRANSFER, to be understood as a label for ‘causing a change of possession’. This verb takes an external argument [I] and two internal arguments: an NP - the affected argument, [YOU] on the action tier, and an Event argument, headed by a PATH predicate. PATH is a di-transitive predicate, which takes an external argument and two internal arguments as its complements. These two arguments, the internal arguments of PATH, are lexically bound (in the sense of Jackendoff 1987, 1990a, see chapter 1.4.2.) by the arguments on the action tier. This ‘lexical binding’ is notated here by the superscripts on the argument positions of the action tier.

The notion of transfer seems quite straightforward when talking about di-transitive verbs such as GIVE. It might seem much less straightforward in the analysis of many other agreement verbs, especially mono-transitive agreement verbs (e.g., HELP, LOOK-AT, VISIT) or verbs where transfer might be used metaphorically (e.g., TEACH, ASK, TELL). I will show, however, that the notion of transfer is part of the LCS of **all** agreement verbs, and therefore all agreement verbs have very similar LCS’s, which include both CAUSE_{poss} and PATH. The Thematic Structure Agreement Analysis implies, then, that the class of verbs which is referred to as agreement verbs, is actually better characterized as the class of ‘transfer’ verbs². This

² It should be pointed out that the notion of ‘transfer’ has been assumed in various lexical analyses of verbs denoting change of possession (e.g., Gruber 1976, Jackendoff 1990a), and some analyses have assumed the existence of an abstract (phonologically null) verb which occurs in a syntactic configuration expressing causation (which ‘transfer’ verbs are part of) (e.g., D-str for Larson 1988, and Lexical Relational Structure for Hale and Keyser 1992). The main difference between these analyses and mine is that I regard TRANSFER in ISL not merely as a semantic notion, or an ‘abstract verb’ (as

similarity between all agreement verbs, in that they constitute the natural class of ‘verbs of transfer’, is captured at the level of LCS, where the representations of all agreement verbs contain the same two predicates (TRANSFER and PATH). The differences between the various verbs of transfer stem from differences in the manner of transfer, or the difference in the argument denoting the transferred entity, the ‘theme’ argument. In the present chapter I concentrate on the similarities between agreement verbs, on those elements which are shared by all agreement verbs and allow us to define them as a natural class. The differences between the various members of this natural class will be dealt with in chapter 5.

The two predicates TRANSFER and PATH, which appear as independent elements in the LCS of the verbs, are merged at some point of the derivation of agreement verbs, since each agreement verb appears as one unified element phonologically, syntactically and semantically. Phonologically, PATH and TRANSFER are pronounced simultaneously, as one phonological unit. Syntactically, they share their arguments: the source and goal arguments of PATH function also as the causer and patient of TRANSFER. Semantically, both predicates denote one unified event. This means that the two independent predicates in the LCS representation merge to form one unified lexical item.

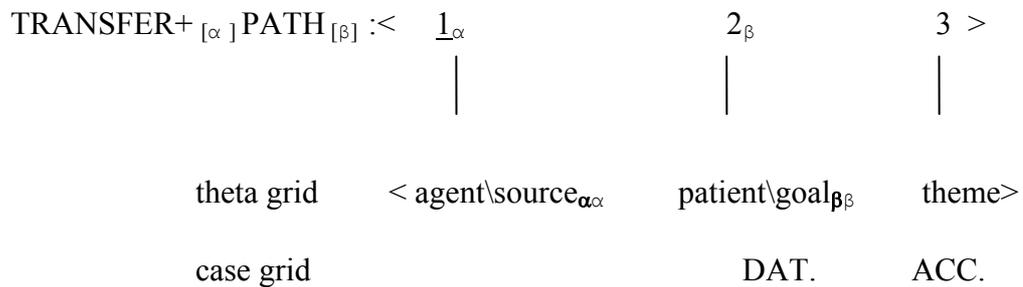
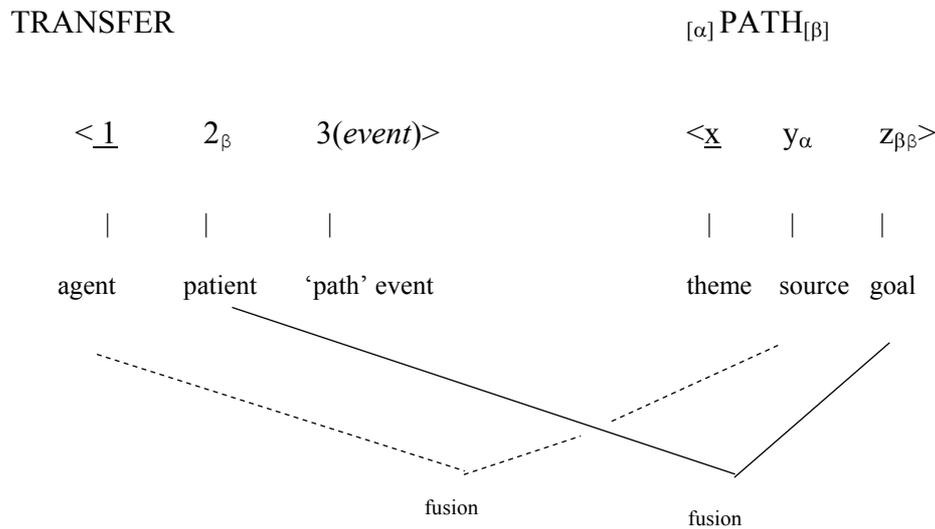
The merger process has the following effects: the two distinct argument structures of PATH and TRANSFER are merged into one (complex) argument structure (following Rosen 1989a), and the argument positions shared by the two predicates are fused into one argument position at the level of PAS. The resulting verb has one argument

Hale and Keyser call them), but rather as a discrete morpheme which has lexical and syntactic

structure, with three arguments in it: an external argument (underlined), which bears the thematic roles of agent/source (or agent/goal in backwards verbs), and two internal arguments: the patient argument, which also bears the thematic role of goal (or source), and the theme argument, the entity that moves along the path. Hence the PAS of the complex verb is shown in (4)³. Fused arguments are indicated by joined lines.

4.

PAS before merger



PAS of complex verb after merger

specifications. That is, TRANSFER in my analysis is a lexical item.

I will show (sections 4.3.2. and 4.3.3.) that an argument structure merger is preferable to a syntactic or a phonological merger, mainly for theoretical reasons.

4.1.2 The Thematic Structure Agreement Analysis and the Agreement Puzzles in ISL

How can a lexical decomposition analysis along the lines above explain the descriptive and theoretical puzzles posed by the agreement facts in ISL? The answer to this lies in the fact that a lexical decomposition analysis makes it possible for us, and in fact requires us, to focus on each component separately, and to distinguish between properties which are characteristic of one predicate from those characteristic of the other. Specifically, I claim that agreement morphology (i.e. the association of the arguments' loci with the beginning and end points of a sign) is an essential property of spatial predicates in ISL, and PATH, as a member of this class, displays agreement morphology. Thus, agreement is a property of PATH, not of TRANSFER. On the other hand, TRANSFER is shown to be the factor distinguishing agreement verbs from spatial verbs.

Let us examine these claims more closely. I propose that PATH is a spatial predicate. ISL has other overt predicates denoting spatial relations, e.g., BETWEEN, ON-(TOP-OF), INSIDE, TOGETHER-WITH. These predicates share the following

³ This is the PAS of a regular agreement verb. In the PAS of a backwards verb the association of the thematic positions of the two predicates is reversed: the agent position binds the goal argument position, and the patient position binds the source argument position.

property: their locations specifications are determined by the R-locus of their complement(s). In other words, spatial predicates agree with their arguments. If PATH is a member of the set of spatial predicates as claimed here, it is not surprising that PATH verbs also agree with their arguments. This point will be further developed in 4.2.1. below.

TRANSFER, on the other hand, is a verb, not a spatial predicate (see 4.2.2). As such, it is not morphologically marked for agreement. It shows agreement morphology only after merging with PATH. The agreement properties of agreement verbs are ‘inherited’ from their embedded predicate PATH.

By pursuing a lexical decomposition analysis of agreement verbs, the precise nature of agreement in ISL emerges: agreement is a property of spatial predicates, not of verbs per se. This is the clue for explaining the puzzling nature of agreement in ISL, both from a language internal point of view, as well as from a universal grammar perspective

From a universal grammar perspective, agreement in ISL is basically a syntactic relationship which holds between a head and its dependents: PATH agrees with its complements. This syntactic relation conforms to agreement analyses in all languages. The “thematic flavor” of agreement in ISL is the result of the close semantic relationship which holds between the agreeing element and the agreement controllers: the agreeing element is PATH, which invariably assigns source and goal thematic roles to its complements (the agreement controllers). Therefore, the

agreement markers are always associated with these two specific thematic roles. But the agreement relationship per se need not make reference to thematic terms.

The language internal puzzle, that of predicting the agreement patterns of verbs in ISL, is solved as well. The claim that agreement is a property of spatial predicates (in our case - PATH) enables us to make the following straightforward prediction: only verbs which select a PATH predicate will exhibit agreement morphology, since it is only these verbs which have the morphological ability (which they inherit from PATH) to be marked for agreement.

Whether or not a verb contains a PATH predicate need not be stipulated according to this analysis. It is determined by its semantics: only verbs denoting directed motion (motion from one point to another), whether real or abstract, contain a PATH predicate. The prediction is then that only these verbs will be marked for agreement. This prediction is borne out: verbs which denote directed motion in ISL are either spatial verbs, where the motion is real, or agreement verbs, where the motion can be abstract. Spatial verbs and agreement verbs both inflect for agreement. Verbs which do not denote directed motion, and therefore would not select a PATH predicate, would fail to inflect for agreement, since they lack the element which has the morphological capability of inflecting for agreement. These constitute the class of plain verbs.

The morphological distinction between agreement verbs and spatial verbs (in particular, the fact that the facing of the hands is operative in the former but not in the latter) is attributed to the existence of an additional predicate in the structure of

agreement verbs, but not of spatial verbs: agreement verbs, as verbs denoting an event of transfer, contain a matrix verb TRANSFER, which assigns dative case to its object. This dative case is realized phonologically as the facing of the hands. Spatial verbs do not denote transfer, and therefore do not contain a TRANSFER predicate. As a result, dative case is not assigned, and the facing is not operative. Other differences between the two classes of verbs will also be shown to follow from the same semantic difference: agreement verbs denote an event of transfer, while spatial verbs denote an event of motion.

The neat picture presented here concerning the predictability of the agreement patterns of verbs in ISL is somewhat more complicated in reality: some verbs which are predicted to agree (based on their semantic structure) fail to do so. I will show that this is due to certain phonological constraints which block agreement, and argue that these phonological constraints can be fully specified only within a componential analysis along the lines suggested here. The phonological analysis is presented in chapter 5.

So far, I have concentrated on each of the components of agreement verbs, discussing the properties of each predicate separately. This was essential in order to make predictions regarding the various agreement patterns in ISL, since these patterns are attributed to the semantic and morphological properties of each predicate independently. I have also suggested that the two components must be collapsed into one complex linguistic element, since the two predicates denote one unified event, rather than two separate ones. Furthermore, they also share their arguments: the source and goal arguments of PATH are the subject and object of TRANSFER. The

merger process presents an intriguing challenge posed by the morphology of agreement verbs: though the predicates are merged syntactically and semantically, the morphological argument-marking properties of each predicate are independently visible: the loci of the arguments are double-marked, as the source and goal of PATH (by their linear order with respect to the direction of the path movement), and as the object of TRANSFER (by the facing of the hands).

The challenge is then how to merge the predicates lexically while retaining their morphological independence. The solution to this challenge is to assume that the morphological processes involved in the formation of agreement verbs have to be ordered with respect to each other. In particular, I will argue that the affixation of the agreement markers onto PATH takes place prior to the merger of PATH with TRANSFER. That is, TRANSFER is merged with an already inflected form of PATH, and therefore the arguments' loci are already morphologically marked as source and goal when the merger takes place. Hence, the merger with TRANSFER cannot obscure the morphological marking that PATH assigned to these arguments.

This analysis leads to the somewhat surprising result that agreement in ISL has to precede other morphological processes (for example, the PATH-TRANSFER merger). This is in a sense unusual, since agreement inflection is usually assumed to follow derivational, and even other inflectional, processes⁴. I claim, though, that this rather surprising consequence of my analysis is in fact very telling with respect to the nature of the lexicon in ISL and the role that modality plays in word formation

⁴ For example, inflections for tense and aspect in many spoken languages are closer to the verb stem than agreement inflection (see e.g., Bybee 1985). See also Anderson (1992) for an analysis of agreement as a morphosyntactic process which follows other morphological processes in the language.

processes: since agreement reflects the relations which hold between spatial predicates and their arguments, and since agreement occurs prior to other morphological processes, it follows that spatial relations and notions constitute one of the very basic building blocks of word formation in ISL. That is, the basic forms of verbs in ISL are directly tied to the spatial thematic level of the verb's conceptual structure⁵. Thus, by studying the phenomenon of agreement, we are rewarded by gaining insight into some of the basic properties and principles governing the formation of lexical items in ISL.

Summary

The analysis of agreement verbs argued for in this dissertation takes as its point of departure the morphological complexity of agreement verbs. Agreement verbs consist of two argument-marking mechanisms: **the direction of the path movement and the facing of the hands**. By identifying the lexical-semantic correlates of these morphological components, the precise lexical decomposition analysis of agreement verbs is obtained. This lexical/semantic analysis in turn makes it possible to explain the diversity of agreement patterns in the language, and to form predictions about the occurrence of these patterns. It also enables us to pinpoint where spoken languages and signed languages differ from each other: it is not the agreement mechanisms themselves which differentiate between languages in the two modalities, since agreement in both types of languages is a relationship which holds between a head and its dependents. Rather, the difference lies (a) in the elements which carry the agreement affixes: verbs and auxiliaries in spoken languages, spatial predicates in

⁵ This conclusion is somewhat reminiscent of the analysis of the role of spatial relations in word formation presented by Shepard-Kegl (1985). A detailed comparison between her analysis and mine is found in chapter 7.1.

sign languages; and (b) in the relative ordering of the agreement process with respect to other morphological processes.

I proceed now to a more detailed discussion of the various components of this analysis: the two predicates PATH and TRANSFER, the merger process, and the predictions made by the analysis.

4.2 The Basic Predicates of Agreement Verbs

4.2.1 PATH

I suggested that PATH, as a predicate denoting the **path** or **trajectory** a referent traverses, is a member of the set of predicates denoting spatial relations. Predicates denoting spatial relations in Hebrew, English and many other spoken languages are members of the class of prepositions. I therefore refer to the analogous predicates in ISL as ‘prepositions’ or ‘spatial predicates’ for ease of terminology, bearing in mind that these predicates in ISL may differ substantially from their Hebrew or English counterparts⁶. I claim that spatial predicates in ISL form a natural class, on the basis of their semantic and morphological properties. Semantically, as their name imply, they denote spatial relations. Important to my analysis here is their morphological characteristic: their location specifications are determined by the R-locus of their

⁶ In fact, sign languages are often characterized as being poor in prepositions, and even to be almost lacking in prepositions altogether (Kegl 1990;163). One main reason for this scarcity of prepositions in sign languages is the fact that sign languages have other means for conveying spatial relations. E.g., spatial relations can be conveyed analogically, by the movement or the position of the hands with respect to each other and/or loci in space, and by using classifier morphology (Valli and Lucas 1992;9. See Kegl 1990 for an analysis of locative predicates as verbs containing applied prepositions). Yet sign languages also make use of free preposition-like elements for conveying spatial relations, as sentences 5 - 7 show. From a very superficial comparison between ISL and ASL concerning these sentences, it seems that ISL makes more use of free ‘prepositions’ than ASL. Hence this might be an area where sign languages differ from each other. I leave this for future research.

complement(s)⁷. For example, in sentence (5), the predicate **INSIDE** is signed at location (b), which is the locus of its complement **REFRIGERATOR**. In (6), the location specifications of the sign **BETWEEN** are the loci a and b, which are the loci of its complements **FATHER** and **MOTHER**. In (7) the preposition **WITH** (or **-TOGETHER- WITH**) begins at locus a and ends at 1P-locus.

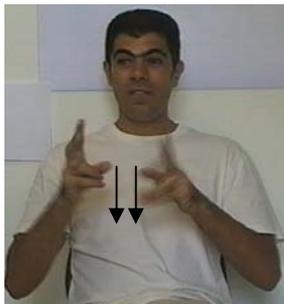
5. **MILK** **REFRIGERATOR** SS:oblong_b **INSIDE**_b ‘The milk is in the refrigerator’.

6. **BOY** **STAND** **FATHER**_a **MOTHER**_b **STAND** **aBETWEEN**_b ‘The boy is standing in between his father and his mother’.

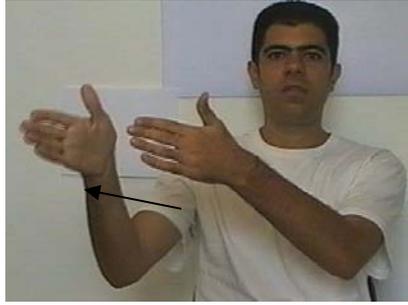
7. **I** **HE**_a **aWITH**₁ **MOVIE** **GO** ‘I went to the movie with him.’



MILK

REFRIGERATOR_bINDEX_b

⁷ This is reminiscent of the analysis of ASL verbs suggested by Gee and Kegl (1982), where the basic verb stems (which are spatial in nature, e.g., **IN**, **ON**, **AT**, **TO**, **FROM**) are said to agree with their complements, and the agreement process involves location (ibid., p. 187). For comparison between Gee and Kegl and the theory proposed here, see chapter 7.1.

INSIDE_b

'The milk is inside the refrigerator.'

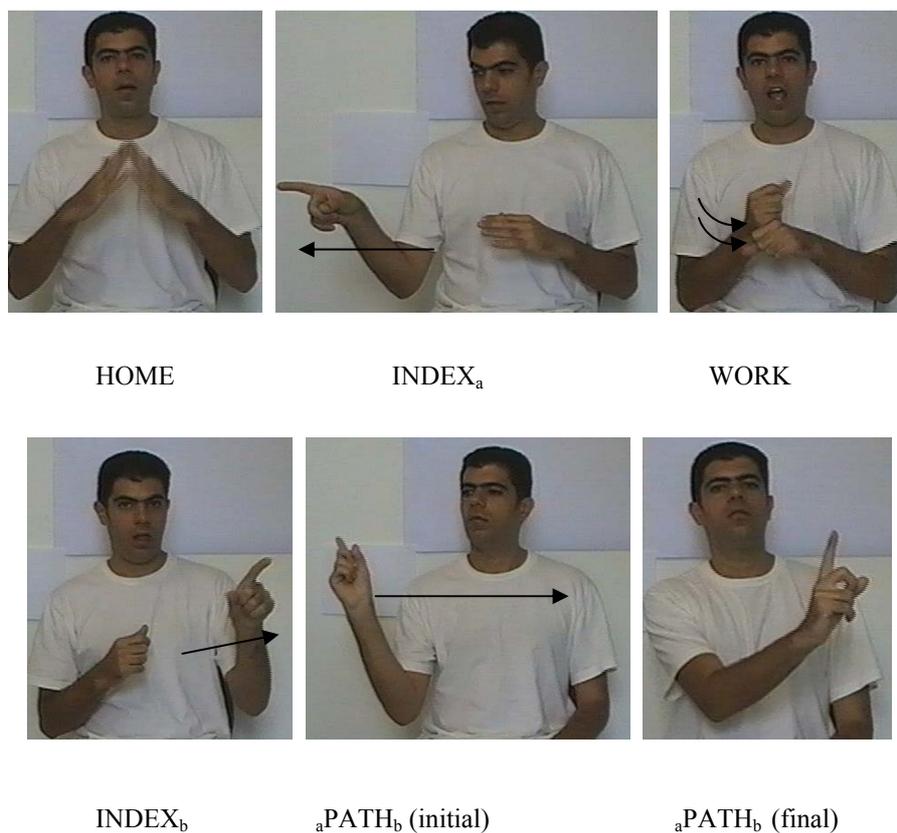
_aBETWEEN_b

'Between (mother and father)'

Figure 4.1: Agreement in spatial predicates

Since the form of these predicates (specifically - their location specifications) is determined by the phi-features of their complements, they are said to **agree** with their complements. PATH, being a member of the set of spatial predicates, also exhibits this property:

8. I HOME INDEX_a WORK INDEX_b WALK _aPATH_b 'I walked from home to work.'



‘(I walked) from home to work’

Figure 4.2: The iconicity of PATH

As we can see, PATH agrees with two loci: the locus of the source argument, and the locus of the goal argument. This reflects the argument structure of PATH: PATH is di-transitive⁸, taking two complements, the **source** and the **goal**. In addition to agreeing with its arguments, PATH also case-marks its arguments. The case distinction between the source and the goal is expressed by their linear order with

⁸ The notion of a ‘di-transitive preposition’ might seem rather odd: in spoken languages prepositions take one complement, not two (I thank Yehuda Falk for pointing this out to me). In a survey of unrelated diverse spoken languages I could not find a single occurrence of a di-transitive preposition. Even prepositions which semantically select more than one complement (such as *between*) do not exhibit di-transitive syntactic behavior. Either another preposition is inserted (as in the Hebrew phrase *‘bein stayim le- ‘arba’* - between two **to** four o’clock’), or the two complements are coordinated (as in *‘between two **and** four’*). In both cases di-transitivity is avoided. From a theoretical point of view though, I see no a priori reason to exclude di-transitive prepositions (en par with di-transitive verbs). However, it is not clear to me why such an element is found only in a sign language, and not in spoken languages.

respect to PATH: the prefixed agreement slot marks the case for the source argument (Ablative), and the suffixed agreement slot marks the case for the goal argument (Allative)⁹. PATH and its two internal arguments take an external argument, the **theme** which traverses that path. The argument structure of PATH then has the following form:

9. PATH	< <u>1</u> ,	2,	>
	theme	source	goal
case:		abl.	all.

Morphologically, PATH belongs to a class of signs which inflect for agreement (as is evident from sentence 8). According to the analysis of agreement presented in chapter 2.1.3., agreement affixes are morphemes consisting of unspecified location slots. PATH is marked for agreement with both of its complements, and therefore it has two agreement affixes attached to it:

10. []PATH[]

⁹ This is quite similar to cases of multiple argument agreement in spoken languages: when a verb bears agreement markers to two (or more) of its arguments, the agreement marker slot associated with each argument reflects the case distinctions between these arguments. Take, for example, the following Swahili sentence (from Blake 1994:14):

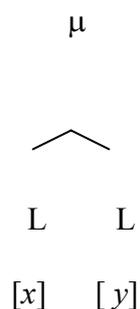
<i>Ali</i>	<i>a-na-m-penda</i>	<i>m-wanamke</i>	<i>m-rembo</i>
Ali	3sg-PRES-3sg-love	class -woman marker	class-beautiful marker

‘Ali loves a beautiful woman’

The subject agreement marker is the prefix, and the object agreement marker is the infix (prefixed to the root). Falk (1994, 1997) notes this close relationship between agreement slots and the case

Phonologically, PATH is specified only for having two empty location slots. These empty slots are then filled by a ‘copying’ procedure, where the location specifications of the R-loci of the arguments are copied into the empty slots (see chapter 2.1.3.). For simplicity of representation, these are marked here as variables on the location slots¹⁰.

11. PATH:



The complex morpheme of PATH and its arguments lacks specifications for Hand Configuration. In sentences that have no agreement verbs, these specifications are supplied either by a classifier morpheme, which combines with PATH, as in (12), or else it gets the G handshape, as in (13).

12. a. CAR BLUE _aCL:B(vehicle)_b ‘The blue car went(drove) from A to B.’
 b. BOAT INDEX_a _aCL:BB (boat)_b ‘The boat sailed from A to B.’
 c. I CUP INDEX_a _aCL:C_b ‘I moved this cup from A to B.’

distinctions among arguments, and therefore claims that multiple argument agreement is in fact a realization of the case grid of the verb.

¹⁰ The M(ovement) segment of PATH is not represented underlyingly (following Sandler 1996b). Its form is derived by a set of redundancy rules.

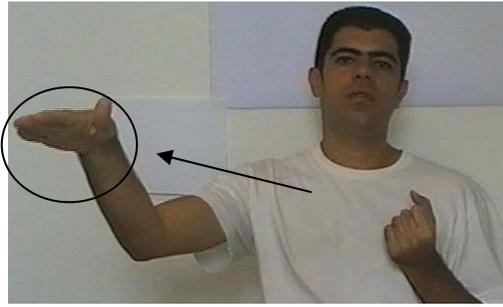


Figure 4.3: PATH+classifier morphology: ${}_a\text{CL}:\text{B}(\text{vehicle})_b$

13. a. AIRPLANE ISRAEL INDEX_a LONDON INDEX_b FLY ${}_a\text{PATH}_b$

‘The plane flew from Israel to London.’

b. HE_a JERUSALEM INDEX_b DRIVE ${}_a\text{PATH}_b$ ‘He drove to Jerusalem.’

c. EVERY-DAY I HOME INDEX_a WORK INDEX_b WALK

${}_a\text{PATH}_b$ (repetitive) ‘Every day I walk from home to work and back.’



Figure 4.4: PATH+default handshape: DRIVE ${}_a\text{PATH}_b$

It is natural to extend this analysis to agreement verbs, and to propose that PATH also appears as a bound morpheme in these verbs. The form of agreement verbs contains a

path movement whose location specifications are determined by the R-loci of the arguments of the verb, just like those of examples 12-13. I am proposing that agreement verbs contain a morpheme with phonological specifications as in (11), and that this morpheme carries the semantic and lexical properties of PATH¹¹:

14. A. BOOK INDEX_a 1GIVE₂ ‘I gave you this book.’

PATH

b. INDEX₁ 1HELP₂ ‘I helped you.’

PATH

As can be seen from sentences 12-14, _aPATH_b occurs in a variety of constructions in the language, both as a free form, and as a bound morpheme with a classifier; it is also an essential component in the structure of agreement verbs. Notice that in all of its varied occurrences, PATH retains its semantic, phonological and lexical properties: semantically, all these sentences involve the meaning of motion from one point to another (whether the motion is real or abstract). Phonologically, all the above forms comprise an LML sequence where the two L specifications correspond to the pronominal features of the source and goal arguments. Lexically, in all the above examples, PATH takes two internal arguments, to which it assigns the thematic roles of source and goal, and the cases ablative and allative, respectively.

4.2.2 TRANSFER

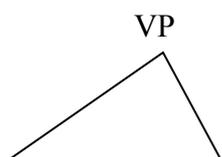
4.2.2.1 Motivation for Positing a TRANSFER Predicate.

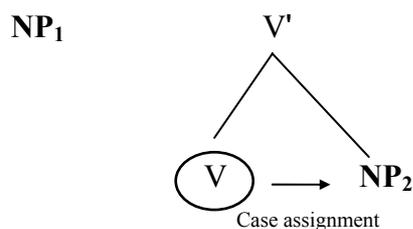
¹¹ I thank Yehuda Falk for insisting that agreement verbs contain a ‘hidden preposition’ in them.

Unlike PATH, which appears in a variety of constructions and has very clear and well defined phonological manifestations, TRANSFER occurs only as part of the structure of agreement verbs, and seems to have hardly any phonological realization. Therefore, positing such a predicate requires some justification.

The first motivation for a predicate which is independent of PATH comes from the analysis of the facing of the hands (chapter 3.3.) where it was argued that the facing is a mechanism independent of the direction of movement, and that it marks syntactic functions and not thematic relations. Unlike the path movement, which marks two arguments and does not posit any hierarchical relations between these arguments, the facing singles out one argument - the syntactic object. It was further suggested that the facing should be analyzed as a case marker rather than as an agreement marker. But then the question arises - which verb assigns this case? Each agreement verb double-marks its arguments as source and goal, and as an object. The source-goal marking is attributed to the spatial component of these verbs, in our terms - PATH. The case marking then, should be attributed to a different component of these verbs, a case assigner which governs and case-marks its object, but not its subject. All these observations suggest the existence of a predicate (verb), distinct from the spatial predicate, which appears in the canonical configuration for transitive verbs, and displays subject-object asymmetry (where the subject, NP₁, is external to the V', while the object, NP₂, is a sister of V):

15.





Note that agreement verbs exhibit subject/object asymmetries with respect to subject pronoun copy and binding, as do all other verbs in the language (evidence for S/O asymmetry in ISL verbs is given in Appendix C). In order to account for these asymmetries, the subject of any verb (be it agreement, spatial or plain verb) must be more prominent configurationally. Returning to agreement verbs, the subject and object NP's, which are also the thematic source and goal, exhibit a 'schizophrenic' behavior: they exhibit no asymmetry with respect to PATH; both nominals are the **internal** arguments of PATH. But with respect to their syntactic functions, these arguments do display the general S/O asymmetry. The necessary conclusion is therefore that agreement verbs must be comprised of another predicate in addition to PATH, which has the properties of a transitive verb, triggering the asymmetry in the syntactic behavior of these nominals.

There is also semantic motivation for positing a TRANSFER predicate: agreement verbs denote a change of possession. In some verbs this reading is much more apparent than in others, and these are the cases that motivated the semantic analysis of agreement verbs which I propose. This reading is most obvious with respect to ditransitive agreement verbs such as: GIVE, SEND, PAY, TAKE, SHOW, GRAB. These verbs all involve a theme argument which changes its possessor; and the

change of possession is initiated by the syntactic subject. That is, the syntactic subject is also a causer. Thus, the LCS's of all of the above verbs contain the following:

16. **CAUSE**_{poss}([α], **GO**_{poss} ([γ], [**PATH** [α/β] [β/α]]))

AFF ([] ^{α} , [] ^{β})

As can be read from this LCS, these verbs contain an element which denotes an event of causing a change of possession, **CAUSE**_{poss}. I gloss as **TRANSFER** the 'causing a change of possession' predicate. The notation in (16) is intended to capture the intuition that **TRANSFER** is a specific type of a **CAUSE** verb, a causative verb in the semantic field of possession.

I suggest that the **TRANSFER** predicate is also part of the meaning of other agreement verbs, where the change of possession is more abstract, and maybe less evident. For example, the verb **TEACH** means 'causing the transfer of knowledge'; verbs such as **ASK**, **ANSWER**, **EXPLAIN**, **TELL-STORY**, **HELP**, **FORCE**, involve the causing of transfer of a question/ answer/ explanation/ story/ help/ force respectively. My claim then is that 'causing the transfer of an entity', be it concrete or abstract, is part of the meaning of all agreement verbs¹². Some representative examples are given in (17) below:

17.

SEND: Mary sent John a book.

¹² That the notion of 'transfer' is relevant to the analysis of agreement verb is pointed out in Brentari (1988) (her analysis was described in 3.2.3.). However, she does not posit an actual **TRANSFER**

CAUSE_{poss} ([α], GO_{poss} ([BOOK]^y, [PATH [α] [β]])

AFF ([MARY] ^{α} , [JOHN] ^{β})

TAKE: Mary took the book from John.

CAUSE_{poss} ([α], GO_{poss} ([BOOK]^y, [PATH [β] [α]])

AFF ([MARY] ^{α} , [JOHN] ^{β})

SHOW: Mary showed John the picture.

CAUSE_{poss} ([α], GO_{poss} ([IMAGE (of picture)], [PATH [α] [β]])

AFF ([MARY] ^{α} , [JOHN] ^{β})

INFORM: Mary informed John (about the party).

CAUSE_{poss} ([α], GO_{poss} ([INFORMATION], [PATH [α] [β]])

AFF ([MARY] ^{α} , [JOHN] ^{β})

HELP: Mary helped John.

CAUSE_{poss} ([α], GO_{poss} ([HELP], [PATH [α] [β]])

AFF ([MARY] ^{α} , [JOHN] ^{β})

DEFEND: Mary defended John.

CAUSE_{poss} ([α], GO_{poss} ([DEFENCE], [PATH [α] [β]])

AFF ([MARY] ^{α} , [JOHN] ^{β})

COPY: Mary copied the answer from John.

CAUSE_{poss} ([α], GO_{poss} ([IDENTITY (of answer)], [PATH [β] [α]])

AFF ([MARY] ^{α} , [JOHN] ^{β})

LOOK AT: Mary looked at John.

CAUSE_{poss} ([α], GO_{poss} ([GAZE], [PATH [α] [β]])

AFF ([MARY] ^{α})¹³

ASK: Mary asked John (a question).

CAUSE_{poss} ([α], GO_{poss} ([QUESTION], [PATH [α] [β]])

AFF ([MARY] ^{α} , [JOHN] ^{β})

VISIT: Mary visited John.

CAUSE_{poss} ([α], GO_{poss} ([VISIT], [PATH [α] [β]])

AFF ([MARY] ^{α} , [JOHN] ^{β})¹⁴

TAKE-ADVANTAGE-OF: Mary took advantage of John.

CAUSE_{poss} ([α], GO_{poss} ([ADVANTAGE], [PATH [β] [α]])

AFF ([MARY] ^{α} , [JOHN] ^{β})

¹³ In this analysis of LOOK-AT I follow Gruber's (1967) analysis, where he suggests that *see* and *look at* (in English) should be analyzed a 'X's gaze goes to/towards Y'; see also Jackendoff (1990a;36).

¹⁴ Though the notion of transfer might seem odd when a verb such as VISIT is concerned, note that such a notion is explicitly expressed in the English light verb construction '*to pay a visit*'.

To summarize, there is both syntactic and semantic motivation for postulating another predicate in the structure of agreement verbs, apart from the PATH predicate. Syntactically, the asymmetric behavior of the arguments cannot be fully accounted for if they function solely as the arguments of PATH, since they both are the **internal** arguments of PATH. This asymmetry can be accounted for by assuming the existence of a verb, which takes one of these arguments as its complement, while the other is its external argument. Semantically, agreement verbs denote causing a change of possession, the transfer of an entity, whether concrete or abstract. Therefore I suggest that the element in question is a verb, glossed as TRANSFER, where this gloss should be understood as ‘causing a change of possession’. I now turn to describe the properties of TRANSFER.

4.2.2.2 The Properties of TRANSFER

A. Argument Structure: An event of transfer includes the following participants: two possessors, and the motion of an entity from one possessor to another. The event is instigated or caused by one of the possessors, who is construed as the causer or the agent. TRANSFER, as a predicate denoting transfer, is a three-place predicate. It takes an external argument, the causer or agent, and two internal arguments. The first internal argument is the nominal affected by the transfer event, the possessor who receives or is deprived of the transferred entity. The second internal argument is the event of motion. Motion from one point to another is expressed in ISL by PATH (as was shown in the preceding section). Since the canonical realization of an event is a clause, I suggest that the motion-event argument of TRANSFER is a clause headed by PATH. The argument structure of TRANSFER is shown in (18):

18. TRANSFER <1, 2, 3>

|

PATH *event*

TRANSFER shares its arguments with its embedded predicate PATH: the two possessors (<1> and <2> in 18) are also the source and goal arguments of PATH. For now, I represent this sharing of arguments by co-superscription.

19. a. Regular agreement verbs:

TRANSFER <1ⁱ, 2^j, 3>

|

PATH <a, bⁱ, c^j>

b. Backwards verbs:

TRANSFER <1ⁱ, 2^j, 3>

|

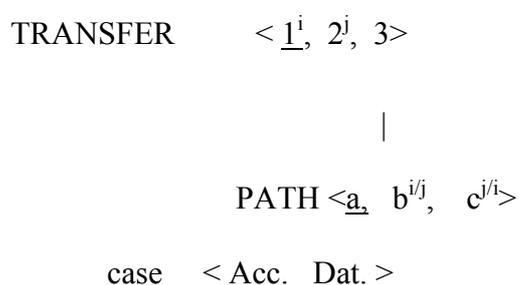
PATH <a, b^j, cⁱ>

TRANSFER imposes selectional restrictions on its NP arguments (<1> and <2>): these arguments are possessors, and therefore are most likely to be human/animate.

B. Case marking properties: The case marking properties of TRANSFER follow from the analysis of the facing of the hands in chapter 3.5. It was suggested there that the

facing is the phonological realization of the dative case. Therefore I assume that TRANSFER assigns dative case. Additionally, since it has an external argument, we may plausibly infer that it can assign accusative case as well (following Burzio's generalization (Burzio 1986; section 3.1.1.)¹⁵). This is represented in the argument structure as follows:

20.



This analysis implies that TRANSFER, although phonologically null, is an essential component of agreement verbs; in fact, it is the matrix predicate of these verbs. Its only phonological manifestation is the dative case it assigns. This case marker, realized by the facing of the hands, is necessarily a bound morpheme, since it has phonological specifications only for facing. It follows then that TRANSFER (that is, its Case-grid) always surfaces as one phonological unit with PATH. The following question then arises: is the merger of PATH and TRANSFER merely a phonological phenomenon, or does it involve also syntactic or lexical processes? In other words, at which level of representation does this merger takes place? This question will be the focus of the next section.

¹⁵ According to Burzio's generalization, a verb can assign an external theta role iff it assigns Case. In other words, a verb can assign accusative case only if it has an external argument, and if a verb has an

4.3 The TRANSFER+PATH Merger

So far, I have described the properties of PATH and TRANSFER as two distinct, independent though interrelated predicates. But when these two predicates combine to form an agreement verb, the result seems to be one complex verb rather than two independent predicates. First, these two predicates are articulated simultaneously. Secondly, there are only three nominal arguments in the clause (two, in the case of monotransitive agreement verbs), whereas the sum of the number of nominals of both predicates is five. In other words, the two predicates together have fewer arguments than the sum of the arguments of each predicate. And finally, each agreement verb denotes one unified event, with one set of specifications for tense and aspect. These observations support an analysis in which the two predicates combine into one verb, rather than one that posits two simultaneously occurring independent predicates.

Such an analysis, however, would face a serious problem: each of these predicates still independently marks its arguments. That is, the nominal arguments of an agreement verb are marked twice: as source and goal of PATH, by the association to the beginning and end points of the sign, and as object (and by default - subject) of TRANSFER, by the facing. Therefore, any merger analysis will have to make sure that the argument-marking properties of the predicates are still visible after the merger takes place.

external argument - it also has an accusative case to assign.

In order to do this, I adopt an analysis of argument structure merger, following Rosen's (1989a) analysis of Romance causative constructions. According to this analysis, the argument structures of the two predicates are merged to form one complex argument structure, with one external argument and one set of tense-aspect specifications. This analysis is augmented with a morphological analysis which assumes that morphological processes can, and in some cases must, be ordered with respect to each other. The process of the affixation of the agreement markers to PATH would then precede the merger of TRANSFER and PATH. This ensures that the argument-taking properties of PATH are preserved in the verb's morphology even after it merges with TRANSFER.

4.3.1 Argument Structure Merger

Rosen (1989a) proposes an analysis of causative constructions in Romance languages, which treats causative verb formation as an operation of merger of the PAS of two verbs: the basic verb, and a causative verb. Under this operation, the internal event argument of the causative verb is replaced by the complete argument structure of the base verb. Merger therefore results in one argument structure for the complex verb, and the combination of the cases of the two verbs; i.e., the number of cases of the complex verb is the addition of the number of cases each verb has (*ibid.*, p.55).

Rosen suggests that a merger analysis may also be applicable to various other constructions where arguments are shared by more than one lexical item (such as light verb constructions, serial verbs, and modal-type verbs). I propose that ISL agreement verbs are such constructions. These verbs exhibit very similar properties to those of

predicates is directly manifested in the **morphological** properties of that argument, rather than in its syntactic behavior. Each argument is marked as source or goal by its association to the beginning or end point of the sign, and as an object or non-object (which, in our case is subject) by the facing. In order to fully account for the morphology of each argument, it must be assumed that each argument is the argument of both PATH and TRANSFER. After merger takes place, these argument positions are fused (as is shown by the lines connecting each pair of arguments, in (22) above), but the identity of the original predicate-argument relation is preserved in the fused argument, since both predicates jointly determine its morphological properties. This joint morphological marking, which necessitates the argument fusion process, poses some further complications, related to the double case marking exhibited by these arguments, which is dealt with in (ii).

(ii) Double case assignment.

So far, I have dealt with the number of **arguments** of the complex verb. However, the merger process also affects the number of **cases** the complex verb can assign. According to the merger theory, the number of cases of the complex verb is the addition of the number of cases of each predicate. I have proposed above that TRANSFER assigns accusative and dative cases (section 4.2.2.2.), and PATH assigns two oblique cases, ablative and allative (section 4.2.2.1.). The complex verb then would have four cases to assign. This is clearly an undesirable consequence; the number of cases of the complex verb exceeds the number of internal arguments: there are four cases, and only two internal arguments (after argument fusion has taken

¹⁶ A possible mechanism for such ‘fusion’ is Higginbotham’s (1985) theta identification, by which theta roles of two elements are identified, or merged (as suggested in Speas 1990) into one theta (argument) position.

place). Hence it is necessary to assume either that the process of argument fusion fuses not only theta positions but some cases as well, or else, to assume that each argument is case-marked twice.

I will pursue the idea that each argument is case-marked twice, because this seems to be dictated by the morphology of the language. As I pointed out above (chapter 3.6.1.), the theoretical challenge imposed by the morphology of agreement verbs is precisely the fact that the arguments are ‘double-marked’, and therefore an analysis which ignores this fact would fail to account for and explain the data¹⁷.

The problem of the ‘double-marking’ in agreement verbs is further complicated by the fact that in a sense, these two types of marking are in contrast with each other. This contrast is most salient in the case of the subject NP: the subject NP, being the external argument of TRANSFER, is not assigned case by the verb itself, since it is not governed by the verb. It is assigned nominative case in its SPEC TP/IP position. But at the same time, it is marked as the internal argument of PATH (as a source for regular agreement verbs and a goal for backwards verbs). In order to be case-marked by PATH, it needs to occupy a position governed by PATH. So, it needs to occupy a position both **governed** and **ungoverned** by the complex verb. This is clearly a paradoxical situation!

¹⁷ Instances of double case marking in spoken languages are very rare, but do occur. Blake (1994;110) reports of some Australian languages where a nominal may bear two case suffixes. In Walpiri for example, a nominal bearing a locative case suffix may also be marked with the Ergative case suffix, to indicate ‘that the agent is also within its scope’. (ibid., p.108). (the relevant example is ‘The man-(ERG) is carrying the meat camp-ALLATIVE-ERGATIVE’ (=to the camp), where the Ergative marking on the *camp* indicates that the agent (along with the patient) is moving to that destination). Blake points out (following Anderson 1982;598) that in cases of multiple cases ‘we could suggest that each layer of multiple case be assigned to a different layer of word structure’ (Blake 1994;110).

To resolve this paradox, I propose that the two marking devices take place at different stages in the derivation (following a suggestion made by Blake 1994:110, to account for double-case marking in Walpiri. See quotation in fn.17). First, PATH is inflected. The agreement affixes, which are co-indexed with the arguments, are attached to PATH. Each agreement marker is associated with a particular affix slot, depending on the thematic role of the argument: the source argument is attached to the prefixal slot, and the goal is attached the suffixal slot. The affixes consist only of location specifications, which are the phonological realization of the pronominal features. These specifications are variables or open positions, to be filled in by discourse grammar considerations, associating the variables with R-loci of the participants in the discourse, as was pointed out in chapter 2.1.3. The actual phonetic form, then, is not specified in the lexicon, but rather is determined in the discourse. But the specific co-indexation between the phonology and the syntax is already present in the lexicon. The inflected form of PATH is shown in (23). It is explicitly marked for the referential features of its source and goal arguments (represented by the indices), and for the case distinction between them (expressed by the linear order of the affixes).

$$23. \quad \text{PATH} \langle \underline{1} \quad 2_i \quad 3_j \rangle \Rightarrow \quad [\]_i \text{PATH} [\]_j$$

theme, source , goal

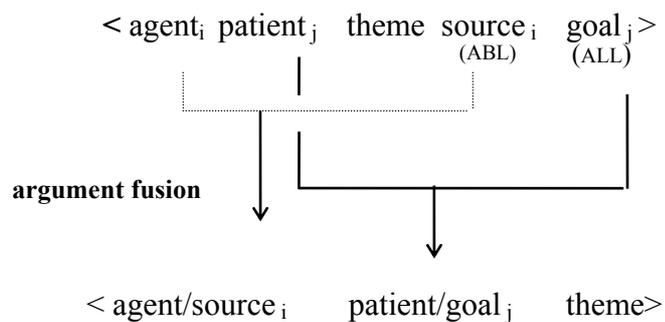
PATH+the agreement affixes then merge with TRANSFER. In other words, when the merger takes place, PATH is already inflected: its end points are already co-indexed

with argument positions, and therefore these positions are already marked as source and goal of PATH when they merge with the argument structure of TRANSFER.

Merger then proceeds along the lines sketched above: the *event* argument of TRANSFER is replaced by the argument structure of the embedded predicate PATH. Thus the merged structure contains five arguments - two pairs of co-indexed arguments, and the theme argument. The co-indexation of the arguments triggers the process of argument fusion discussed above. As for the case grid of the complex verb, it consists only of the cases of TRANSFER, since the cases of PATH are already assigned once the merger takes place. This is represented in (24) and (25):

24. Merger of PATH and TRANSFER:

TRANSFER < agent_i patient_j e (PATH SC)> } ⇒ TRANSFER+ []_i PATH []_j
 []_i PATH []_j < theme, source []_i goal []_j> } ↓



25. The argument structure of the resulting complex verb:

TRANSFER+ []_i PATH []_j : < 1_i 2_j 3 >
 | | |
 theta grid < agent/source_i patient/goal_j theme >

case grid

DAT.

ACC.

This complex verb is then projected into the syntax as a di-transitive verb, in its inflected form. The cases of PATH are no longer visible to the syntax, since they were assigned before merger took place¹⁸. The arguments are now case-marked by the complex verb, which can assign a dative case (as an inherent case), and an accusative case (as a structural case). The *j* argument is the internal argument of both PATH and of TRANSFER and is theta-marked by both predicates. Therefore, it is assigned dative (inherent) case. The theme argument, which is not theta-marked by either predicate, gets structural accusative case. The *i* argument, being the external argument of the complex verb, is projected into a syntactic position external to the V', and then moves to a position where it receives/checks nominative case.

From a morphological point of view, the merger of PATH and TRANSFER is a process of affixation. The affix TRANSFER is the head of the construction, as is assumed of affixes in various morphological theories, e.g., Lieber (1980), Williams (1981), hence its properties are those which percolate to the maximal projection of the construction. In our case, these properties are the case grid of the complex verb (which is the case grid of TRANSFER), and the selectional restrictions imposed on the arguments: the nominative and the dative arguments are possessors, and therefore tend to be animate. Note that these selectional restrictions are not imposed by PATH:

¹⁸ The intuitive idea behind this analysis is that the source-goal marking on PATH is a word formation process which, after being completed, is no longer available to the syntax. This is quite similar to other morphological processes, e.g., category changing processes: if a verbal root is attached to a nominal affix, then the resulting word is a noun, and is projected as such into the syntax; its verb properties are no longer available for the syntax.

Another example is plural inside compounds: when a plural N is compounded with another N, its plurality is no longer available to the syntax. That is to say, the number features of the compound NP are not related to the plurality of the modifying N inside the compound.

the source and goal arguments of PATH need not be animate. They can be locations as well. The somewhat unusual nature of this morphological process is that the affix TRANSFER is attached to an already inflected root. Generally it is assumed that inflectional processes follow derivational processes. There are however some counter examples to this (e.g., adjectival passives, and plural NP's inside compounds, which occurs regularly in Hebrew: *beit xolim* ('sick people house', hospital), *gan yeladim* ('children nursery', nursery school))¹⁹. The idea that agreement inflection is 'deeper' than other morphological processes is further supported by Sandler (1990), who argues that agreement inflection is deeper than aspectual modulation of the verbs²⁰.

To summarize, then, the merger of PATH and TRANSFER takes the following steps:

1. **PATH is inflected:** The agreement marking affixes are attached to PATH, and are co-indexed with the arguments of PATH.
2. **The inflected form of PATH is merged with TRANSFER:** Lexically, it is a process of argument structure merger: the Event argument of TRANSFER is replaced by the argument structure of PATH. Morphologically, it is a process of affixation, where an affix TRANSFER is attached to an inflected root. The properties of the affix percolate to the maximal projection of the construction.
3. **Argument fusion:** The resulting structure then undergoes a process of argument fusion, whereby theta positions linked to identical referents are fused to one argument position. The complex verb then has three arguments (one external argument and two internal arguments) and two cases to assign: one inherent case (dative) and one structural case (accusative).

¹⁹ For additional examples of inflectional processes which feed derivational ones – see Booij (1993).

²⁰ Aspectual modulation are also considered inflectional rather than derivational, but Sandler's analysis supports the idea that agreement processes precede other morphological processes.

In this subsection I suggested that the merger of PATH and TRANSFER is a lexical process of argument structure merger, following Rosen (1989a). That is, this merger takes place at the level of PAS. However, there are other possible approaches to the merger process. Other researchers have suggested different analyses to account for the formation of causative or di-transitive verbs. For example, it had been suggested that a syntactic head-movement analysis can best account for the properties of causative verbs (Baker 1988) or di-transitive verbs (Larson 1988, Hale and Keyser 1900). An incorporation process at the level of PF has been assumed by Bittner and Hale (1996) in their analysis of unergative verbs in Georgian. In the following subsections, I examine these two possibilities with respect to the PATH-TRANSFER merger: that this merger takes place at the level of D-str, or at the level of PF. I will argue that these possibilities are more problematic theoretically than the analysis suggested above.

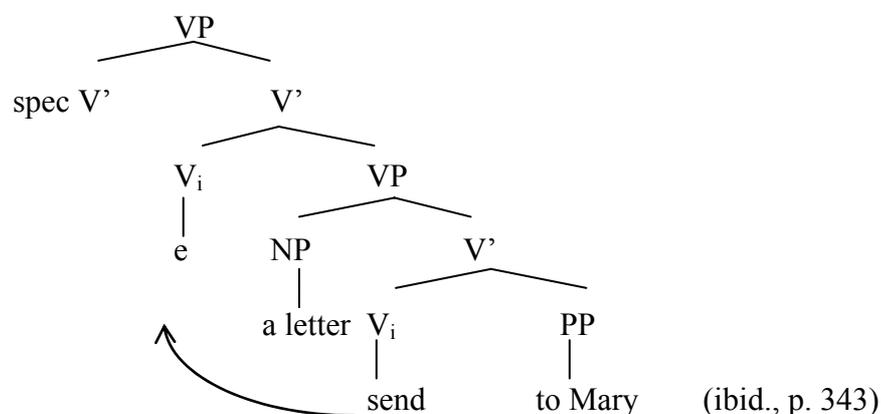
4.3.2 A Syntactic Movement Analysis (Larson 1988)

Larson (1988) proposes an analysis of the double object construction, the basic claims of which are the following: (a). The ‘dative’ object is closer to the verb than the ‘accusative’ object; therefore, the dative object is a sister of the verb, whereas the accusative object is a sister of the V’. (b). The D-str of di-transitive verbs contains two V nodes, the higher of which takes the lower one as its complement.

The main motivation for (a) is that thematically the dative object seems to form a constituent with the V to the exclusion of the accusative object, in that the choice of

the dative object might determine the thematic interpretation of the accusative object but not vice versa²¹. Furthermore, binding facts point out that the accusative object is hierarchically more prominent than the dative object²². Thus, the constituent which contains both objects is a VP, whose SPEC position is occupied by the accusative object, and the complement position - by the dative object. This VP is the complement of an empty V node, the subject of which is the external argument of *give*. The surface word order is arrived at by a movement of the lower V into the empty V node (head movement).

26.



This analysis is compatible with the analysis I suggest for agreement verbs in the following respects:

²¹ This is exemplified by e.g., the following idiom chunks:

(i) Mary took Felix to the cleaners\ to task\ into consideration . (Larson 1988,340)

In (i) , the choice of the dative object determines the thematic role assigned to the accusative object *Felix*. As Larson points out, this line of argumentation is parallel to the one given in Marantz (1984) to support the claim that it is the VP (rather than the V alone) that assigns theta role to the subject.

²² For a different view and analysis of the binding facts see Jackendoff (1990b).

1. Both analyses contain two V (predicate) nodes: Larson's structure has two V nodes in it, and my analysis assumes that agreement verbs contain two predicates - PATH and TRANSFER.
2. In Larson's analysis, the goal-argument is a sister of its predicate, whereas the theme argument occupies a higher (SPEC XP) position. This is similar to the PAS representation of PATH (suggested in section 4.2.), where the goal nominal is an internal argument, while the theme argument is the external argument of PATH.

There are, however, also important differences:

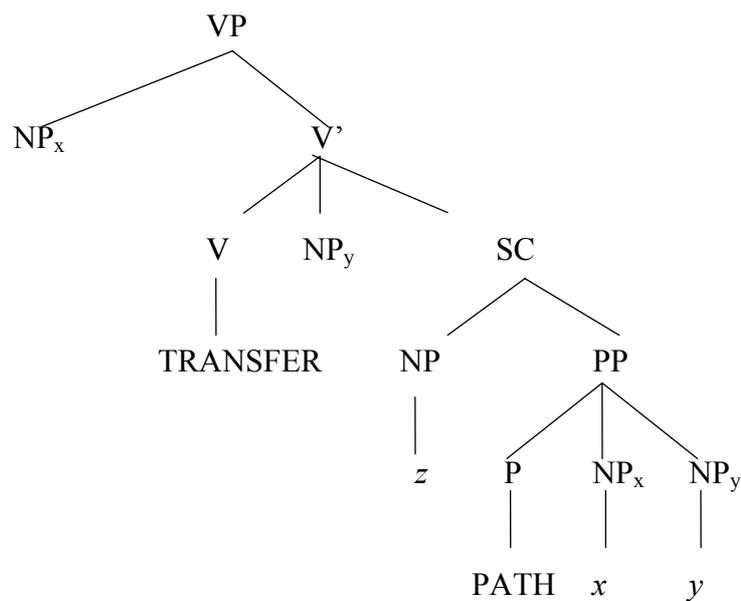
1. In the structure of agreement verbs, both predicate nodes are lexically filled (by TRANSFER and PATH), whereas in Larson's analysis only one V node is lexically filled.
2. The lower predicate in Larson's analysis takes only one complement. However, in the analysis of agreement verbs, the lower predicate (PATH) takes two internal arguments (source and goal). Positing two internal arguments for PATH is forced by the morphology of ISL, since both source and goal are morphologically marked; whereas in English only one argument is marked as source/goal (by the choice of preposition - *from* or *to* respectively). The subject argument is not marked as to its spatial thematic role²³.
3. There is co-indexation of the arguments of TRANSFER and the internal arguments of PATH; i.e., TRANSFER and PATH share arguments, unlike the structure

²³ It is important to notice that semantically, English di-transitive verbs take both a source and a goal argument (as is the case for ISL). But this fact is not represented in the syntax: the argument which is linked to the subject position in the syntax is not marked by a morphological case or a preposition which indicates its spatial thematic role. In other words, it seems that one of the positions of the arguments of *path* in the LCS of di-transitive verbs in English is not linked with a syntactic position; hence the lower V in Larson's analysis takes only one complement, whereas in ISL it takes two complements.

Larson proposes, where the external argument is not even represented, since it does not play any role in the internal structure of the VP.

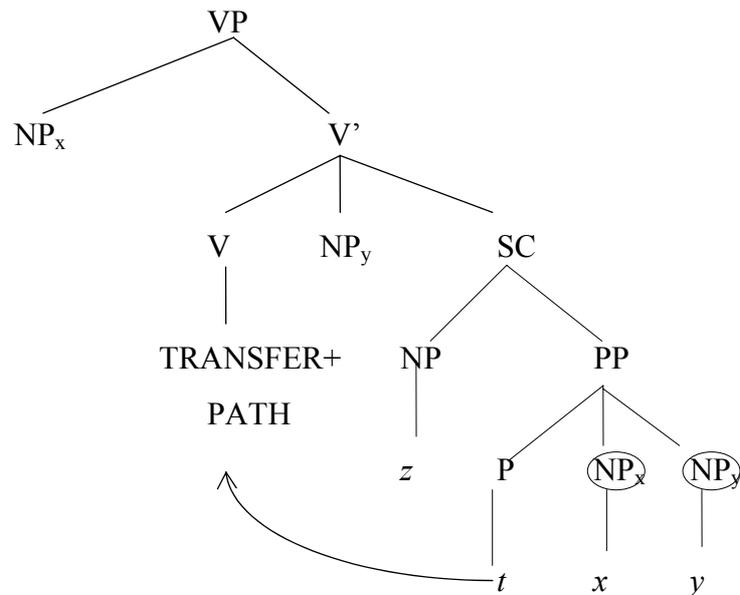
In spite of these differences, let us try to apply Larson's analysis to agreement verbs. Under such an analysis, PATH and its arguments are projected into the syntax as a small clause (SC) which is the complement of TRANSFER. The D-str of agreement verbs would then be as follows:

27.



Following Larson's analysis for di-transitive verbs, the merger of PATH with TRANSFER is treated as a result of a syntactic movement: the P node rises and adjoins to the V node, leaving a *t*. The complex verb governs the *t*, as well as the arguments of PATH.

28.



The problem with this analysis is - how to represent the sharing of the arguments by the two predicates. The mechanism of argument fusion is no longer available, since this mechanism is operative at the level of PAS, not in the syntax. The regular mechanism of dealing with shared arguments in the syntax is control: the embedded position of the shared argument is occupied by PRO, and controlled by an NP of the matrix predicate. This mechanism, however, is not applicable in our case here. Within the GB framework, the embedded positions of the shared arguments (the circled positions in the tree) cannot be occupied by PRO, since they are governed by the P node. This contradicts the PRO theorem, which states that PRO has to be ungoverned. The Minimalism framework will not be of help either, because although the notion of government is not used in this theory, PRO is nevertheless associated with a non-

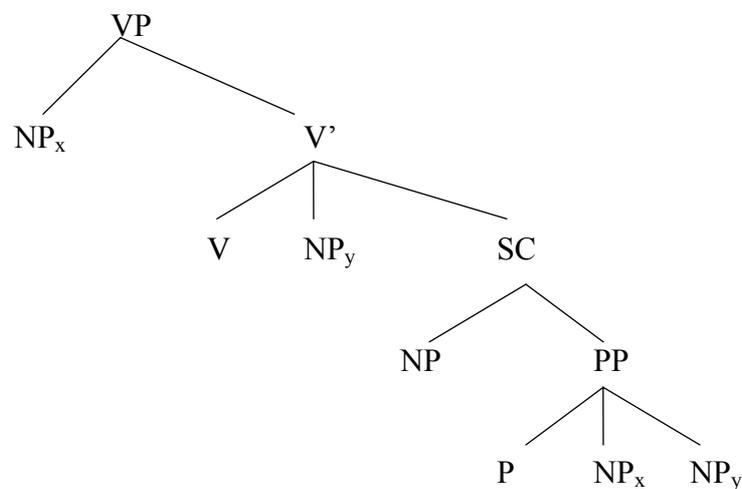
finite T node, in order to ensure that its distribution is limited to the spec TP position of non-finite clauses (Chomsky and Lasnik 1993) This is clearly not the relevant configuration in our case, and therefore PRO is excluded from these positions.

Hence, the property of argument sharing of the two verbs renders a syntactic movement analysis more problematic from a theoretical point of view than the argument structure merger analysis suggested above.

4.3.3 A Phonological Merger

Another possibility is to assume that the merger of the two predicates is a PF phenomenon. That is, syntactically each predicate is distinct, and each marks its arguments independently: PATH theta-marks and case-marks its arguments as source and goal (assigning them the appropriate oblique cases), while TRANSFER assigns dative case to its internal argument. However, the two predicates are articulated as one phonological unit. The syntactic configuration would have the following form:

29.



The phonological merger can be motivated on the following grounds: (i). TRANSFER (or its case grid) is phonologically an affix, since it has phonological specifications for facing only. Therefore it has to attach to another root. (ii). Both predicates share the same arguments. Since these arguments supply the phonological specifications for location, it follows that both predicates have the same location specifications. This fact, together with the fact that TRANSFER is necessarily a bound morpheme, may account for the fact that both predicates combine into one phonological unit.

There are however, some problems. First, as in the case of the syntactic movement analysis, the mechanism of argument fusion is unclear. The co-indexation of the arguments by itself does not suffice to guarantee that the co-indexed arguments surface as one argument at the level of PF (rather than two co-indexed, co-referential arguments, as in the case of a reflexive pronoun, for example). We already saw that a control structure here cannot be assumed. Thus it seems that a special mechanism would have to be stipulated if we adhere to a PF merger analysis. In the case of PAS merger, on the other hand, such a mechanism is necessary to account for phenomena other than the PATH-TRANSFER merger.

Second, a PF merger analysis would fail to explain why the argument structure of PATH is not visible in the syntax: since both arguments appear independently in the syntax, it should be expected that both argument structures would be reflected in the syntactic behavior of the complex verb (e.g., that the external argument of PATH will exhibit subject properties). This, however, does not occur: the relationship of the

arguments to PATH has no reflection in their syntactic behavior, only in the morphology of the complex verb.

Third, and more important, such an analysis seems to go counter to our intuitions that both predicates represent only one, unified event. For example, this analysis allows for a state of affairs where each predicate can be independently modified by an adverbial, or that an adverbial would have scope only over one predicate. For example, we would expect an adverbial such as *almost* to take scope only over PATH, or only over TRANSFER. Thus, the sentence ‘I almost gave him the book’ could have the meaning either of ‘I transferred to him, and the book **almost** went from me to him’, or ‘I **almost** transferred to him, and the book went from me to him’. Both of these possibilities are impossible: TRANSFER+PATH can be modified only as a unified predicate. There is no way that one predicate can be modified to the exclusion of the other. And it is not clear how to rule out such a possibility in an analysis which regards each predicate as syntactically independent of the other²⁴.

Summary: In this section I have addressed the following question: at what level of representation does the PATH+TRANSFER merger take place? Three possibilities were examined: an argument structure merger, a syntactic movement analysis, and a PF merger. I have argued that a PAS merger analysis can account for both the morphological and the syntactic behavior of agreement verbs. The two other possibilities, on the other hand, face some problems: the argument sharing of the two predicates cannot be accounted for straightforwardly under both possibilities. The PF

²⁴ This line of argumentation was used to argue against the analysis proposed by some generative semanticists for deriving lexical causative such *kill* from ‘*cause to die*’ (e.g., Fodor 1970).

merger analysis furthermore cannot capture the fact that both predicates represent one, unified event. Hence the PAS merger analysis is to be preferred.

4.4 The Advantages of the Analysis

Let us return now to the problems which this analysis is intended to explain. These problems are:

- Assuming that the agreement patterns of agreement verb is determined by thematic notions - how can linguistic theory account for thematic agreement?
- Can we predict the agreement pattern of each verb in the language? That is, can we predict which verbs will be agreement verbs, plain verbs or spatial verbs?

4.4.1 Explaining Thematic Agreement

The problem posed by thematic agreement entails the following conflict: do we need to develop a special machinery to deal with the existence of thematic agreement in ISL, or can we account for the ISL facts by existing theories of agreement? This analysis shows that the second option is possible, and is to be preferred. The answer to this challenge is that the morphological marking of agreement is not a property of verbs in ISL, but rather of predicates denoting spatial relations. Spatial predicates in ISL agree with their internal arguments, in that their location specifications are determined by the phi-features (the R-loci) of their arguments, as I argued in section 4.2.1. Verbs, on the other hand, are not inherently marked for agreement. The agreement features of agreement verbs are actually ‘inherited’ from a specific spatial predicate - PATH, which is part of their lexical structure.

By assuming that agreement is a property of PATH and not of the verbs themselves, the agreement relations need not be stated in thematic terms anymore. PATH takes two internal arguments, with which it agrees. Thus, agreement is a relation which obtains between a head and its arguments, and therefore can be stated in purely configurational terms. The thematic ‘flavor’ of agreement in ISL is due to the close relationship between the oblique cases which PATH assigns to its arguments, the agreement slots these arguments are associated with, and the thematic roles they bear. PATH assigns ablative and allative cases to its complements. These cases are invariably linked to the thematic roles of source and goal, respectively. The association of these arguments to the two available agreement slots expresses the case distinction between these arguments: the source argument is linked to the prefixal slot, and the goal argument to the suffixal slot. Therefore, each agreement slot is always associated with a specific spatial thematic role. But this is the result of the close semantic relationship which holds between oblique cases and thematic roles. The agreement relation is stated in configurational terms as a head-complements relation. The thematic structure of the head determines that the complements, with which it agrees, are assigned the source and goal thematic roles. Agreement per se, however, need not be stated in thematic terms.

This analysis, in addition to explaining the ‘thematic flavor’ of verb agreement in ISL, has another direct advantageous consequence: it can explain straightforwardly the existence of plain verbs in the language. Since verb agreement morphology is usually characteristic of all or none of the verbs in a language, a situation where only a sub-set of the verbs in a language is morphologically inflected for agreement calls for an explanation. By assuming, however, that in ISL overt agreement inflection is a

property of spatial predicates (PATH in our case) rather than of verbs, the existence of plain verbs finds a natural explanation: only verbs which select for a PATH predicate show overt agreement morphology, since only these verbs contain an element which is morphologically capable of being inflected for agreement. Other verbs, which do not subcategorize for PATH, lack the morphological ability to mark agreement overtly²⁵.

4.4.2 Predicting the Agreement Patterns of ISL Verbs

Let us turn now to the second problem - that of predicting the agreement patterns of verbs in ISL. As I pointed out above, previous analyses could not give an accurate prediction as to the agreement pattern each verb takes. Some tendencies were pointed out, e.g., that agreement verbs cannot be intransitive, or that body-anchored verbs do not agree. These criteria were based on semantic/syntactic factors on the one hand (such as the transitivity of a verb), and on phonological factors on the other hand. Janis's (1992) analysis, which gives more rigorous criteria for predicting the agreement patterns of verbs, is based mainly on semantic features, but admits that phonological factors are also involved.

I agree with the basic intuition that there are both semantic/thematic factors and phonological factors involved in determining the agreement pattern of the verbs in the language. I claim, though, that the analysis I suggest here makes it possible to define these factors more accurately, and to state explicitly how these factors interact with

²⁵ In other words, the agreement features can be said to be present with all verb classes in the language, but may be morphologically realized only in the classes of verbs which select a spatial predicate, since

each other and with the morphology of the language in order to account for the various agreement patterns of the verbs in the language. The basic claim I make is: **the agreement pattern of a verb is determined by its thematic/semantic structure**. But certain phonological factors (which will be discussed in chapter 5) may impose restrictions on verbs which should have turned out to be agreement verbs according to their semantic structure, thus preventing them from agreeing.

What then, is the relationship between the semantic/thematic structure and the morphology in ISL verbs? Let us first repeat the morphological properties characterizing the agreement patterns of each of the verb classes in ISL. These properties are: **directionality** - the direction of the path movement of the verb is determined by the loci of the source and goal arguments (this was analyzed here as agreement of the PATH predicate with its arguments); and **reversibility** - the facing of the hands is determined by the locus of the object (which was analyzed here as a dative case marker of TRANSFER). Hence, the different agreement patterns in ISL can be represented in terms of two features [+/- directionality] and [+/- reversibility]. It should be pointed out that these features do not have any theoretical status. They are used here only in order to make the presentation clearer.

30.

Agreement verbs are [+directional] and [+reversible].

Spatial verbs are [+directional] and [-reversible].

Plain verbs are [-directional] and [-reversible].

the verb itself lacks the morphological capability of inflecting for agreement. I thank Mark Aronoff for pointing it out to me.

According to my analysis, the positive values of these two features are the overt manifestation of two predicates - TRANSFER and PATH. Whether or not a verb contains these predicates - is dictated by the semantics of the verb. Let us consider agreement verbs first: agreement verbs are verbs denoting an event of transfer. Such an event consists of two semantic notions - **motion** of the theme from one possessor to the other, and causing or instigating the **transfer**. These two semantic elements are directly represented in the lexical structure of these verbs, by the predicates PATH and TRANSFER, respectively. Each of these predicates determines one of the morphological characteristics of agreement verbs: the directionality of agreement verbs is the morphological manifestation of the agreement of PATH with its arguments, and their reversibility is the morphological manifestation of the case-grid of TRANSFER. Hence, verbs denoting transfer are [+directional] and [+reversible]. This is summarized in (31):

31. The semantics and morphology of agreement verbs:

semantics	event of transfer	
	⇓	
LCS	TRANSFER	PATH
	⇓	⇓
morphology	[+reversible]	[+directional]

Since the morphological features of reversibility and directionality are directly related to and determined by the predicates TRANSFER and PATH, my analysis predicts that if neither predicate is part of the lexical structure of a verb, that verb will not exhibit the morphological properties associated with the predicate in question. Hence, verbs which do not denote an event of transfer (and therefore have neither a PATH nor a TRANSFER morpheme in their lexical representations), would be neither directional nor reversible. These verbs constitute the class of ‘plain verbs’ in the language, as is represented in (32):

32. The semantics and morphology of plain verbs:

semantics **not** denoting an event of transfer or directed motion



LCS

morphology [-reversible] [-directional]

A third class consists of verbs which denote motion but not transfer, and therefore have a PATH predicate but not a TRANSFER predicate. These verbs are directional (they inflect for source-goal agreement) but not reversible (the facing is not operative). These are the ‘spatial verbs’, represented in (33):

33. The semantics and morphology of spatial verbs:

semantics	event of directed motion
	↓
LCS	PATH
	↓
morphology	[+directional]

Thus, by assuming the existence of these two predicates, it is possible to show explicitly how the lexical structure determines the morphology of the verbs in the language: the morphological properties of the various agreement patterns in the language are analyzed as the phonological and morphological realizations of two predicates, which appear in the LCS of some, but not all, verbs in the language, depending on the semantics of each verb.

Sometimes, though, it is not so easy to determine the lexical structure of a certain verb. Take, for example, the English verb *say*: does it denote just the creation of an utterance, or the **transfer** of this utterance to an addressee? If the former, then my analysis predicts that the equivalent verb in ISL is a plain verb. If the latter, then such a verb is predicted to be an agreement verb. The predictions the theory makes depend

on the lexical analysis of the verbs in question. However, determining the lexical structure of a certain verb solely by relying on our intuitions about its meaning is problematic. Hence, it seems that some more guidelines for detecting the notions of ‘transfer’ and ‘path’ are called for. Such guidelines are described in the following sub-sections.

4.4.2.1 Properties of Verbs of Transfer

One characteristic of verbs of transfer is that they select more than one argument, since the theme is transferred from one nominal to the other. Therefore, one place predicates cannot denote transfer.

A second characteristic of verbs of transfer is that their subject and dative object are typically human/animate, or can be conceived as such. This follows from the fact that these arguments are possible possessors, and therefore have the properties of a possessor, e.g., most likely human/animate. Hence a verb which does not typically impose ‘possessorhood’ or animacy restrictions on its subject and object is not a verb of transfer²⁶.

A third property is that the meaning of verbs of transfer implies also motion. This follows from the fact that the notion of transfer entails the motion of an entity from one possessor to another.

²⁶ Sometimes an inanimate NP can be a possessor, e.g., *authorities*, *the state* etc. These NP’s denote groups or organizations of people, and therefore can be construed as possessors. What is important to

Thus the three basic properties which are used here as diagnostic for an event of transfer are: (1) The number of arguments the predicate take: a transfer predicate takes more than one argument. (2) The selectional restrictions imposed on these arguments: the arguments of a transfer event have to be construed as possible possessors. (3) An event of transfer entails the motion of an entity from one possessor to another. With these guidelines, let us take a look at various groups of verbs and try to account for their agreement pattern. A comprehensive list of ISL verbs and their agreement patterns is given in appendices A and B.

First, as was pointed out above, intransitive verbs do not denote transfer, since a transfer event involves more than one argument. Thus, all intransitive verbs are predicted to be plain verbs. This prediction is borne out.

34. intransitive verbs:

CRY

RUN

FALL

SLEEP

HAVE-FUN

STAND-UP

LAUGH

YELL

Other verbs which are predicted not to agree are transitive verbs which take an abstract nominal or a sentential complement as their internal arguments. Such arguments cannot possibly be construed as possessors, and hence verbs selecting such

us here is that the object of verbs of transfer has to be a potential possessor, and therefore more likely to be animate.

complements cannot denote a transfer event. This prediction is borne out. The verbs in (35) and (36) are plain verbs:

35. Verbs selecting abstract objects:

ASK-FOR (a favor)

ACCEPT (an invitation, an idea)

CHECK (a suggestion, a theory)

PROVE (a theory)

REFUSE (an invitation, offer)

UNDERSTAND (a problem, an answer)

36. Verbs selecting sentential complements:

DECIDE

VOLUNTEER

MAKE AN EFFORT

WHISPER

PROMISE

WONDER

SHOUT

SUGGEST

Also, verbs which do not impose animacy restrictions on their NP complement are not verbs of transfer. Again, this follows from the selectional restrictions that verbs of transfer impose on their internal argument, namely, that it has to be a possible possessor:

37. Verbs which do not impose animacy restrictions on their objects:

ADD

INTERRUPT

BREAK

LOOK- FOR

DELAY	ORDER (an item from the store)
FIND	USE
FORGET	WANT

Some of these verbs may take an animate\human object (e.g., LOOK-FOR, FIND) as well. This is to be expected: if a verb does not impose animacy restrictions on its object, it may co-occur with animate as well as inanimate complements. However, the fact that these verbs do not impose animacy or ‘possessorhood’ restrictions on their arguments is taken here as a diagnostic for their lexical structure. Since verbs of transfer necessarily impose semantic restrictions on their arguments, verbs which fail to do so cannot be construed as verbs of transfer. It is important to emphasize that it is not the properties of the object which determine the agreement pattern; rather, the properties of the object and the verb’s agreement pattern are both an outcome of the verb’s semantic\thematic structure.

The most problematic case is that of psych verbs: psych verbs are in many cases transitive, and at least one of the arguments (the experiencer) is animate\human. Psych verbs cross-linguistically appear in two types of patterns (see e.g., Belletti and Rizzi 1988, Pesetsky 1990): the ‘*fear*’ type, where the experiencer argument is the syntactic subject, and the theme nominal is the syntactic object, as in ‘*I fear him*’; and the ‘*frighten*’ type, where the experiencer is the syntactic object and the theme is the syntactic subject, as in ‘*He frightens me*’²⁷. Psych verbs pose interesting problems and challenges to linguistic theory, some of which will be mentioned in chapter 6, in the discussion of the ‘*frighten*’-type construction in ISL. For the present chapter,

however, we will restrict ourselves to the ‘*fear*’-type construction and the agreement pattern it exhibits²⁸.

‘*Fear*’-type psych verbs (e.g., ENJOY, BE-WORRIED, ENVY, HATE, LIKE, BE-FRUSTERATED, BE-ANGRY) can be transitive²⁹. Furthermore, the experiencer argument, which surfaces as the syntactic subject, is sentient, and is therefore animate/human. Thus, psych verbs share two of the properties characterizing verbs of transfer: they have more than one argument, and they impose animacy restrictions on their experiencer argument (though not on their theme argument). However, almost all psych verbs are plain verbs. Evidently, then, either the predictions are wrong, or psych verbs are not verbs of transfer, despite several points of similarities between the two classes. Since most psych verbs are body anchored, it might be argued that they do not agree because of phonological factors (which will be specified in chapter 5). But one notorious problematic case is the verb LIKE (both ISL and ASL): this verb is marked for initial contact only, therefore there is no phonological reason why it could not agree (with the goal NP). According to the analysis I suggest here, however, LIKE does not qualify as an agreement verb because it does not denote the motion of an entity from one point to another, but rather the existence of a mental image or a mental state in the mind of the experiencer (see Jackendoff 1990a:262). Since a transfer event necessarily implies motion, LIKE cannot denote transfer. Therefore, its

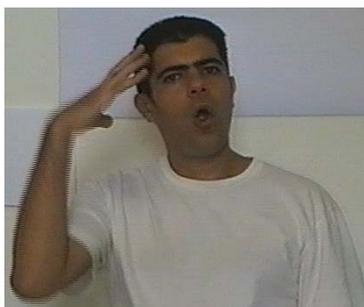
²⁷ In Italian and various other languages there is a third variant, where the theme is in subject position, and the experiencer surfaces as an indirect or prepositional object (see Belletti and Rizzi 1988).

²⁸ ‘Frighten’-type psych verbs are not directly relevant for the discussion of the agreement morphology in ISL since they appear in a complex **syntactic** construction, namely - a light verb construction. Nonetheless, the semantic analysis of this class of psych verbs is related to the predications made here, since it involves causation. This topic will be dealt with in chapter 6.

²⁹ Many ‘*fear*’-type psych verbs can also show up as intransitive predicates (e.g., BE-AFRAID, BE-DISAPPOINTED, ENJOY (SATISFIED)), many of which are adjectives: HAPPY, SAD, AFRAID, SATISFIED, ENVIOUS.

LCS does not contain TRANSFER and PATH, and there is no source for the morphology of agreement verbs.

Generalizing the analysis of LIKE, the prediction here is that psych-verbs of the ‘fear’-type, where the experiencer argument surfaces as the syntactic subject, cannot agree, since they all denote the creation/existence of a mental state, rather than the transfer of an entity. This prediction is borne out in ISL. The only exception which I am aware of is the sign glossed as HATE; a possible explanation is put forward in chapter 6. Another interesting case is a verb glossed as SHOW-AFFECTION-TOWARDS. This verb, unlike verbs such as LIKE or LOVE, does involve an event of transfer; it denotes something like ‘transferring your emotions to another’. This semantic analysis is supported by the fact that this verb has a cognate adjective meaning ‘extrovert’³⁰. Therefore, this verb is an agreement verb, as is predicted by my analysis.



LIKE (initial)



LIKE (final)

³⁰ Thanks to Wendy Sandler for pointing it out to me.



${}_1$ SHOW-AFFECTION-TOWARDS $_2$ ${}_2$ SHOW-AFFECTION-TOWARDS $_1$

Figure 4.5: The plain verb LIKE, and the agreement verb SHOW-AFFECTION-TOWARDS.

This line of argumentation, however, could potentially be criticized as being circular in some cases: since the lexical structure of the verb is much less tangible than its morphological properties, there may be cases where we would analyze a verb as denoting transfer only because it has the morphological properties of agreement verbs; that is, we would determine the LCS of the verb on the basis of its morphology, and then explain the morphological pattern on the basis of the LCS, which was constructed on the basis of the morphology. This is a valid criticism: the morphology of a verb is much more accessible than its lexical decomposition. How, then, can we ensure that we take as our point of departure the semantic structure, rather than the morphology?

My answer to this is the following: the analysis of agreement verbs as verbs denoting transfer is based on many clear-cut cases, where the lexical decomposition of the verbs is straightforward. But after establishing the relationship between the semantics and the morphology of these verbs, and stating explicitly how the former determines the latter, it is possible to use this relationship in order to gain more insight into the exact lexical decomposition of some cases which are not so clear-cut. That is, the

morphology can help us arrive at a more precise lexical decomposition of certain verbs.

Let us take a specific example: e.g., the verbs glossed as SCREAM\SHOUT and SHOUT/YELL-AT. Though both verbs involve the emission of a loud vocal sound, the former is a plain verb, while the latter is an agreement verb. Why do they exhibit different agreement patterns? Here, the morphology may give us a clue as to the difference in meaning between these two verbs: YELL-AT involves transfer, that is - the shouting is directed at somebody, whereas SCREAM involves only the emission of a sound. This semantic difference is captured in the LCS representations of the two verbs:

38. YELL-AT:

LCS CAUSE_{poss} ([α], [GO_{Poss} ([SHOUT], [PATH [α] [β]])
AFF ([JOHN] ^{α} , [MARY] ^{β})

39. SCREAM:

LCS CAUSE([α], [GO ([SHOUT], [FROM [α 's mouth])
AFF ([JOHN] ^{α} ,)



SCREAM

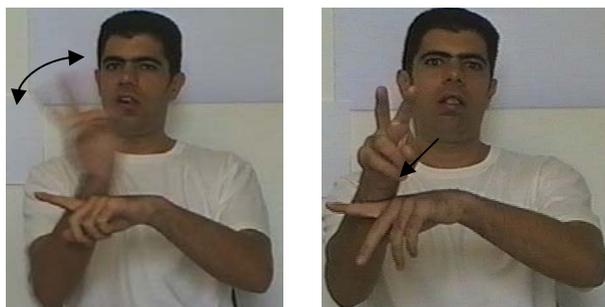
YELL-AT

Figure 4.6: The agreement verb YELL-AT vs. the plain verb SCREAM

This lexical decomposition is supported by syntactic facts in addition to the morphological differences between the two verbs: SCREAM is an intransitive verb, whereas YELL-AT is always transitive, and it imposes animacy restrictions on its object. Therefore, only SCREAM is appropriate in the following contexts:

40. a. He screamed and screamed (but nobody heard him).
 b. Don't shout (scream) so loud.

Another interesting minimal pair is LIE and LIE-TO (CHEAT): both verbs have the same HS and location specifications, but only the latter has a path movement and a change of facing. Again, the morphology gives us a clue as to the accurate lexical decomposition of these verbs: only LIE-TO involves the **transfer** of the lie to another person. And as in the case of YELL-AT and SCREAM above, this analysis is supported by the number of arguments of the verbs concerned, (LIE is intransitive, LIE-TO is transitive), and by the selectional restrictions on the complement (the object of LIE-TO is animate).

**Figure 4.7: LIE vs. LIE-TO**

Thus, after establishing the link between the thematic\semantic structure and the morphology, we can use the latter (morphology) to get at a more accurate analysis of the former. This is very important in the case of the analysis of verbs in sign languages in particular, since the common way of referring to signs is by glosses. As is very well known, this method is very problematic for various reasons. One reason is that we tend to refer to the properties of the gloss, that is, the translation of the sign into a spoken language, instead of referring to the properties of the sign. Thus we might arrive at incorrect conclusions because we are misled by the properties of the gloss rather than the sign itself. Take, for example, the agreement verb SHOW-AFFECTION-TOWARDS mentioned above. If this sign is glossed as LIKE, then it could constitute a counter example to our predications. Verbs such as LIKE were analyzed above as denoting the existence of a mental image, and not as transfer verbs, and therefore are not expected to agree. But if we take agreement morphology as an indicator for transfer, then we are forced to arrive at a much more accurate lexical analysis of that verb. In this way the morphology can be used as a tool for lexical analysis of the verbs in the language.

This situation is somewhat reminiscent of causative verbs in languages which mark causation morphologically. In such languages, the causative morpheme is licensed in the syntax by a CAUSE function in the semantic structure of the verb. But after identifying a particular morpheme as causative, this morpheme can serve as an indicator for causation in the semantics of the verb. ISL differs from spoken languages in that it marks morphologically not causation, but rather a specific type of causation: an event of transfer. Yet the relationship between morphology and

semantics is quite similar to those found in languages where semantic primitives are represented overtly in the morphology.

To summarize, the main point here is that the agreement pattern of a verb is determined primarily by semantic\thematic factors. The agreement pattern of agreement verbs is a morphological manifestation of the two semantic functions TRANSFER and PATH. Therefore it is predicted that only verbs denoting transfer will be both directional, because of PATH, and reversible because of TRANSFER.

There are, however, phonological factors involved as well: there are verbs which are directional but not reversible (e.g., SHOW), reversible but not directional (e.g., LOOK (with admiration)-AT, BLAME), mark agreement with only one argument (e.g., ASK), or do not agree at all (though they do denote transfer, e.g., BUY, STEAL). I claim that these variations are the result of phonological clashes between the morphemes of which agreement verbs are comprised. These phonological clashes will be described and analyzed in chapter 5, where it will be shown that a full phonological account is possible only within the framework of an analysis which distinguishes between a PATH morpheme and a TRANSFER morpheme.

So far, I have shown that the componential analysis of verbs suggested here explains the morphological properties of agreement verbs on the one hand, and the existence of plain verbs on the other hand. It also correctly predicts whether a verb will turn out to be a plain verb or an agreement verb. Yet agreement verbs are not the only verbs in the language which inflect for agreement; spatial verbs agree as well, though they display different morphological properties. I turn now to examine how the suggested

analysis can account for the differences as well as similarities between spatial and agreement verbs.

4.4.2.2 Agreement Marking in Spatial Verbs vs. Agreement Verbs

Agreement verbs contain a PATH morpheme, since TRANSFER selects a PATH event argument as its internal argument. But agreement verbs are not the only verbs which contain the PATH morpheme: predicates which denote directed motion contain this morpheme as well (see examples in section 4.2.1.). That is, verbs that have been referred to as ‘spatial verbs’ also contain a PATH morpheme, and therefore should be expected to inflect for source-goal agreement as well. This expectation is borne out: the path movement of spatial verbs is also determined by the R-loci of the source and goal arguments. In that respect, agreement verbs and spatial verbs share the same agreement pattern. But there are also well-known differences between the two classes of verbs. In what follows I summarize these differences, and show how the analysis suggested here can account for at least some of the differences as well as similarities between the two classes of verbs.

The differences between spatial verbs and agreement verbs:

1. The two classes of verbs differ from each other in their use of space: in agreement verbs loci are perceived discretely, while in spatial verbs they are perceived continuously. (See chapter 2.2.1.2. for a detailed discussion of the difference in the use of space between these two classes of verbs).

2. In agreement verbs the source-goal arguments are the syntactic subject-object, while with spatial verbs the source-goal are syntactic obliques (i.e., the subject-object nominals do not correspond to the source-goal).
3. Spatial verbs are non-reversible; that is, the facing of the hands (palms or fingers) is not determined by the R-locus of the complement. Facing is not operative in the argument marking process of spatial verbs.

Let us examine how these properties can be accounted for within the framework developed in this chapter. First, both classes of verbs exhibit source-goal agreement, since both classes denote motion from one point to another. Directed motion is expressed in ISL by **PATH**, which agrees with its source and goal arguments. Both spatial and agreement verbs contain a **PATH** morpheme and inherit its agreement properties, as is illustrated in (41):

41.

- a. BOOK INDEX_a I ₁GIVE₃ ‘I gave him the book’

LCS- ([α], TRANSFER [GO_{POSS} ([BOOK]^γ, [**PATH** [α] [β]])])

AFF ([I] ^{α} , [HE] ^{β})

- b. BOOK INDEX_a I _ACL:C_B ‘I moved the book from A to B’

LCS- ([α], [GO ([α], [**PATH** [A] [B]])])

AFF ([I] ^{α} , [BOOK])

- c. CAR INDEX_a _ACL:B_B ‘The car went from A to B’.

LCS- (GO ([CAR], [PATH [A] [B]]))

The difference in the mapping of the source and goal arguments into the syntax follows directly from the LCS's of the two classes of verbs: in agreement verbs, the argument positions on the action tier bind the arguments of PATH on the spatial tier. This binding triggers the process of argument fusion at the level of PAS (described in section 4.3.1. above), which results in an argument structure where the source and goal arguments are also the external and internal arguments of the complex verb. In spatial verbs, no binding exists between the arguments of the matrix verb and the arguments of PATH: either PATH is the main predicate (as in 41.c), or the main verb is CAUSE-(TO-MOVE) (as in 41.b.). In both cases the internal arguments of PATH are not bound by any other argument position on the action tier, and therefore they are mapped into the syntax as the internal arguments of PATH.

The fact that in spatial verbs the facing is non-operative is also accounted for straightforwardly: under the analysis suggested here, the facing is the morphological manifestation of the case properties of TRANSFER. Spatial verbs, as opposed to agreement verbs, do not denote an event of transfer, and therefore do not contain a TRANSFER predicate. Hence there is no source for a change of facing in the morphological form of spatial verbs. It should be pointed out that this explanation can be arrived at only within an analysis which draws a distinction between the direction of the path movement and the facing of the hands as two distinct, independent mechanisms. If these two mechanisms are regarded as fulfilling the same function in

the language, then the fact the agreement verbs may exploit both mechanisms, whereas spatial verbs exploit one - remains a mystery³¹.

Nonetheless, the differences and similarities between the LCS representations of the two classes of verbs cannot account for their different use of space. As was pointed out in chapter 2.1.4., this is part of a much broader distinction in the language, namely the distinction between a locative and a non-locative use of space. This distinction cuts through the entire referential system of ISL. The agreement system, being part of the referential system, displays this distinction as well. I suggested in 2.1.4.2. that a possible approach to pursue in order to explain this distinction involves the notion of semantic fields, where different semantic fields may have different properties. For example, the locative semantic field may be characterized as continuous, whereas the semantic field of possession is composed of discrete elements, as is reflected in its discrete use of space. I leave for future research the problem of formalizing the characterization of the different semantic fields.

So far I have shown that the differences and similarities between agreement and spatial verbs can be predicted and accounted for by the analysis presented in this chapter. I now turn to the question of predicting whether a verb is a spatial verb or an agreement verb. As was argued above, the agreement pattern of a verb is determined by its semantic structure. This holds in the case of spatial verbs as well. Spatial verbs denote actual motion, from one location to another. They differ from agreement verbs in the semantic field involved: spatial verbs denote motion in the locative semantic

³¹ Janis (1992) attempts to provide an explanation for the fact that agreement verbs, but not spatial verbs, use both direction of the path and the facing to mark agreement. For a criticism of her account, see chapter 7.3.

field; they do not involve possession. Therefore, their source and goal arguments are not possessors, but rather locations.

Thus my prediction is that a verb will be a spatial verb if it denotes actual motion between two locations³², and it will be an agreement verb if it denotes a change of possession. However, these two readings are not necessarily mutually exclusive: there may be cases of overlapping, that is, that a verb denotes both actual motion and change of possession. In such cases, the verb may occur with either type of agreement pattern: it may behave either as a spatial verb or as an agreement verb (that is, display either discrete or continuous use of space), but with a slight difference in meaning:

42. a. CUP INDEX_a 2CL:C₁ ‘Give me that cup.’
 b. CUP INDEX_a aCL:C₁ ‘Bring me that cup.’

In (42.a.) the verb ‘GIVE-a cylindrical object’ exhibits the agreement pattern of an agreement verb, and implies change of possession. In (42.b.) the verb behaves as spatial verb, and its meaning emphasizes more the change of location than the change of possession. If the change of possession is to be emphasized too, then an additional verb GIVE (with no classifier incorporated) can be added, yielding what might be characterized as a serial verb construction:

43. CUP INDEX_a aCL:C₁ 2GIVE₁ ‘Give me that cup.’

4.5. Summary

The Thematic Structure Agreement Analysis argues that the morphological properties of verbs in ISL are determined by their lexical structures, and in particular - whether their lexical structures contain a PATH predicate and a TRANSFER predicate. The existence of PATH determines that a verb agrees with the arguments of PATH in that its location specifications are determined by the R-loci of these arguments. The existence of TRANSFER determines that the facing specifications are determined by the R-locus of the object argument. The prediction is that if the lexical structure of a verb does not comprise of the two predicates (or one of them), it would not exhibit the morphophonological properties associated with each predicate: verbs which do not denote an event of transfer (and hence do not contain TRANSFER and PATH) would not be directional (would not inflect for agreement) nor reversible; these constitute the class of 'plain verbs'. Verbs which denote directed motion but not transfer (and hence contain PATH but not TRANSFER) are directional, but not reversible; these verbs constitute the class of 'spatial verbs'. Only verbs denoting an event of transfer (and hence select both a TRANSFER and a PATH predicate) would display both directionality and reversibility; these verbs constitute the class of 'agreement verbs'.

It follows then, that agreement verbs and spatial verbs both constitute natural classes: agreement verbs are verbs of transfer, and spatial verbs are 'path' verbs, verbs denoting directed motion. Moreover, agreement verbs can be regarded as a special sub-set of spatial verbs, since they also involve a PATH function. Their additional

³² This prediction corresponds to Janis's (1992) prediction, that a verb whose arguments have locative

morphological characteristics stem from their more complex semantic structure, in that they denote an event of transfer, and therefore also involve a different semantic field. Plain verbs, on the other hand, form a class which is only negatively defined: the class of all the verbs which do **not** contain a PATH or a TRANSFER predicate. That is, various plain verbs may have varied types of LCS's, the common feature of which is only that all of them contain neither PATH nor TRANSFER. It might very well be the case that plain verbs may be divided into other types of verb classes, on the basis of some other common features. This, however, lies out of the scope of the present work.

Chapter 5

Where do all the different agreement verbs come from?

The previous chapter presented agreement verbs as a natural class, that of verbs of transfer. The focus was on those elements which are shared by all agreement verbs, and therefore are those elements by which this natural class is defined. These elements are the predicates PATH and TRANSFER. The present chapter focuses on the elements which differentiate agreement verbs from one another, and give rise to all the numerous agreement verbs in the language.

As we saw in earlier chapters, one distinction which cuts across the whole class of agreement verbs is the distinction between regular and backwards agreement verbs. This distinction is semantic in nature. However, this cannot be the only differentiating factor, since there are many more than just two agreement verbs in the language. In this chapter other differentiating factors are identified. I show that independently of the regular vs. backwards verbs dichotomy, agreement verbs fall into two classes according to their syntactic behavior: di-transitive agreement verbs, and monotransitive agreement verbs. I argue that monotransitive agreement verbs are derived by a process of noun incorporation, whereby a noun occupying the theme argument position is incorporated into the PATH predicate. Different monotransitive agreement verbs are created by incorporating different nouns into PATH (section 5.1.). Di-transitive agreement verbs differ from each other in another respect: what is lexicalized in these verbs is the ‘manner of transfer’ (e.g. ‘by grasping’, ‘by letting’, ‘by releasing’ etc.), which is reflected phonologically in the hand internal movement (section 5.2.).

By analyzing the elements which distinguish agreement verbs from each other, all the morphological components of agreement verbs are identified. These components are: PATH, the agreement markers, TRANSFER and either the theme argument or the manner of transfer. Yet, there are verbs in which some of these components are not overtly manifested. Such verbs are potential counterexamples to the analysis, since the morphemes which are claimed to characterize all agreement verbs seem to be lacking in many of them. However, I show (in section 5.3.) that verbs with anomalous morphology do not constitute counter example to my analysis, but rather support it. I argue that the anomalous morphology of these verbs is the result of clashes between the phonological specifications of the various components of agreement verbs. These clashes can be explicitly stated only if these components are distinguished from each other. Therefore, by assuming a componential analysis of agreement verbs, the phonological and morphological properties of such verbs are predictable.

5.1. The Derivation of Monotransitive Agreement Verbs

Agreement verbs fall into two syntactic classes - monotransitive and di-transitive. All agreement verbs have essentially the same LCS representations, as they all denote transfer. Therefore, the differences in their syntactic properties (specifically - in the number of arguments which they license in the syntax) must stem from the way the LCS's are projected into the PAS, the level of representation which encodes the argument-taking properties of predicates.

5.1.1. The LCS and PAS of Monotransitive Agreement Verbs

Consider the LCS representation of a di-transitive agreement verb and a monotransitive agreement verb, exemplified here by GIVE and HELP respectively.

1.

GIVE: CAUSE_{poss} ([α], Go_{poss} ([]^γ, [PATH [α] [β]])

AFF ([]^α, []^β)

HELP: CAUSE_{poss} ([α], Go_{poss} ([**HELP**], [PATH [α] [β]])

AFF ([]^α, []^β)

The two verbs have an almost identical LCS representation: both representations consist of the same semantic primitives, which take the same argument positions. The difference between the two LCS's lies in the fact that in the case of HELP, the theme argument position (the direct argument of GO) is not a variable: it is a constant - the noun HELP. That is, this position is filled, or saturated, in the lexicon. As such, it cannot project into the syntax.

Monotransitive agreement verbs like HELP, then, differ from di-transitive agreement verbs in that one argument position is lexically filled at the level of LCS, and is therefore not projected into the syntax. This position is invariably the position of the theme argument - the first argument of GO. The numerous monotransitive agreement verbs in the language differ from each other in the **content** of that lexically filled position. That is, they differ from each other in the entity that is being transferred. Some representative examples are given below:

2.

INFORM:

CAUSE_{poss} ([α], Go_{poss} ([**INFORMATION**], [PATH [α] [β]])

AFF ([] ^{α} , [] ^{β})

HELP:

CAUSE_{poss} ([α], Go_{poss} ([**HELP**], [PATH [α] [β]])

AFF ([] ^{α} , [] ^{β})

DEFEND:

CAUSE_{poss} ([α], Go_{poss} ([**DEFENCE**], [PATH [α] [β]])

AFF ([] ^{α} , [] ^{β})

LOOK AT:

CAUSE_{poss} ([α], Go_{poss} ([**GAZE**], [PATH [α] [β]])

AFF ([] ^{α})

ASK:

CAUSE_{poss} ([α], Go_{poss} ([**QUESTION**], [PATH [α] [β]])

AFF ([] ^{α} , [] ^{β})

VISIT:

CAUSE_{poss} ([α], Go_{poss} ([**VISIT**], [PATH [α] [β]])

AFF ([] ^{α} , [] ^{β})

TAKE-ADVANTAGE-OF:

CAUSE_{poss} ([α], Go_{poss} ([**ADVANTAGE**], [PATH [β] [α]])

AFF ([] ^{α} , [] ^{β})

In the LCS's of all the above verbs, the theme argument position is lexically filled by a nominal. The surface form of these verbs is derived by conflating this nominal element with the verbal stem PATH. The conflation of a nominal root with a verbal stem has been suggested to be a case of noun incorporation (NI) (Baker 1988, Hale and Keyser 1992, Mithun 1984, Rosen 1989b). Following this line of thought, I suggest that the derivation of monotransitive agreement verbs is a case of NI. Furthermore, I will argue that these data support a particular analysis of NI as a **lexical** process, as suggested by Rosen (1989b)¹.

5.1.2. Monotransitive Agreement Verbs as Noun Incorporation

Noun Incorporation is a construction in which a nominal stem is attached to a verbal stem to yield a complex, derived V stem. An example of NI is given in (3). In (3.a.) the noun *tobacco* appears as an independent nominal in the clause, while in (3.b.) it is attached to the verb stem, yielding a complex verb meaning '*tobacco-buy*'. The

¹ An NI analysis has been suggested to other constructions in ISL, namely verb classifiers (Meir 1997). Both the analysis of verb classifiers and the analysis of monotransitive agreement verbs support a lexical analysis of NI over a syntactic one.

resulting verb is morphologically complex in that it contains both a verbal root and a nominal root:

3.

a. *wa?hahninu? ne? oyekwa?*

TNS.3sg.3N.buy.ASP ART 3N.tobacco.NM

‘He bought the tobacco.’

b. *wa?haye?kwahni:nu?*

TNS.3sg.3N.tobacco.buy.ASP

‘He bought tobacco.’

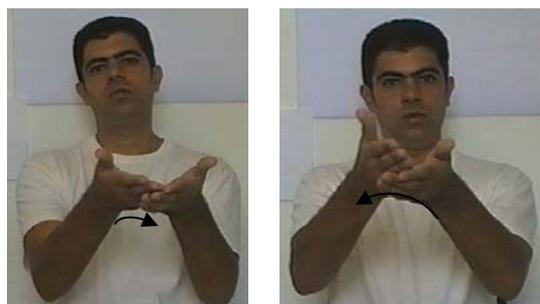
(Onondaga, cited in Rosen 1989b:295, from Woodbury1975)

Mithun (1984), in her comprehensive study of NI, points out that languages which exhibit NI constructions also have syntactic paraphrases of these constructions. In other words, languages which have constructions such as (3.b.) usually also have sentences such as (3.a.).

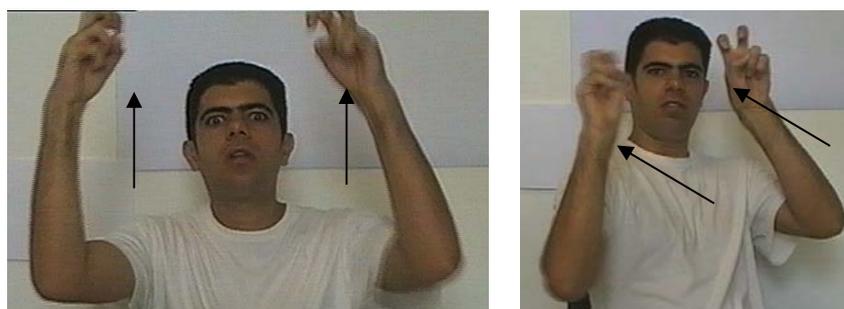
Building upon the similarities between monotransitive agreement verbs in ISL and NI constructions, I suggest that the formation of monotransitive agreement verbs is the result of incorporating a nominal root into a predicate (PATH). This analysis is motivated by the following observations:

A. Most monotransitive agreement verbs and their corresponding nouns show phonological resemblance. They share the phonological specifications for HC, manner of movement and location. In fact, such noun-verb pairs differ from each

other phonologically mainly in their path movements and facing: nouns have a much shorter path movement than verbs, and sometimes the direction of the path of nouns is upwards rather than forwards. Furthermore, nouns do not change facing. Both the phonological similarities and differences are to be expected under an NI analysis. In most cases of NI, the incorporated noun is usually similar in form to the unincorporated noun (see for instance, the numerous examples of NI in Mithun 1984). However, the complex verb contains the verbal root in addition to the incorporated noun. The verbal elements in the case of agreement verbs are PATH and TRANSFER, manifested phonologically by the path movement and the facing. It is precisely these elements which are not part of the phonology of the nouns.



HELP (noun) vs. HELP (verb)



OPPORTUNITY vs. TAKE-ADVANTAGE-OF

Figure 5.1: Noun-verb pairs in ISL

B. Most monotransitive agreement verbs can be paraphrased by a light verb construction, where the theme argument appears as an independent noun, the syntactic object of the light verbs GIVE and GET², exemplified in the following:

4.

I₁HELP₂ ‘I helped you.’
 I₁GIVE₂ HELP ‘I gave you help’
 I₂GET HELP ‘I got help from you’

5.

I₁DEFEND₂ ‘I defended you.’
 I₁GIVE₂ DEFENCE ‘I gave you defense’
 I₂GET DEFENCE ‘I got defense from you’

6.

I₁LIE₂ ‘I lied to you.’
 I₁GIVE₂ LIE ‘I gave you lie.’
 I₂GET LIE ‘I got lie from you’

As pointed out above, in languages which have NI, usually there is an alternation between the incorporated and non-incorporated forms. ISL monotransitive agreement verbs conform to this generalization, as illustrated in the sentences in 4-6.

² In fact, the light verb construction with GET is the natural way for denoting a passive reading of monotransitive agreement verbs (i.e. ‘I got help from him’ instead of ‘I was helped by him’).

It has been a matter of dispute whether NI constructions are derived in the syntax, by a movement of the N node into the V node (as suggested e.g., by Baker 1988, Hale and Keyser 1992), or in the lexicon (as suggested by Rosen 1989b). I adopt here the lexical approach, since the syntactic approach fails to account for some aspects of the syntactic behavior of monotransitive agreement verbs, as shall I argue shortly.

Under a lexical approach, the formation of monotransitive agreement verbs is regarded as a word formation process in which the incorporated argument is saturated within the V+N complex in the lexicon, and is not projected into the syntax³. Therefore, the argument structure of the complex verb is changed: the derived verb has one argument less than the base verb; it is monotransitive rather than di-transitive.

Under a syntactic analysis, NI is regarded as syntactic movement, which operates over lexical categories rather than over maximal projections. The NI construction is formed by movement of the N⁰ head of an NP argument into the V node. Since only the head N moves, the prediction is that if N has a modifier, this modifier does not move along with its head. Rather, it is left ‘stranded’ in its original position. An example of a stranded modifier is given in (7):

7. Kusanartu-mik spangar - s- voq.
 Beautiful-INSTR bead-get-INDIC 3S
 ‘He bought a beautiful bead’ (=He bead-got a beautiful)

3 This type of NI process is termed ‘compound NI’ in Rosen (1989b).

(Greenlandic Eskimo, Baker 1988:94, citing Sadock 1980)⁴

Extending this analysis to monotransitive agreement verbs, the prediction is that a sentence such as in (8.b.) is a grammatical paraphrase of (8.a.):

8. a. I gave him important help.
 b. I helped him important. (=I gave-help him important).

However, this prediction does not hold in the case of ISL monotransitive agreement verbs, as the following examples show:

9. *HE₃STORY;TELL₁ LONG ‘He story:told me long (=He told me a long story)’
 10. *HE₃HELP₁ IMPORTANT ‘He helped me important (=He gave me an important help)’

A lexical analysis, on the other hand, correctly predicts the ungrammaticality of the sentences in 8-9. Since the incorporated noun is satisfied in the lexicon and is not

⁴ Baker remarks that “The possibility of this kind of discontinuous dependency is explained and even expected if NI is indeed the syntactic movement of a subphrasal category.” (ibid., p.95). However, others have pointed out that this analysis is problematic because (a) not all NI constructions allow for modifier stranding (Rosen 1989b), and (b) in those languages which allow stranding, this construction is not restricted to incorporating verbs. Rather, stranded modifiers can co-occur with simple, non-incorporating verbs as well (Di Sciullo and Williams 1987, Rosen 1989b, Anderson 1992). Thus, the prediction that a syntactic analysis makes concerning modifier stranding is too strong, and might prove to be redundant, if stranding is not necessarily a by-product of the NI construction.

project to the syntax, there is no syntactic position with which this stranded modifier can be associated, hence the ungrammaticality of the construction⁵.

To summarize, monotransitive agreement verbs are analyzed here as formed by a lexical process of incorporation where the incorporated argument is satisfied in the derived verb. As the argument position is satisfied in the lexicon, it cannot be projected into the syntax. Therefore, this analysis accounts straightforwardly for the monotransitivity of these verbs, as well as the blocking of modifier stranding.

5.2. The Derivation of Di-Transitive Agreement Verbs

Di-transitive agreement verbs differ from monotransitive agreement verbs in that their LCS representations contain no constant. Hence, all the unbound argument positions are projected into the syntax. Since the transferred entity is not lexicalized in the meaning of these verbs, the source for their variety must lie elsewhere.

Here, the close relationship between phonology and semantics in ISL can give us a clue. It should be noticed that these verbs have an internal movement: closing movement (TAKE, GRAB, CATCH), opening movement (SEND, PAY, THROW-TO), or orientation change (GIVE). I would like to suggest that what is lexicalized by these hand internal movements is the manner of transfer⁶: ‘by grasping’, ‘by releasing’, and ‘by letting’. That is to say, the semantic difference between these

⁵ This is one of the arguments suggested by Rosen (1989b) supporting a lexical analysis of NI over a syntactic one. For other arguments along this line, the reader is referred to Rosen’s paper.

⁶ The verb GIVE in ASL does not have an internal movement. This might indicate that the manner of transfer lexicalized in these verbs need not necessarily be reflected in their phonological form.

transfer verbs is located in the manner of transferring⁷. For example, the difference between GIVE and SEND is that in the former the manner of transfer can be characterized as ‘by letting’, whereas in the latter it would be ‘by releasing’.



TAKE (initial)



TAKE (final)



GIVE (initial)



GIVE (final)



PAY (initial)



PAY (final)

Figure 5.2: Hand internal movement in di-transitive agreement verbs.

⁷ Some monotransitive agreement verbs are also differentiated by the manner of transfer, e.g., SUMMON vs. INVITE. See appendix A for their LCS representations.

It is important to point out that these differences in the manner of transfer are not reflected in the LCS's of these verbs, since they cannot be captured in structural terms. Rather, they are related to the real-world representations of these verbs, in much the same way as the difference between *run* and *walk* cannot be attributed to any structural grammatical entity but rather to the visual, real-world representations of these verbs. Jackendoff (1990a;32-34) argues convincingly that visual properties of items and actions cannot be encoded by a set of discrete grammatical features, since any attempt to reduce visual properties to a set of discrete features would result in absurdities (such as postulating a feature of [long neck] to differentiate between a duck and a goose). Therefore Jackendoff suggests that the lexical entry for objects and actions include a visual representation (encoded in a model of visual perception, such as the 3D model developed in Marr 1982), thereby eliminating the need for objectionable features in the LCS representations.

Returning to di-transitive agreement verbs, I suggest that the differences between these verbs are not the result of any grammatical process, but rather they encode 'real-world' differences between the verbs. Linguistically, di-transitive agreement verbs have the same lexical and syntactic behavior, as is represented in their identical LCS and PAS representations (except for the difference between regular and backwards agreement verbs). The difference in meaning between these verbs is represented here as un-analyzable wholes.

11. GIVE: CAUSE_{poss} ([α], Go_{poss} ([] ^{γ} , [PATH [α] [β]])])

AFF ([] ^{α} , [] ^{β})/ **by giving (letting)**

PAS: < $\underline{\alpha}$, β , γ >

12. SEND: CAUSE_{poss} ([α], Go_{poss} ([] ^{γ} , [PATH [α] [β]]))

AFF ([] ^{α} , [] ^{β}) / *by sending (releasing)*

PAS: < $\underline{\alpha}$, β , γ >

13. TAKE⁸: CAUSE_{poss} ([α], Go_{poss} ([] ^{γ} , [PATH [α] [β]]))

AFF ([] ^{α} , [] ^{β}) / *by taking (grasping)*

PAS: < $\underline{\alpha}$, β , γ >

Summary:

The preceding sections present the factors that give rise to the variety of agreement verbs in ISL. These factors are:

1. Incorporation of the theme argument: if the position of the theme argument is filled by a nominal root (a constant) which is incorporated into the verb, then this argument is satisfied in the lexicon and is not projected to the syntax, and the result is a monotransitive agreement verb. The various monotransitive agreement verbs differ from each other in the identity of the incorporated nominal.
2. Difference in the manner of transfer: di-transitive agreement verbs differ from each other in the manner of transfer. These differences are related to the real-world representation of the verbs, and not to their structural properties.

⁸ Shepard-Kegl (1985:400) has a similar description of the meaning encoded in the hand internal movement of TAKE (ASL). She calls this movement ‘a grasping classifier’, and describes the verb as ‘a grasping goes from location 70 to location 30.’ Brennan (1990), in her analysis of word formation in British SL, regards the grasping movement as a GRASP morpheme, which “exploits the idea of

5.3. The Phonological Properties of Agreement Verbs

The analysis of agreement verbs presented here claims that agreement verbs consist of several distinct morphemes: PATH, TRANSFER, the arguments' R-loci, and the theme argument or the manner of transfer. These morphemes combine to form a single phonological unit - an agreement verb.

It has been noticed that not all of these morphemes are phonologically present in every agreement verb. For example, some agreement verbs do not change facing. Others change facing, but the direction of the path is immutable. Others still show agreement with one argument only, rather than with two. Finally, there are verbs that seem to belong semantically to the class of agreement verbs in that they denote 'transfer', yet they fail to agree altogether. Such verbs, one may claim, constitute counterexamples to my analysis of agreement verbs, since the morphemes which are claimed to characterize **all** agreement verbs (PATH and TRANSFER) are not phonologically manifested in many of them. I demonstrate here that a closer phonological analysis proves that the opposite is true: anomalous agreement verbs do not constitute counter examples to the analysis; rather, they turn out to support a componential analysis of agreement verbs.

physically grasping or getting hold of some entity, and then is extended to more abstract conceptions.”

The phonological analysis is stated in terms of Sandler's (1989) Hand Tier model, which was presented in chapter 1. Two concepts play an important role in the analysis: 'underspecification' and 'blocking'. The concept of 'underspecification' is used here to refer to cases where the underlying form of a morpheme does not have specifications for one or more of the major class segments⁹. The missing specifications are then supplied by other morphemes which combine with the incomplete morpheme (Liddell and Johnson 1989;255,) e.g., agreement markers in the case of PATH. Or else, the unmarked value for each segment is inserted by a default rule (Sandler 1989;152).

The default values I assume for the basic units are:

- Place of articulation – neutral space, the signing space in front of the signer's chest.
- Setting (location) - [prox], a location near the signer's chest, and 'medial' (or [-prox, -distal]), a location in medial distance from the first location (Sandler 1989;152)
- Orientation - 'forward'¹⁰.

Additionally, I assume that specified features block the insertion of other features of the same node¹¹.

(*ibid.*, p.104).

⁹ This sense of 'underspecification' is close to what Liddell and Johnson (1989;257) call "incomplete S-morphs". It is somewhat different from the use of this term in Brentari (1990b), where an unspecified feature is understood as a non-contrastive feature.

¹⁰ The motivation for regarding 'forward' as the default value for Orientation comes from the following observation: agreement verbs are reversible only if their Orientation in citation form is 'forwards'. If Orientation has any other specifications (e.g., 'side', 'in', 'up'), then it remains stable in all inflected forms of the verb. In other words, all Orientation features that are not 'forward' block facing. Since specified features block the insertion of other features of the same class, I deduce that the only non-specified feature for Orientation is 'forwards'.

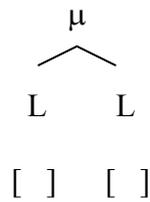
¹¹ Sandler (1996a) exemplifies this blocking effect in a different morphological process - the inflection for multiple plural. She shows that in verbs which have movement specifications, the inflection of the multiple plural is blocked. This blocking is attributed to the fact that the multiple-plural morpheme has movement specifications [horizontal arc]. The movement specifications of these verbs block the insertion of the multiple plural morpheme.

In what follows, I briefly repeat here the phonological representations of each of the morphemes of agreement verbs, and then show how a componential analysis of agreement verbs can explain the defective agreement paradigms exhibited by certain verbs.

5.3.1 The Phonological Representation of Agreement Verbs

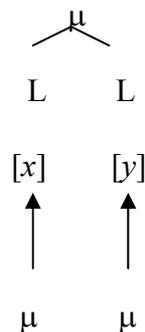
PATH: Path is specified only for having two empty location slots.

14. PATH:



These empty slots are then filled by a ‘copying’ procedure, where the location specifications of the R-loci of the arguments are copied into the empty slots (see chapter 2.1.3.). For simplicity of representation, these are marked here as variables on the location slots.

15. PATH+agreement markers



The Dative case (of Transfer): this morpheme consists an Ori(entation) class node only (palm, fingers or both) where the value for Ori is unspecified. This unspecified orientation is filled by copying the location features of the R-locus of the object argument. In the case of a neutral context such as in citation form, the [+forward] default value for orientation is filled in.

16. The dative case of TRANSFER:

$$\begin{array}{c}
 \mu \\
 | \\
 \text{Ori} \\
 \wedge \\
 \text{palm} \quad \text{finger} \\
 [\quad] \quad [\quad]
 \end{array}$$

It should be noticed that the morphemes which are shared by all agreement verbs (PATH, its agreement markers, and the dative case of TRANSFER) have unspecified values. The only element which has phonological specifications is the nominal root representing the theme argument.

The theme argument: The phonological features of the theme depend on the specific lexical item which occupies this position in each verb. These nominal roots have handshape specifications, but they might have other phonological specifications as well, such as Orientation (e.g., CL:C – ‘side’), place of articulation (QUESTION- ‘mouth’, LOOK- ‘eyes’), and location (e.g., (admiring)-LOOK - [+hi], [+lo]).

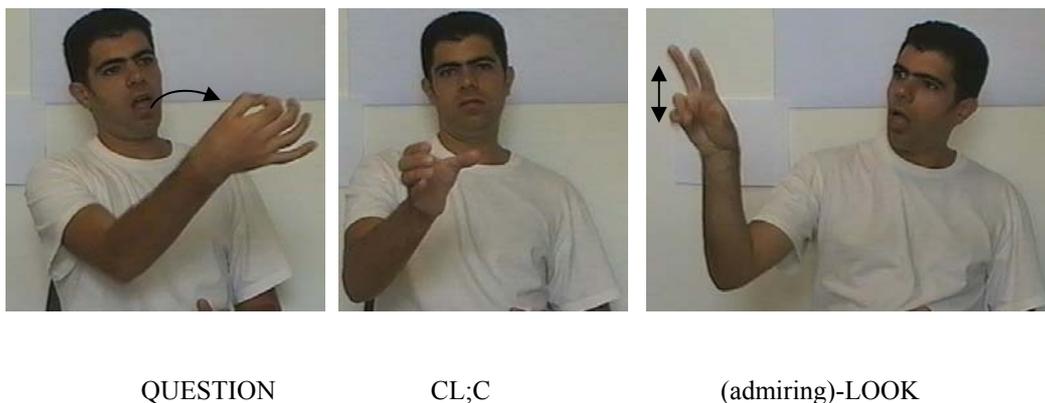
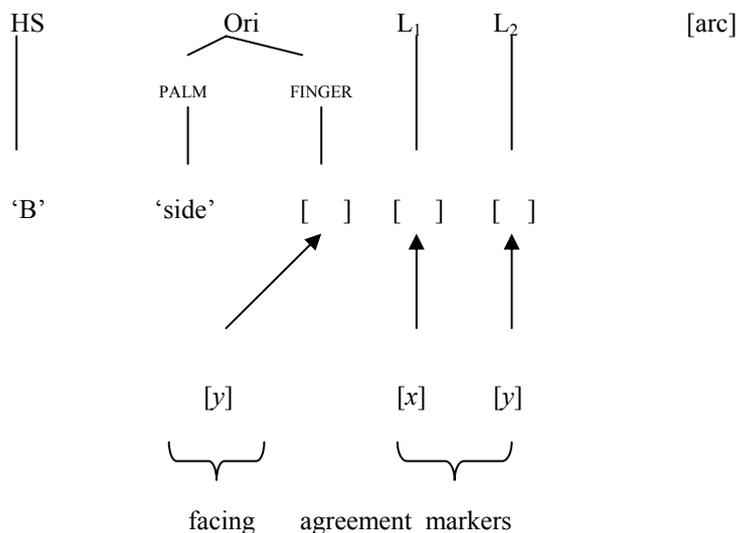


Figure 5.3: Nominals with additional phonological specifications.

Let us see how all these components combine to one phonological unit. In (17) the underlying representation and surface form of an agreement verb are presented.

17. HELP:

Underlying representation^{12 13}:



¹² According to Sandler (1996a), the M segment need not be represented underlyingly. Movement features, such as [arc] in (15) are represented as floating features underlyingly, and are associated with the M slot by means of redundancy rules.

¹³ The representation of the handshape as 'B' oversimplified, as the position of the hands relative to each other is not stated here. This representation ignores the non-dominant hand, because it is not relevant for the analysis of verb agreement.

Surface form:

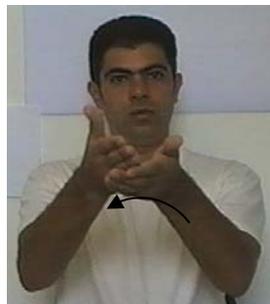
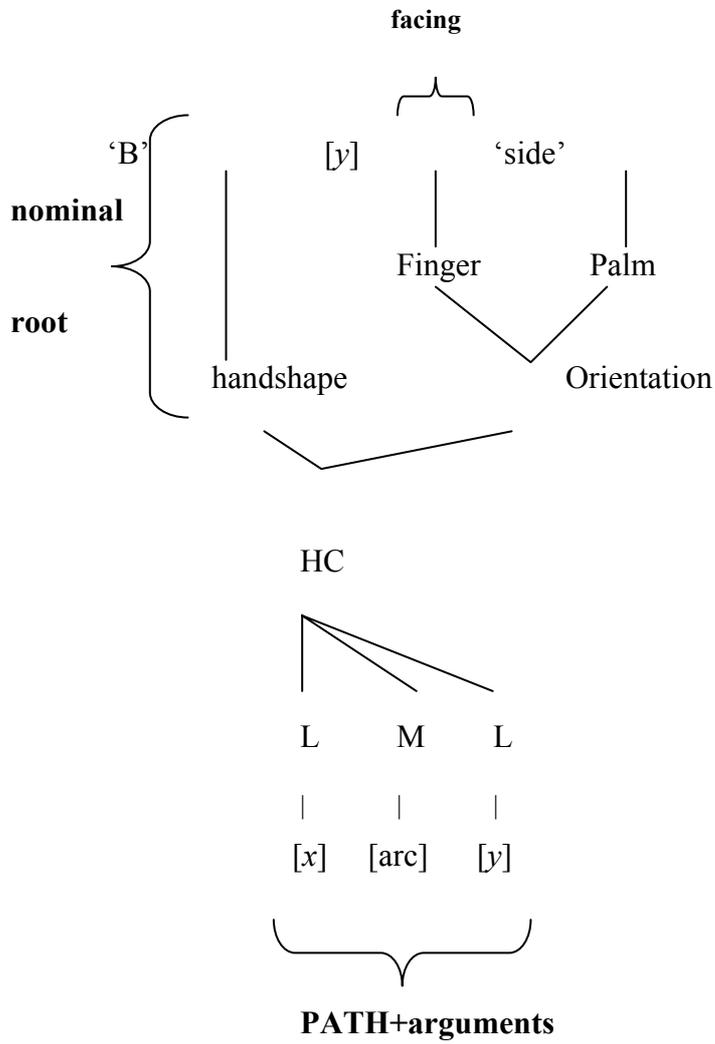


Figure 5.4: HELP

In this verb, the nominal root of the theme argument has phonological specifications for handshape only. Since none of the other morphemes have handshape specifications, no phonological clash occurs, and HELP exhibits the full morphological paradigm of agreement verbs: it is both directional and reversible, and agrees with two arguments.

In other verbs, however, this is not the case: the theme argument has phonological specifications for some other features (in addition to handshape), and these specifications necessarily clash with those of the other morphemes. Since all other morphemes have unspecified phonological features, the specified features of the element in question are inserted, thus blocking that particular verb from displaying the full morphological paradigm of agreement verbs. These clashes are examined in the following section.

5.3.2 Various Phonological Manifestations as a Result of Clashes

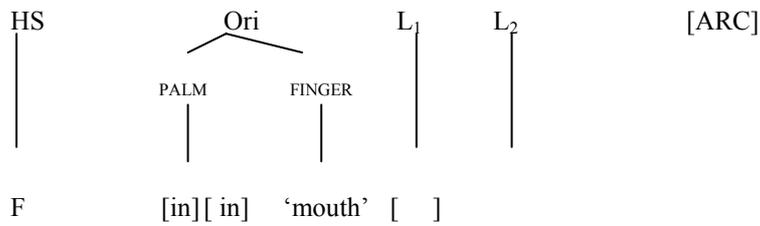
A. Failure to agree with one argument (e.g. ASK, ANSWER, SEE, REVENGE, INFORM, PERCEIVE-BY- EAR).

When the theme argument of monotransitive agreement verbs has location specifications for either of its end points, these specifications clash with the open slots of the agreement markers of PATH. Since this L slot is no longer open, the location specifications of the argument's R-locus cannot be associated with it. This results in a

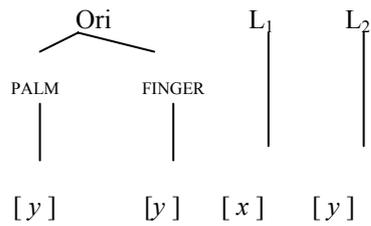
verb which fails to mark agreement with one of its arguments. ASK is an example of such a verb¹⁴:

18. ASK:

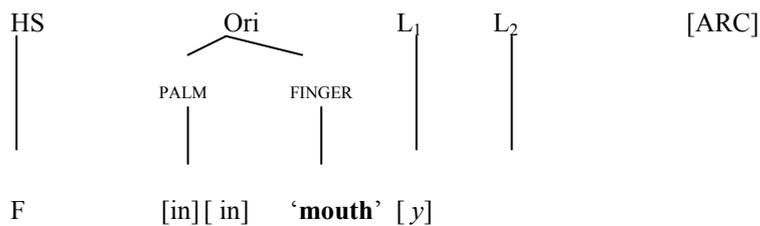
Nominal root – QUESTION:



PATH+arguments, TRANSFER:



The verb ASK:



¹⁴ This verb also has specifications for Orientation. The orientation specifications might prove to be predictable on the basis of phonotactics, which are beyond the scope of this study.

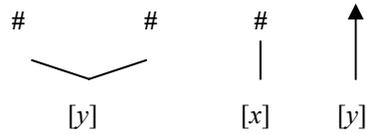
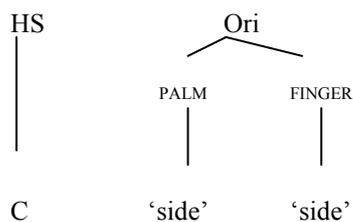


Figure 5.5: ASK

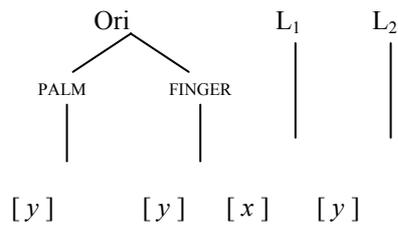
B. Failure to change facing:

When the theme morpheme has orientation specifications for both palm and fingers, these specifications clash with the open orientation slot of the TRANSFER morpheme, thus blocking the change of facing in the verb. For example, in the classifier CL:C, denoting ‘a cylindrical object’, both palm and fingertip orientation are specified for [side]. This classifier can conflate with PATH+TRANSFER, yielding a verb meaning ‘give a cylindrical object’. The resulting verb GIVE-CL;C has orientation specifications, and therefore fails to change facing; it is directional, but not reversible.

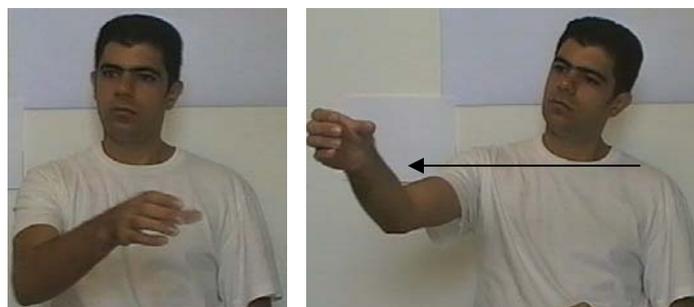
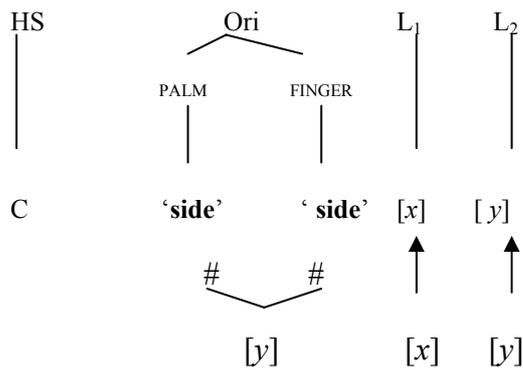
19. CL:C:



PATH+arguments, TRANSFER:



GIVE-CL:C



initial

final

Figure 5.6: GIVE-CL:C

If only one orientation element is specified (either palm or fingers) then facing will be realized on the non-specified element. For example, the verb HELP (ISL) is specified for palm orientation 'side'. Finger orientation, though, is unspecified. Therefore, facing is manifested by finger orientation alone. It is interesting to compare this sign with the sign HELP in ASL. The two signs – HELP (ISL and ASL)

have the same LCS's and argument structures. Yet they differ in their phonological specifications. In ASL, the dominant hand of the sign *HELP* has an S (closed fist) handshape, with both palm and finger orientation specified for 'side'. Therefore, facing is blocked; this verb is directional, but not reversible, in accordance with the predictions made here.



HELP (ISL)



HELP (ASL)

Figure 7: The verbs *HELP* in ISL (where the facing is manifested by finger orientation) and ASL (where facing is blocked)

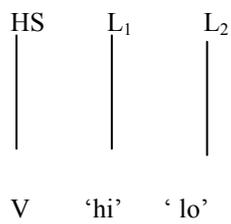
C. Failure to agree with both arguments:

If the theme's L segments are both specified, the resulting verb will fail to mark agreement with its arguments' R-loci. Facing, however, is not blocked, since the orientation features are unspecified. Such verbs, then, mark their arguments solely by

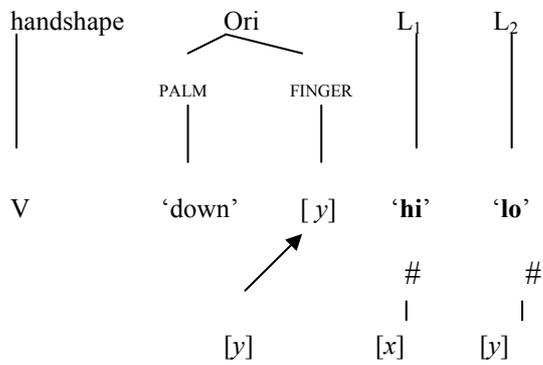
facing, not by the direction of the path. In other words, they are reversible, but not directional. This is illustrated by the verb LOOK-(with admiration):

20. LOOK-(with admiration)

Nominal Root:



LOOK-(with admiration):



$_1\text{LOOK}_2$ $_2\text{LOOK}_1$ **Figure 5.8: LOOK-(with admiration)****E. Verbs which fail to mark their arguments morphologically:**

Some verbs seem to belong semantically to the class of verbs of transfer, yet they fail to display any argument-marking morphology altogether. In other words, morphologically they belong to the class of plain verbs. Under the analysis suggested here, this could be explained as cases of ‘multiple clashes’, where the nominal root of the verb has specifications for orientation and both locations. Some examples of such verbs are given below:

21.

	Ori specifications: blocking of facing	Location specifications: blocking of agreement markers
STEAL	‘down’, ‘side’	non-dominant hand, constant contact
BUY	‘in’, ‘side’	[hi], [lo]
LOAN (rent)	‘side’, ‘side’	Place-non dominant hand, final contact
EN- COURAGE	‘up’	[ipsilateral] [contralateral]

AGREE	'down', 'side'	'side', 'chest'
--------------	----------------	-----------------



STEAL



BUY



LOAN



AGREE.

Figure 5.9: Verbs which fail to agree.**Summary:**

This section provided phonological evidence for the componential analysis of agreement verbs argued for in this thesis. The phonological analysis of agreement verbs shows that their various morphophonological properties can be accounted for only within this framework, since such a framework enables us, and in fact, forces us, (a) to identify the morphemes which comprise agreement verbs, and (b) to state their phonological representations explicitly. By examining the co-occurrence restrictions

on these morphemes, the numerous phonological ‘costumes’ which agreement verbs may put on can be explained and predicted. Thus, morphophonological irregularities provide additional support for the analysis suggested here.

Chapter 6

Predictions

This chapter evaluates the analysis from a theoretical perspective. Following the Popperian tradition, based on the notion of falsifiability as a criterion of demarcation between scientific and non-scientific theories, the question is presented of what cases might constitute counterexamples to the analysis. Several types of counterexamples are examined, showing the analysis to be falsifiable but not false.

6.1. What Might Constitute Counterexamples to the Analysis?

The Thematic Structure Agreement Analysis presented in this work makes clear predictions about the morphosyntactic properties of the verbs in the language. The basic claim is that the agreement pattern of a verb can be predicted on the basis of its semantic/thematic structure. The predictions made by this analysis concern both the form of the verbs (which is determined by the AMP's, in chapter 3), and the types of verbs which are characterized by the morphosyntactic properties of agreement verbs (following the analysis of agreement verbs as verbs of transfer in chapter 4). These predictions are stated in (1):

1. The predictions made by the analysis:

A. The form of agreement verbs

Agreement Morphology Principles (AMP's):

- (a) The direction of the path movement of agreement verbs is from **source to goal**.

and

(b) The facing of the hand(s) is towards **the object of the verb**.

B. The thematic/semantic structure of agreement verbs

Agreement verbs are verbs denoting transfer, that is - the motion of an entity from one possessor to another, where the event is instigated by one of the possessors. Hence the prediction is that only verbs which denote **the motion of an entity**, and **whose arguments can be construed as possessors** will turn out to be agreement verbs. More specifically, the subject and object of agreement verbs have the following properties:

- As arguments of PATH, they have the spatial thematic roles of source and goal.
- As possessors, (a) they are characterized as ‘highly individuated’ (in the sense of Hopper and Thompson 1980), i.e. they tend to be **proper, animate, concrete, count** and **referential**. (b) Their existence is independent of the action itself.

It should be pointed out that these predictions are intended for all natural sign languages, since all sign languages seem to have the same three verb classes (I return to this point in chapter 8). However, they will be examined here with respect to one sign language, ISL. I leave a cross-linguistic examinations of the predictions made here for future study.

What could constitute counterexamples to these predictions?

Several possibilities come to mind:

- (i) a verb whose movement is from goal to source (which would contradict principle (a) of the AMP’s).

(ii) a verb whose facing is invariably towards the subject; that is, a verb where the palm or the fingertips are oriented towards the R-locus of the syntactic subject, thus contradicting principle (b) of the AMP's.

(iii) an agreement verb which takes a sentential or an abstract object (i.e., if there were verbs like THINK, KNOW, HOPE, SUGGEST, which inflect for agreement). A sentential or an abstract object is not a possible possessor. Therefore, such verbs cannot be construed as verbs of transfer.

(iv) an agreement verb denoting a change of state (e.g., BREAK, CLEAN, KILL). Such verbs do not denote the motion of an entity from one point to another; hence their LCS's do not contain PATH, and are therefore predicted not to agree.

(v) an agreement verb denoting the creation of an entity, e.g., WRITE, SING, COMPOSE, BAKE, MAKE. 'Creation'-verbs do not denote motion or transfer, and the existence of their internal argument is the result of the action itself and is therefore not independent of the action. Thus, such verbs are predicted not to agree.

(vi) a psych verb ('afraid'-type) which agrees (e.g. HATE). According to my analysis, 'afraid-type'- psych verbs denote the creation or existence of a mental image, but not an event of transfer, and are therefore predicted not to agree.

(vii) an agreement verb which takes both animate and inanimate complements (e.g. SEE, LOOK, VIDEO-TAPE). An inanimate object is less likely to be construed as a possessor, and therefore the existence of such verbs would be somewhat problematic for my analysis.

Let us look more closely at these cases. The verbs described in (i)-(ii) above do not exist in the language, to the best of my knowledge. I know of no verb where the facing of the hands is towards the subject, or where the path movement is from goal to

source. Because of the analogical nature of PATH, such verbs seem to be impossible for cognitive reasons, a point which will be dealt with in chapter 8.

The verbs described in (iii)-(v) also do not exist in the language. I have not encountered agreement verbs which take a sentential or abstract object, or which denote the creation of an entity or a change of state. Some verbs take a sentential complement as well as a goal-object (e.g. TELL, INFORM, ASK). These verbs agree with their goal-argument (which is neither sentential nor abstract), but never with their sentential object, and therefore do not contradict my predictions. Of these three types of verbs, the ‘change-of-state’ verbs are especially interesting, since they have much in common with verbs of transfer: both denote causation, and both are characterized by highly individuated arguments. However, change-of-state verbs do not denote the motion of a theme with respect to a source and a goal. Since agreement in ISL is linked to the spatial predicate PATH, verbs which do not contain PATH cannot display agreement¹.

Of the verbs described in (vi), one verb actually exists in the language - HATE. The verb *hate* in English and Hebrew behaves as an ‘afraid-type’ psych-verb in that it is stative, and the subject is understood as an ‘experiencer’. My analysis predicts that such verbs should not agree, since they do not denote transfer (see chapter 4.4.2). HATE, however, is an agreement verb, both in ISL and in ASL, in contrast to the above predictions. The explanation I suggest for the existence of this verb is that the glosses here are somewhat misleading: the verb glossed as HATE does not denote the existence of an emotion, but rather some kind of a transfer of this feeling. Partial

support for this approach is provided by the form of the verb (both in ISL and ASL). In both languages, the form of the verb could be conceived of as a rejecting, rebuffing gesture. More importantly, however, are the selectional restrictions imposed by the ISL verb HATE on its object: HATE typically selects an animate, usually human, object, as is characteristic of verbs of transfer. With non-human objects, a different verb is used. Thus, a more appropriate gloss to this verb might be REBUFF, i.e. a non-stative verb denoting the transfer of a rejection towards somebody².

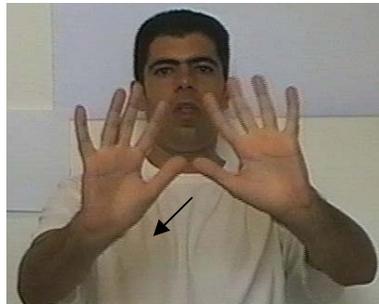


Figure 6.1: The verb HATE (ISL)

The fact that in both ISL and ASL it is the same verb that constitutes a counterexample (and it is the only verb that I am aware of) suggests that the problem is with the inaccurate gloss and not with the generalization.

Verbs with properties such as those described in (vii) are slightly problematic for my analysis, since, as was pointed out above, inanimate nominals are less likely to be possessors, and therefore such verbs are more difficult to be construed as verbs involving a change of possession. Such verbs do exist in the language, e.g., SEE,

¹ Using Jackendoff's (1990a) terms, verbs of motion and transfer are GO-verbs (hence their arguments have the thematic roles of source and goal), while 'change-of-state' verbs are INCH-BE verbs, that is - inchoative verbs.

² This explanation is supported by the intuitions of my ISL consultant, Meir Etdegi, who suggested that REBUFF is a better paraphrase of the ISL sign HATE.

LOOK, KEEP-AN-EYE-ON and VIDEO-TAPE. They were analyzed above (chapters 4 and 5) as verbs of transfer in which the theme argument is the GAZE, moving from the subject to the object. However, they do not impose any animacy restrictions on their object, which is quite unusual for verbs of transfer³. Note, however, that these verbs share most of the characteristics of the prototypical transfer verbs: they involve abstract motion of the gaze from the possessor (of the gaze) to a referent. In fact, the verbs *see* and *look* are analyzed as verbs involving motion in Gruber (1967). Hence the subject and the object are the thematic source and goal. Furthermore, the subject is also the possessor of the gaze. Thus it seems that the class of transfer verbs in the language has been grammaticalized enough to include some members which deviate minimally from the properties characterizing the most prototypical members of this class⁴.



Figure 6.2: SEE, LOOK, VIDEO-TAPE

³ As was mentioned in chapter 4, the selectional restrictions in question are not [animacy] per se, but rather the possibility of being a possessor. Inanimate nouns which can be conceived of as possessors are acceptable. The verbs mentioned here, however, do not seem to impose ‘possessorhood’ restrictions either.

⁴ Aronoff (1997) notes that “Certain aspects of inflection can be traced to natural or general social/cognitive functional factors, but full blown inflectional systems are usually unnatural in part”.

6.2. ‘Frighten’-type Psych Verbs

One group of verbs which my analysis makes no predictions about is the class of ‘frighten’-type psych verbs. Other members of this class (in English) are *amaze*, *disturb*, *depress*, *encourage*, *anger*, *annoy*, *shock*, *surprise*, *thrill*, *excite*⁵. This class of verbs is notorious cross-linguistically for raising descriptive and theoretical problems and challenges, which led to extensive research on the matter⁶. This, however, is not directly relevant for our present concern. What is generally agreed upon is that psych verbs of this class denote “... the bringing about of a change in psychological or emotional state. They are transitive verbs, whose object is the experiencer of the emotion, and whose subject is the cause of the change in psychological state.” (Levin 1993;191). This characterization shows that ‘frighten’-type verbs have much in common with transfer verbs: both denote an event of causation, in both the subject is a causer, and the object is animate (in transfer verbs by virtue of being a possessor, and in psych verbs by virtue of being an ‘experiencer’). Moreover, if we follow Jackendoff’s suggestion that an experiencer is regarded as some kind of a location or goal (Jackendoff 1990a; 262), then in both classes the object might occupy the same position on the spatial thematic tier. However, the question of whether the object of ‘frighten’-type verbs is a goal or a location is not settled, which implies in turn that it is still unclear whether these verbs imply the **transfer** of a psychological state from the causer to the experiencer, or a **change of the psychological state** of the experiencer. Both possibilities seem

The existence of less typical agreement verbs such as SEE, LOOK and VIDEO-TAPE might be taken as an indication of the maturation of agreement morphology as a full blown inflectional system.

⁵ For a much fuller list of members of this class, see Levin (1993;189-190).

⁶ Some current works on the subject include Belletti and Rizzi (1988), Grimshaw (1990), Pesetzky (1992), Zubizarreta (1992).

plausible, and therefore different sign languages are expected to vary as to the morphological class to which these verbs are assigned.

ISL conveys the meaning of ‘frighten’-type verbs via a complex light-verb construction, as in the following:

2.

- a. ₃GIVE₁ WORRY ‘He worries me.’
- b. ₁GIVE₂ SURPRISE ‘I surprised him.’
- c. ₃GIVE₁ NERVES ‘He makes me nervous’.
- d. ₃GIVE₁ SHAME ‘He shames me’ (=put me to shame).

This construction is a causative construction. In ISL, GIVE is used as a causative verb taking another predicate or clause as its complement, in much the same way as *make* in English can be used in paraphrastic causative constructions (as in ‘*He made me do it.*’). Thus, in ISL, ‘frighten’-type verbs behave like causatives, and not as transfer verbs. However, other sign languages may behave differently in this respect. I leave this comparative study for future research.

Summary: In this chapter several possibilities of counterexamples to the analysis were presented. The examination of these shows that the analysis makes accurate predictions concerning the form of agreement verbs (in the definitions of the direction of the path and the facing of the hands) and the lexico-semantic characterization of agreement verbs. One apparent counterexample (HATE) and a few somewhat marginal cases (SEE, LOOK and VIDEO-TAPE) were discussed, suggesting that the

class of transfer verbs includes some less typical members, which share most, but not all, of the characteristics of transfer verbs.

Chapter 7

Comparison with Other Approaches

Introduction

This chapter compares the Thematic Structure Agreement Analysis suggested in this thesis with previous ones. Areas of similarities and differences are pointed out, emphasizing the ways in which the present analysis makes a contribution over previous analyses to our understanding of the phenomenon of verb agreement in sign languages and its consequences for general linguistic theory. Three analyses will be considered: Kegl's Locative Approach (Gee and Kegl 1982, Shepard-Kegl 1985), the Direction of Transfer Rule analysis (DTR) (Brentari 1988, forthcoming) and The Controller Feature Hierarchy Analysis (Janis 1992). Of these, Janis (1992) shares the two main goals of the present work: predicting and explaining the agreement patterns of the verbs in the language, and accounting for agreement in a sign language by general linguistic principles. The analyses of Kegl and Brentari have somewhat different goals, but they are tangent to my analysis in various aspects.

It is important to emphasize that these analyses are based on data from ASL, whereas my analysis is based on ISL. Nonetheless, as was mentioned in earlier chapters, these two languages (and other sign languages as well) behave in a very similar manner regarding verb agreement and verb classes. Therefore, it is not implausible to compare these analyses with respect to their descriptive and explanatory power. Instances where ASL and ISL differ from each other will be pointed out.

None of the three analyses distinguish between **the different roles** which the direction of the path movement and the facing of the hands play in the language¹. As I have shown (chapter 3), such a distinction is imperative in order to fully account for the morphology, syntax and semantics of backwards verbs and their relation to regular agreement verbs. The lack of such a distinction results in imperfect accounts of backwards verbs in all three analyses (see chapter 3). Moreover, ignoring this distinction makes it impossible to explain why facing plays a role in the morphology of agreement verbs, but not of spatial verbs. In this respect then, my analysis is an important improvement over previous ones. In this section, however, I shall focus mainly on other areas of difference, since the analysis of backwards verbs was dealt with at length in chapter 3.

These three analyses differ from each other with respect to two main issues: (i) the degree of isomorphism which they assume to exist between the phonology and semantics of agreement verbs, and (ii) the range of data to be accounted for. Concerning the first issue, Kegl's locative approach presents one extreme. It assumes complete isomorphism: the entire ASL lexicon (agreement verbs being no exception) is ultimately built from basic verb stems which are spatial in nature, whose phonological structure is isomorphic with the meaning they represent. Janis's Feature Hierarchy approach represents the other extreme. Under her analysis, agreement verbs are monomorphemic: their phonological specifications have no morphemic status, which implies that they have no independent semantic content. Therefore, the form of agreement verbs is arbitrary. Brentari's DTR analysis stands in between these two

¹ In a later work (Brentari, forthcoming) Brentari adds a statement concerning the orientation of the hand (in fact, the orientation of the back of the hand). However, she does not specify the different roles of the direction and the facing, and both features are stated with reference to the same R-locus, that of

extremes: it assumes that only one component of agreement verbs is motivated: the direction of the path movement, which represents analogically the path traversed by the theme argument with respect to the subject argument. The other phonological specifications of agreement verbs are not dealt with explicitly in her analysis. My analysis assumes that agreement verbs are partially, though not wholly, iconic, like the DTR. However, Brentari's formalization of this insight differs substantially from the analysis suggested here, and, as I will show, it makes the wrong predictions.

Let us turn to the second issue, the range of data to be accounted for. The three analyses target different ranges of data, and make different assumptions concerning the relationship between the various types of verbs within that range. Kegl's locative approach targets the entire ASL lexicon. It assumes that the basic word formation processes underlie the formation of all words in the lexicon, and therefore agreement verbs do not differ substantially from spatial verbs or plain verbs. Brentari's DTR analysis targets some verbs with a path movement in their phonological representation, though it does not state what the criteria are for determining that set of verbs. Her analysis is applicable to agreement verbs and to some plain verbs, to the exclusion of spatial verbs. Janis assumes that the classification of verbs into agreement, spatial and plain verbs is valid, and she aims at providing an analysis which accounts for and predicts the morphosyntactic properties of each of these classes.

From this point of view, the 'thematic analysis' is most similar to Janis's analysis.

Both analyses share the assumption that the classification of verbs according to the

the subject. Therefore, though the facing gets a separate statement in the analysis, it is nevertheless not recognized as a **different, independent mechanism** in the language.

agreement pattern they display plays an important role in the structure of these languages, and therefore need be accounted for.

The analysis suggested in this thesis, then, shares with the DTR the idea that the path movement of agreement verbs deserves a special treatment; it shares with Janis's analysis the range of data and the goals of the analysis. And as will become evident shortly, it shares with Kegl's locative analysis some of the insights concerning the role of spatial thematic roles in word formation processes in sign languages. Yet each of the other analyses misses important generalizations captured by the Thematic Structure Agreement Theory presented here.

I now turn to a more detailed examination of these analyses.

7.1 The Locative Approach (Gee and Kegl 1982, Shepard-Kegl 1985)

This approach (Gee and Kegl 1982, Shepard-Kegl 1985) is based on the 'locative hypothesis', according to which "spatial expressions are more basic, grammatically and semantically, than various kinds of non-spatial expressions. They are more basic in the sense that they serve as "structural templates" for the constructions of other grammatical systems and semantic structures..." (Gee and Kegl 1982;185). Kegl claims that the lexicon of ASL manifests in a very perspicuous manner the locative base of language and the ways in which other grammatical and semantic systems are built upon this locative base. Hence, by studying the structure of lexical items in ASL we can narrow down the set of lexico-semantic primitives of linguistic theory in

general, and characterize the ways in which they can be combined. (Shepard-Kegl 1985;76)

Kegl claims that the basic building blocks of the entire ASL lexicon are a set of movement roots (which she calls verb stems) and affixes attached to these stems. The most basic verb stems are TO and FROM, indicating the motion of an articulator *to* or *from* a certain location. These motion stems attach to *terminators*, which indicate the beginning or end position of the moved element in relation to some other element. These terminators are IN, ON, and AT. The orientation of the moved element is expressed by the stem WARD. Each of these stems takes one argument, and the features of the argument are expressed as location specifications of the beginning (in the case of FROM) or end point (in the case of TO) of the motion. These basic stems can be combined in a rule governed manner to produce more complex verbs. Both simple and complex verbs are expanded by a rule of ‘Theme incorporation’, where a nominal affix (a classifier, a noun or a nominalized verb) is attached to the verb stem. This nominal element invariably plays the role of the Theme with respect to the verb. Verbs which do not denote location or motion are derived from these basic locative building blocks by metaphorical extension of the basic verb stems into more abstract domains.

Let us look at some examples (based on Shepard-Kegl 1985;106-107): The sign MOVE (meaning ‘move something from location a to location b’) is comprised of the following morphemes: a classifier (an O handshape, which in itself consists of two classifiers - a ‘thumb’ classifier and a b-classifier) oriented downwards (indicating contact with the moving element). These morphemes are embedded in two connected

movement roots - FROM and TO, each taking a location (a and b respectively) as a complement². A verb such as CARRY-BY-HAND differs minimally from MOVE in its orientation morpheme (the orientation is upwards), indicating ‘support of the moving object by the hand’ (ibid.,106). The meaning of the verb GIVE is arrived at by a figurative extension of CARRY-BY-HAND. This figurative extension is achieved by associating the two locations with body parts (chest, in this case), indicating agreement with persons rather than with locations in space, and by changing the terminators from location (AT) to orientation (WARD). This change “serves to downplay association of the movement with actual location” (ibid., p. 107), thus necessitating a figurative reading of locative relations.

A sign such as GIVE, which is a figurative extension of the locative sign CARRY-BY-HAND, can be further extended by associating the first location with another body part such as the forehead, yielding the verb INFORM. This would indicate that the sign is a member of the cognition class (i.e. associated with thought). Thus, Kegl claims, verbs of different semantic fields are formed by figuratively extending the locative meaning of the basic verb stems, or extending the meaning of an already extended verb (as in the case of INFORM).

The theory proposed here shares some basic concepts with that of Kegl. First, in both analyses spatial notions constitute a fundamental and essential component of the lexicon of these languages, and both analyses claim that the morphology of words in those languages is directly linked to (or directly reflects) these spatial semantic notions. Therefore, both analyses posit morphemes whose meaning is spatial, and

² This is a rather oversimplified version of Kegl’s analysis. Her analysis includes other morphemes, such as a role prominence morpheme, and several levels of lexical embedding. I leave these details out,

whose form directly represents this meaning (TO and FROM for Kegl, PATH in my analysis). Moreover, in both analyses, these spatial predicates are regarded as belonging to a deeper word formation level than other processes. Another important point of similarity is that in both analyses, agreement is a property of spatial predicates. Therefore the thematic roles assigned to the agreeing nominals are spatial thematic roles (“...The thematic role of an argument is completely determined by the motion/location element (verb or preposition) with which it co-occurs” (Shepard-kegl 1985:69)).

There are, however, several differences between the two theories. First, it is important to notice that although the two analyses posit a deeper level for spatial predicates, they arrive at this conclusion from very different angles. For Kegl, this is the basic assumption underlying her conception of the ASL lexicon, since in her analysis spatial verb stems are the only building blocks available for the entire lexicon. In my analysis, there is no such axiomatic assumption. Rather, it is an outcome of the PATH-TRANSFER merger: it is necessary to assume that the agreement inflection of PATH occurs prior to the merger in order to account for the morphology of agreement verbs (section 4.3.1). A second difference between the two analyses is the following: the locative approach makes a very strong claim about the relationship between the phonology (or even the phonetics) and the semantic components of the grammar, a claim which I will show to be too strong. The claim is that there is complete isomorphism between the phonology and the semantics: “....the phonetic structure and the semantic structure of these verbs (basic verb stems which build the entire ASL lexicon I.M.), and the words derived from them, can be stated simultaneously because

since they are not relevant for our purpose here.

the phonetic and the semantic structure of ASL are virtually one-to-one maps (isomorphisms) of each other.” (Gee and Kegl 1982;186). What this actually implies is that each phonological feature is associated with a particular meaning, hence each phonological feature is a morpheme³. In other words, each path movement in the phonological representation of a sign conveys the meaning of a *path* (a trajectory an element traverses), and each location specification represents a semantic locative referent. This strong claim about the relationship between phonology and semantics is a general statement concerning the entire ASL lexicon.

My analysis differs from Kegl’s in these important respects. The ‘thematic analysis’ is intended to account specifically for verb agreement in ISL. It focuses mainly on the class of agreement verbs, and it does not assume complete isomorphism between phonology and semantics. Crucially, it does not equate PATH with any path movement in the phonological representation of a sign. A phonological path movement is the overt realization of PATH only if it carries the semantic and morphological features of PATH: denoting a motion from one point to another, and carrying agreement affixes. I also do not regard each location specification as an agreement marker; rather, an agreement marker has an **open** location slot. A location slot which has underlying location specifications (such as - ‘mouth’, ‘nose’, ‘head’, ‘torso’ etc.) is not an agreement marker in my theory.

These differences between the two theories have important consequences. Since PATH in my theory is not equated with a phonological path movement, it is possible to argue that not all verbs with a path movement also contain PATH. This claim

³ Some phonological features even consist of more than one morpheme. The hand shape, for example, is a combination of several morphemes: the thumb, the shape of the other fingers, and the relationship

enables us to draw a principled distinction between verbs which inflect for agreement (agreement and spatial verbs) and verbs which do not (plain verbs), a distinction which is not predicted by the locative approach. The thematic theory also enables us to predict which verbs fall into each class, as well as to account for the morphological properties associated with each class. In Kegl's theory, on the other hand, every sign in the lexicon is constructed from the two basic verb stems TO and FROM. Hence, all verbs are essentially 'spatial', and all verbs contain agreement markers (since each location is regarded as the complement of the verb stems). Thus, predictions about the classification of verbs do not seem to follow from Kegl's framework⁴.

Another major difference between Kegl's analysis and mine is with respect to the treatment of facing. Kegl's locative approach does not draw a distinction between facing and orientation. The grammatical role of orientation has gone unnoticed in the locative analysis⁵. This has several consequences: first, backwards verbs cannot be accounted for. Kegl does observe that both backwards verbs and regular agreement verbs display source-goal agreement. However, her analysis does not capture the 'backwardness' of backwards verbs, because it does not make the crucial distinction

between the thumb and the fingers. (See Shepard-Kegl 1985;87-103).

⁴ One might argue that this is an advantage of Kegl's theory, since the classification of verbs to the three classes might be unmotivated, creating distinctions which do not play a role in the linguistic system of the language. Such an approach is in accord with Kegl's subsequent work (ABKN 1992), where it is argued that syntactic agreement is realized as non-manual markers (eye-gaze and head tilt). Non-manual agreement markers are attached to all verbs in the language (plain, agreement and spatial), and therefore there is no **syntactic** evidence for classifying verbs into the three above classes. This approach, however, disregards the **morphological** distinctions between verbs of three classes. Specifically, the three classes have different morphological properties, and, according to my analysis, also different semantic properties, in that agreement verbs are verbs of transfer, spatial verbs are verbs of motion, while plain verbs are neither. These morphological and semantic properties are not captured by an analysis which regards all verbs as basically spatial, and all locations as agreement markers.

⁵ Kegl notices that in verbs which involve a figurative extension into the field of possession, the terminator AT (of actual spatial verbs) is changed into WARD (which is realized phonologically as the orientation of the hands). However, she describes the role of orientation as essentially semantic in that it contributes to the figurative reading of these verbs: "The association of the movement with orientation terminators serves to downplay association of the movement with actual locations" (Shepard-Kegl 1985;107).

made here between the direction of the path and the facing. The special morphological and semantic properties of backwards verbs cannot be appreciated if only one argument marking mechanism is identified.

Apart from this descriptive inadequacy, the failure to take facing into account creates a theoretical problem as well. According to the AMP's, the facing marks the syntactic object. Since the facing is part of the phonological structure of lexical items, under Kegl's framework it is part of word formation processes which build up the lexicon of the language. Since all word formation processes involve spatial notions, it is not clear how to account for an element whose function is best stated in syntactic rather than thematic terms. As 'object' is not part of the sub-lexical structure of words in her theory, and as agreement verbs are not treated as a natural class, the generalization that the facing marks the syntactic object cannot be captured.

Summary: My analysis shares some of the basic localistic assumptions of Kegl's framework. In particular, I assume complete isomorphism of form and meaning in the PATH morpheme. Furthermore, both analyses take spatial morphemes to be the basic building blocks of word formation processes in sign languages. However, unlike the locative approach, the thematic theory does not assume that this isomorphism is extended to all phonological features of the entire lexicon. Therefore, the range of data that my analysis can account for is much more restricted than that of Kegl's. On the other hand, the Thematic Structure Agreement Theory suggested here can make accurate predictions regarding the agreement patterns of the verbs in the language, and it offers explanations about the relationship between the three verb classes in the language, which cannot be captured in Kegl's analysis.

7.2 The Direction Approach (Brentari 1988, forthcoming)

Brentari's analysis of the morphology of verbs in ASL makes use of the notions of 'Path' and 'transfer'. This suggests some sort of similarity between her analysis and mine. However, she uses these notions in a very different way than the one I suggest, and therefore there are substantial differences between our analyses.

The basic idea underlying Brentari's 'direction approach' is that "...there is a correlation between the direction of Path as a part of the linguistic code of ASL and semantic notions that have been associated with transitivity relations." (Brentari 1988;21). That is to say, the direction of the Path is a reflection of the verb's transitivity relations. The process of encoding transfer relations in the morphology of the verbs in the language is expressed as the Direction of Transfer Rule (DTR):

Direction of Transfer Rule (DTR), (Brentari 1988;22):

"When the transfer of a theme is away from the subject, the Path will move away from the spatial locus associated with the signer (in the default case) or away from the overtly marked subject spatial locus. When the transfer of a theme is toward the subject, the Path will move toward the spatial locus associated with the signer (in the default case) or toward the overtly marked subject locus."

This principle is augmented with another principle in a later work (Brentari forthcoming, p. 141) which is concerned with the role of orientation:

Direction expressed by orientation:

“When orientation is relevant to the expression of the transfer of a theme, the back of the hand is oriented towards the signer (in the default case) or towards the overtly specified subject locus.”

As can be seen from the DTR, Path is the morphological realization of the ‘transfer’ relations. That is, Path and transfer reflect the same type of relations. This is clearly different from my use of these terms, where PATH and TRANSFER are two distinct morphemes, with different properties, and they encode different types of relations. What Brentari means by ‘transfer relations’ is not transfer of the action (transitivity relations), but rather the movement that the theme argument undergoes. That is, Path reflects spatial relations. While the thematic theory suggested here also associates the direction of the path movement with the direction of motion of the theme, the two analyses differ in the formulation of this motion. In particular, the ‘subject’ is central to Brentari’s analysis, whereas my analysis shows that it is not relevant. In the DTR, the path movement reflects the motion of the theme with respect to the subject. In my analysis, PATH moves from **source** to **goal**. In the DTR, the facing is stated in terms of the subject (the back of the hand is towards the subject), while the AMP’s are stated in terms of the object NP. It might be claimed that both analyses make the same statement, only using different syntactic and physiological terms (‘object’ and ‘facing’ in the AMP’s, vs. ‘subject’ and ‘back of the hand’ in the DTR): if the palm is oriented towards the object, then the back of the hand is towards the subject, hence, both analyses say the same thing. However, this similarity is an illusion. I will show that the difference in terminology captures different generalizations and also entails different predictions concerning the form of reflexive agreement verbs.

It seems that the main reason for stating the DTR in terms of ‘subject’ is the following: the DTR is intended to apply not only to agreement verbs, but to some other verbs which do not inflect for agreement (i.e. to some plain verbs) as well, such as RESPECT and INHALE. Brentari (forthcoming, p. 138) suggests that some verb stems in the ASL lexicon include a [direction] feature in the verb stem, which encodes the direction of the motion of the theme with respect to the signer (in the default case) or the overtly marked subject locus. The motivation behind this suggestion seems to be the observation that in many verbs (both agreement and plain verbs) - the direction of the path movement is not arbitrarily determined. For example - the fact that INHALE has a movement towards the signer and not away from the signer is not accidental, but rather it reflexes the meaning of the verb: the air goes **into** the subject nominal. Thus, the DTR is intended to capture a generalization about the structure of the lexicon in general, and not just agreement verbs. Yet the analysis faces several problems. Some of these problems are more general in nature, while others concern the analysis of the form of agreement verbs in particular. I turn first to the more general problems.

First, the DTR is unable to predict which verbs inflect for agreement and which do not. Since the DTR addresses both agreement verbs and (transitive) plain verbs, the agreement properties of each verb cannot be inferred from any general principle, and need be specified in the lexicon for each verb.

The second problematic aspect is with relation to the [direction] feature: Brentari does not mention which verbs have a [direction] feature underlyingly, and what the criteria are for determining this. It is not clear whether all transitive verbs which have a path

movement in their phonological representation are characterized by the [direction] feature or not. In addition, the exact nature of the [direction] feature is somewhat unclear. It is regarded as a “phonological feature with partial semantic motivation” (Brentari forthcoming, p. 143), but not a morpheme. Leaving the relationship between the phonology and the semantics unspecified in this way impedes identification of the class of ‘direction’ verbs.

A third problem is that the DTR is inapplicable to spatial verbs, since the DTR is stated in terms of the motion of the theme with respect to the **subject** nominal. That is, the subject is implicitly assumed to be source or goal. In spatial verbs, however, the subject is neither. This is illustrated in (1), where the subject HE is neither the source nor the goal of motion:

1. CUP INDEX_a HE_i aCL:C_b

‘He moved the cup from location A to location B.’

In sentence (2), the subject is the theme (the element in motion), and therefore the DTR is not applicable, since it assumes that the subject and the theme are separate entities.

2. MALE CL:bC (human) INDEX_a aCL:G_b - (MOVE)

‘The man went from A to B.’

Since the DTR cannot apply to spatial verbs, a generalization is being missed, namely that in both spatial and agreement verbs the direction of the path is from source to goal. Stating the DTR in terms of **subject** (rather than source and goal) misses this generalization.

The DTR faces some problems more specific in nature, which directly concern the form of agreement verbs. These problems stem from (a) the fact that the syntactic and semantic components are not kept apart, and (b) the fact that the DTR is stated in terms of the subject NP rather than the object NP.

1. As I pointed out earlier (chapter 3), the fact that the DTR is stated both in syntactic and thematic terms makes it impossible to account for the form of both regular and backwards agreement verbs by one mechanism. Rather, the first part of the DTR deals with regular agreement verbs, and the second part, with backwards verbs. This is in contrast with my analysis where both types of agreement verbs are handled by the same mechanism - the AMP's.
2. Reference to the subject NP instead of to the object NP results in wrong predictions concerning the form of reflexive verbs. In ISL, a reflexive verb is not marked by special reflexive morphology⁶. Rather, it takes the form ${}_i\text{VERB}_i$; that is, both agreement markers are assigned the same reference point. Since the S and O of the verb share the same locus (and the source and goal as well), it is of interest to see what direction the path movement and the facing take. The DTR is

⁶ ASL differs from ISL in that respect: in ASL there is a reflexive pronoun (an A handshape with an extended thumb), and the verb is articulated with respect to the locus of that pronoun (Diane Brentari, personal communication). The DTR (which was developed to account for the facts of ASL, not ISL) may then be able to account for reflexives in ASL. But Janis (1992:223 and 338) points out that in ASL, agreement verbs have an inflected reflexive form of the verb (in addition to the reflexive pronoun). This reflexive form exhibits object agreement rather than subject agreement. For example "The 1st person reflexive form looks the same as a non reflexive that agrees with 1st person object and a subject whose locus is right in front of the signer." (ibid., p.223) The DTR is not able to account for these ASL forms, as I show below.

stated in terms of the subject only, and thus it predicts that in case of regular verbs, the path movement will be away from the subject (since the theme is transferred from S), and **the back of the hands** will be towards the S-O locus; and in case of backwards verbs, the path movement will be **towards** the subject (since the theme is transferred to S), and **the back** of the hands - again towards the S-O locus. These predictions, however, yield wrong results: in ISL reflexive verbs there is hardly any path movement at all, and if any path movement can be discerned, it is an upwards movement **towards** the locus of the Subject-Object in regular agreement verbs. The facing of the hands is towards the locus of the S-O. In the case of reflexive backwards verbs (as, for example, in -₁TAKE₁ 'I took (something) from myself'), the reduced path movement is **away** from the locus of the S-O, again, contrary to the predictions of the DTR. The facing of the hands in both regular and backwards verbs is **towards** the locus of the S-O. Thus, the DTR is unable to account for the form of reflexive agreement verbs. The AMP's, on the other hand, which are stated in terms of the object nominal, correctly predict the form of reflexive agreement verbs.



Figure 7.1: Reflexive forms of agreement verbs

Summary: The main points of difference between the DTR and the Thematic Structure Agreement Analysis are: (a) the DTR is stated in terms of subject, while the thematic analysis shows that this notion is not relevant for characterizing agreement morphology; (b) the DTR assumes an underlying phonological feature of [direction]. These differences result in wrong predictions concerning the form of reflexive agreement verbs, and the inability to capture the similarities and differences between spatial and agreement verbs and to predict the agreement patterns of the verbs in the language.

7.3 The Controller Features Analysis (Janis 1992).

The work of Janis (1992) deals with the morphosyntactic properties of verbs in ASL, and in particular, their argument-taking properties and their morphological expressions (agreement and classifiers). Her detailed and careful work is the most comprehensive attempt to provide a unified account for the different agreement patterns of verb classes in the language, and several of her observations inspired directions for investigation in the present work. Both works share the same goals: (a) to predict the agreement patterns of all verbs in the language, and (b) to account for agreement in a sign language by general linguistic principles. Moreover, both analyses argue that it is the semantics of the verbs which determines their agreement properties: "...the determination of agreement has a lexical component... but we argue that the basis of that lexical component is semantic, and therefore predictable."(Janis 1992;267). The two analyses, though, differ substantially in their basic assumptions concerning the nature of agreement verbs, and in the mechanisms they assume to account for agreement morphology.

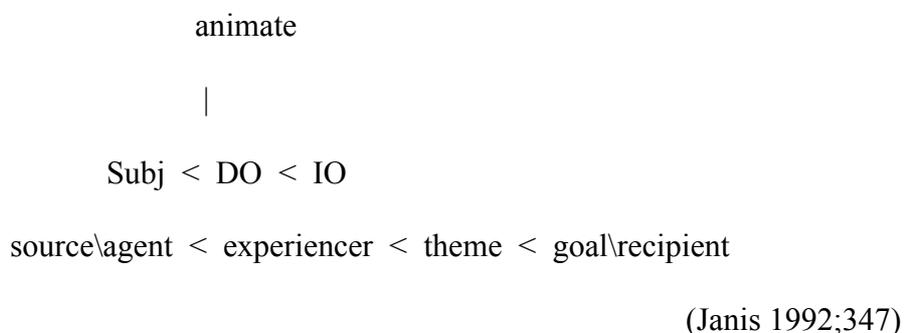
Janis provides a detailed description and analysis of the similarities and differences between the three verb classes, and in particular, between agreement and spatial verbs. Her treatment claims that agreement verbs are diachronically derived from spatial verbs by a process of lexicalization, whereby the locative meaning of the basic verb is lost and gives rise to a more abstract sense of motion, i.e., transference. This process also turns a classifier handshape into an arbitrary handshape, and it turns locative agreement into an arbitrary part of the form of a verb root (*ibid.*, p. 269). In other words, the lexicalization process causes the various components of spatial verbs to lose their morphemic status, thus resulting in a monomorphemic verb, whose meaning is no longer spatial (or locative, in Janis's terms).

Janis argues that regarding lexicalization as a diachronic process, rather than as a productive syntactic process (as in Kegl's analysis), can better capture several facts about the relationship between spatial and agreement verbs in ASL: it can explain the similarities in form between certain spatial and agreement verbs (e.g., CARRY-BY-HAND vs. GIVE), while it also captures the fact that the classifier and locative meanings present in spatial verbs are lost in the agreement verb cognates. It can also explain the many gaps in the lexicon, where agreement verbs cognate to spatial verbs could exist, but don't. Thus, under her analysis, agreement verbs and spatial verbs are similar in that both control agreement, but synchronically they do not have any semantic common property. Therefore, an account of their agreement properties cannot be stated in terms of a morpheme common to verbs in both classes.

Janis's controller feature approach to verb agreement is that agreement is not a property of the verb *per se*, but rather a property of the nominals associated with the

verb. In order to see whether a given nominal may control agreement, it is necessary to examine whether it has the required controller features. If there are more possible controllers than agreement slots “the agreement facts can be predicted by hierarchically ranking the controller features as to which ones take precedence.” (Janis 1995;197). The controller features identified by Janis for ASL are of three types: semantic roles (SR’s), grammatical roles (GR’s) and animacy. The controller features and their ranking are given below:

3.



This feature hierarchy is supplemented by a principle determining the association of controller features to agreement slots:

4. Using the SR hierarchy

- a. associate slot 2 with the highest available controller.
- b. associate slot 1 with the lowest available controller.

Her analysis is especially intended to account for cases where the same verb can appear in two different agreement patterns. The verb TEACH (ASL) for example, inflects for agreement when its object is animate (e.g. ‘adults’), but not when its

object is inanimate (e.g. 'math'); that is, it is an agreement verb in one context, and a plain verb in another (*ibid.*, pp. 322-330).

Under Janis's analysis, one need not assume that there are two different verbs meaning TEACH, which have the same form but different agreement properties. Rather, the different agreement patterns are attributed to the different properties of controllers: if the object is animate, it can control agreement. Hence the verb is an agreement verb. If, on the other hand, the object is inanimate, it cannot control agreement. Since the subject nominal cannot control agreement unless the object nominal does so too, the verb has no possible controllers, thus it does not agree at all (that is, it is a plain verb).

The mechanism of controller features Janis presents succeeds in making correct predictions regarding most of the verbs in the language, except for the problem of accounting for backwards verbs. As was pointed out in chapter 3, the SR hierarchy cannot be applied in the case of backwards verbs, since it assumes the semantic roles of agent and source to be one unified semantic role. In backwards verbs these semantic roles are dissociated, thus rendering the hierarchy non-applicable. The controller feature analysis also misses some generalizations concerning the relationship between spatial and agreement verbs, and several aspects of the analysis are stipulated, thus reducing its explanatory power. Two problematic aspects will be examined here - the treatment of thematic roles, and the treatment of the facing.

A. **Thematic roles.**

The first problem concerning thematic roles is that The Controller Feature Approach does not distinguish between two **types** of thematic roles - that is, spatial thematic roles and action thematic roles. Rather, the SR hierarchy is stated in terms of **both** spatial and action thematic roles. This has several disadvantages: (a) The association of arguments to agreement slots is stated in terms of an ad-hoc four place hierarchy (shown in (3)), rather than by the two thematic roles of source and goal of the AMP's. (b) It results in contradictions in the case of backwards verbs, in that the agent role is either superfluous or it makes the analysis inapplicable (as was shown in chapter 3.4.). (c) The SR hierarchy applies only to agreement verbs, but not to spatial verbs. Therefore, it misses the generalization that in both types of verbs the source nominal is associated with the 1st slot and the goal nominal with the 2nd slot.

A second problem with Janis's SR hierarchy is the need to stipulate many aspects of the analysis, which weakens its explanatory power. Since Janis regards agreement verbs as monomorphemic, with no locative-spatial meaning components, the association between the SR and the agreement slots (shown in (4)) is arbitrary and must be stipulated. However, in sign languages this association does not seem to be arbitrary, but rather it is motivated: it would be very strange to imagine a sign language where the beginning point of a sign would indicate the goal argument while the end point would be associated with the source argument. This is true both in verbs which denote real motion, as well as in verbs which denote abstract motion. The fact that studies of numerous unrelated sign languages have confirmed this observation cannot be accidental. Therefore, the ad-hoc nature of the association between

agreement slots and SR's in Janis's analysis, makes it much less explanatory than the analysis suggested in this thesis⁷.

B. The facing:

Janis was the first one (to the best of my knowledge) to observe that although agreement can be manifested by the direction of the path and/or by the orientation of the hands, spatial verbs mark agreement only by the direction of the path (in my terms - facing is not operative in spatial verbs). Agreement verbs, on the other hand, can take all three possibilities. Janis suggests that this can be predicted by the relationship between the number of the arguments of the verb and the number of morphological agreement slots: if the number of arguments matches the number of slots - the verb takes orientational agreement (i.e., facing). If there is a mismatch, and the number of arguments exceeds the number of slots, the verb takes positional agreement (i.e., direction of path agreement, *ibid.*, p. 404). Monotransitive agreement verbs, which license two arguments in the syntax and have two agreement slots, are predicted to mark agreement by facing, since the syntax matches the morphology. Di-transitive agreement verbs, which license three arguments in the syntax yet have only two agreement slots, will mark agreement by the direction of the path. As for spatial verbs, since they always have syntactic arguments which are not associated with an agreement slot (the subject in particular), they mark agreement solely by the direction of the path, and not by facing⁸.

⁷ Attributing the spatial 'flavor' of agreement verbs to a diachronic process of lexicalization cannot suffice, since it makes no predictions about new verbs which are introduced into the language.

⁸ Verbs with double agreement (agreement verbs which are both directional and reversible) are explained on phonological grounds: Janis suggests that these verbs are essentially directional, but in addition to that - they have no specifications for orientation in their underlying phonological representation. Therefore, agreement, which is linked to the position (location) tier of these verbs, will

There are several problems with this analysis: first, it does not always hold. Janis herself notices that verbs such as INFORM, TTY-TO, FEED and SPEND (ASL) are monotransitive, yet exhibit positional rather than orientational agreement (*ibid.*, p.407). She argues that these verbs have an additional implicit argument (*information, money etc.*), and therefore can be regarded as di-transitive. This explanation, however, is quite dubious, since the generalization is stated in terms of **syntactic** arguments, while implicit arguments have no syntactic realization. Hence it is not clear why implicit arguments should have any affect on the form of agreement. Other types of counterexamples also exist, e.g., the verb SHOW (ISL and ASL), which is di-transitive, yet marks agreement by direction and not by orientation. Thus, descriptively this analysis is inadequate. This analysis is also inadequate from an explanatory point of view. It is not at all clear why the form of agreement should be related to the relationship between the number of syntactic arguments and the number of agreement slots.

To summarize, the Controller Feature Analysis and the Thematic Structure Agreement Theory differ mainly in their explanatory power, but also in the predictions they make. Janis's analysis does not capture the similarities between spatial verbs and agreement verbs. Furthermore, several basic aspects of the analysis have to be stipulated ad-hoc, especially with regards to the association of arguments to agreement slots, and with respect to the facing of the hands. These problematic aspects find a natural solution in my analysis. First, by recognizing the spatial component of agreement verbs, that is - PATH, the similarities between spatial and agreement verbs are captured straightforwardly: in both, the path is from source to

also spread to the (empty) orientation tier, thus resulting in double agreement on the surface (Janis 1992;412).

goal. Hence, in both classes of verbs, the only thematic roles relevant for agreement are the spatial thematic roles - source and goal. Second, by distinguishing facing from direction of path movement, my analysis correctly predicts the form of the different agreement verbs (regular and backwards verbs), and at the same time provides an explanation as to why facing is not operative in spatial verbs. Thus, Janis's analysis of agreement verbs as monomorphemic makes it necessary to stipulate many aspects of their behavior. The thematic structure approach, on the other hand, recognizes the various components of agreement verbs and their different roles, and offers a natural explanation of the morphology and semantics of these verbs by using a small number of general principles.

7.4 Summary:

The Thematic Structure Agreement Theory vs. Other Theories

My work differs from previous ones in that it presents a componential analysis of agreement verbs, and it attributes different properties to the various components of agreement verbs. Therefore, it can capture both the spatial and the non-spatial nature of agreement verbs. Such distinctions cannot be made in an analysis which regards agreement verbs as monomorphemic (Janis 1992), nor in an analysis which regards them as spatial in nature (Shepard-Kegl 1985), since each can capture only one of the facets of agreement verbs.

Most importantly, this analysis poses significant challenges to general linguistic theory, in that it shows ways in which sign languages differ from spoken languages. In particular, the problem of thematic agreement could not be raised in an analysis

where agreement is not stated in thematic terms (Janis 1992 and Brentari 1988). As we saw, the challenge of accounting for thematic agreement within the framework of general linguistic theory resulted in an analysis which both clarified the nature of agreement in language in general, and at the same time pinpointed the differences between languages in two different physical modalities. The theoretical significance of this will be further elaborated in chapter 8.

Chapter 8

Agreement in Broader Context:

Sign Languages vs. Spoken Languages Reconsidered

Introduction

The main conclusion of my analysis of verb agreement in ISL is that agreement is a unified phenomenon in both signed and spoken languages, as it is basically a syntactic relation between a head and its dependents. Thus, languages in both modalities can be accounted for by the same theoretical apparatus. Yet, verb agreement in sign languages still looks very different from agreement constructions in spoken languages. The tri-partite classification - plain, agreement and spatial verbs - which seems to characterize sign languages in general (Newport 1996, Lillo-Martin and Sandler in preparation), has no equivalent in spoken languages. And though this classification has been shown to follow general linguistic principles, nonetheless it still sets sign languages apart as a group. The question that arises is then - why the difference? If agreement is essentially a unified phenomenon, why do sign languages seem so different? Considering sign languages in the context of cognitive modularity, Sandler (1993b) argues that a comprehensive theory of language should not only highlight the similarities between signed and spoken languages, but should also pinpoint where the two types of languages differ from each other, and, ultimately, offer an explanation for these differences. Since verb agreement is a central aspect of the grammar of sign languages, it is both a fitting and a useful vehicle for examining sign languages in this broader theoretical context. That is the main concern of the present chapter.

Three main issues are at stake:

- i. The similarity between sign languages: Why do different sign languages look so much alike with respect to their agreement properties? That is - why do unrelated sign languages have the same basic three-way verb classification (plain, spatial and agreement verbs)?
- ii. The diversity of spoken languages: Why don't spoken languages resemble each other as sign languages do?
- iii. The differences between languages in the two modalities: How do sign languages differ from spoken languages? How can these differences be accounted for?

It is important to stress that the similarities between unrelated sign languages are much more striking than is the case for unrelated spoken languages, and that these common traits appear in all levels of linguistic structure (Newport 1996, Sandler 1993b, 1995a, Sandler and Lillo-Martin in preparation). Furthermore, the particular combination of properties found in sign languages generally is not found in any spoken language (Gee and Goodhart 1988, Sandler and Lillo-Martin in preparation). For example, the fact that all sign languages apparently have the same three agreement patterns and verb classes has no parallel in spoken languages. Notice that the similarity is both in the morphological form and in the semantics of these verb classes. An equivalent in spoken languages would be for all spoken languages to have the Semitic 'binyanim' (verb classes), and, even more than that, for all spoken languages to have precisely the same classes, both in form and in meaning or syntactic valency. Clearly, no such uniformity is found across spoken languages. This root and pattern morphological trait is a property of only one specific language

family, and within that family, the number of forms and their associated meanings vary from language to language.

I suspect that this combination of properties is the result of a conspiracy between various factors, some of which are modality driven, while others may be rooted in the human language capacity and some general cognitive principles¹. Obviously, providing a general solution to this typological challenge is far beyond the scope of this work. What I will attempt to do here is to tackle the challenge from the perspective of one specific point of view, that of verb agreement. I will suggest that the uniformity of verb agreement across sign languages is the result of interaction between a general cognitive principle concerning the role of iconicity in our cognition and language (the ‘iconicity hypothesis’), and the possibilities for the realization of this principle provided by the visual modality. The uniformity of sign languages, and the differences between signed and spoken languages will then be ascribed to the fact that sign languages, but not spoken languages, can represent spatial relations iconically. As spatial relations are central to the structure of language², the different possibilities for expressing them allowed for by the two modalities result in a significant difference in the structure of languages of the two modalities.

A note of caution is warranted before pursuing this subject: When addressing such broad issues as the nature of sign languages vs. spoken languages, any explanation is inevitably speculative to some extent and possibly over-generalizing. The explanation I suggest is intended to account for properties of sign languages vs. spoken languages

¹ See e.g., Gee and Goodhart (1988) for an explanation of some of these traits in ASL as a consequence of the nativization and modality constraints.

² For the centrality of spatial relations in human language and cognition, see H. Clark (1973), Gruber (1976), Jackendoff (1976, 1987), Miller and Johnson-Laird (1976) and references cited there, Lyons (1977).

in general, though it is based on my own research about one particular sign language (ISL), and research available in the literature on other sign languages and various spoken languages. The sign language literature is mainly on ASL, a language unrelated to ISL as far as we know. Work on agreement and verb classes in other sign languages include British SL (Kyle and Woll 1985), Italian SL (Pizzuto et. al. 1990), Taiwan SL (Smith 1990), SL of the Netherlands (Bos 1993, 1994), Danish SL (Engberg-Pedersen 1993), Japanese SL (Fischer 1996). This is just a small sample of the sign languages of the world, yet at least some of these languages are unrelated to each other. Therefore a property (or set of properties) common to all of them which does not occur in spoken languages could be regarded as a candidate for a “sign language universal” and as such requires an explanation. Research on agreement in spoken languages has been conducted on a much wider array of languages and language families. Generalizations about spoken languages in this chapter are based on works cited in the references. Hence, reference to ‘sign languages or spoken languages in general’ in this chapter is meant to be understood as ‘those sign languages and spoken languages that I am aware of’. Such an approach places the analysis of verb agreement in a broader context, showing how research on a specific phenomenon in one sign language can further our understanding of language in general, in a way that would have been impossible without taking sign languages into consideration.

The chapter is organized as follows: section 8.1 addresses the differences between signed and spoken languages from the point of view of pronominal agreement. Two differences are brought up, both of which allude to the centrality of spatial relations in explaining the typological puzzles presented above. This line of argumentation is

developed in 8.2., where it is argued that the iconicity of spatial predicates is the main factor differentiating languages in the two modalities. This type of iconicity is further explored, suggesting that iconic representation of conceptual functions can serve as a useful tool for the study of conceptual structure. The facing of the hands in agreement verbs is examined in light of this suggestion (section 8.3). Finally, section 8.4. forms the conclusions.

8.1 In What Ways Do Sign Languages Differ from Spoken Languages?

The analysis of ISL verb agreement in this work reveals two main differences between ISL and spoken languages: the nature of the agreeing element, and the relative order of the agreement process with respect to other morphological processes. Each of these factors is examined below.

8.1.1 The Nature of the Agreeing Element

The first major difference between languages in the two modalities with respect to their agreement systems lies in the nature of the agreeing element: in spoken languages the agreeing element is the verb or the auxiliary, while in sign languages, according to the analysis proposed here, it is spatial predicates³. This point has an important implication, namely that spatial predicates in ISL form a natural class. This natural class is defined on semantic as well as on morphological grounds.

³ The analysis of agreement verbs and spatial verbs in this thesis focused on one particular spatial predicate - PATH. However, I argued (Ch. 4.2.1.) that agreement is a property characterizing not only PATH, but the class of spatial predicates in the language. A more thorough examination of spatial predicates other than PATH, and the role they play in the agreement systems in the language awaits future research.

Semantically, the members of this class denote spatial relations. Morphologically, they carry agreement affixes. At first sight, this might not seem to be so different from spoken languages: in many spoken languages, spatial relations are expressed by prepositions, which (in many of these languages) constitute a natural class with well defined syntactic, semantic and/or morphological properties. However, there are two important differences between spatial predicates in ISL and prepositions in spoken languages.

First, ISL spatial predicates are iconic: their form is a transparent representation of the spatial relation they represent (as is illustrated in figure 8.1)⁴. In spoken languages this possibility is not available: sounds emitted by the vocal tract cannot represent spatial relations in the direct manner which is possible in the visual modality. As we shall see below, this seemingly trivial fact plays a central role in explaining issues (i) (ii) and (iii) above.



IN



ON-TOP-OF

⁴ Gee and Kegl (1982) make the same statement: they describe predicates denoting spatial relation (their 'locative/directional verbs') as verbs '...whose phonetics and semantics are isomorphic.' (ibid., p.199). See also Schick (1990).

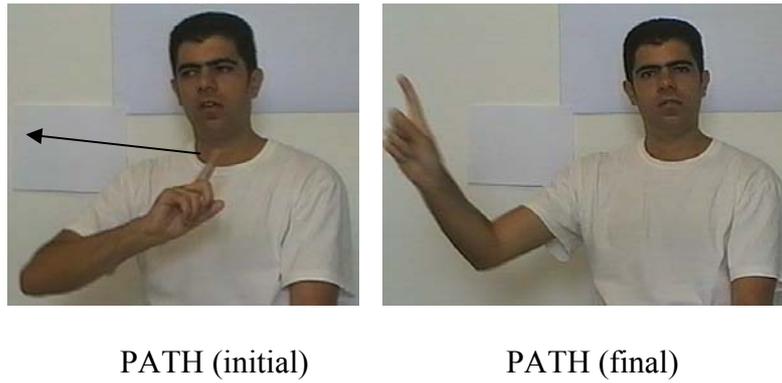


Figure 8.1: Iconic spatial predicates in ISL.

Second, spatial predicates in ISL carry agreement affixes. This might not seem so unusual, as quite a few spoken languages have agreeing prepositions. However, verb agreement is much more common in spoken languages than preposition agreement. For example, in a list of 65 spoken languages presented in Nichols (1986:68-69) there is no language with preposition agreement which does not have verb agreement as well. However there are quite a few languages with verb agreement but no preposition agreement. Thus, it seems that in spoken languages verb agreement is typologically much more common than preposition agreement, whereas with sign languages the reverse is true: no sign languages have been reported to lack agreement with PATH (that is, source-goal agreement) and all have a class of plain verbs which do not agree. In some sign languages there are auxiliary-like elements which mark agreement with syntactic functions (e.g., Taiwan SL in Smith 1990, SL of the Netherlands in Bos 1994, Japanese SL in Fischer 1996). However, these elements occur in addition to the existence of the source-goal agreement pattern in these languages. Thus, spoken languages and sign languages seem to exhibit reverse patterns concerning the nature of the agreeing element: prominence of verbs and auxiliaries in spoken languages, prominence of spatial predicates in sign languages.

8.1.2 The Relative Ordering of the Agreement Process in the Morphology

The PATH-TRANSFER merger process reveals another important difference between languages in the two modalities: the morphology of agreement verbs, and in particular - the ‘double-marking’ of the arguments, necessitates an analysis which assumes that the inflection of PATH for agreement occurs prior to the merger of PATH and TRANSFER. That is, the agreement affixes attached to PATH are co-indexed with the source and goal arguments before PATH undergoes other morphological processes in the language ⁵. As was pointed out (chapter 4.3.1.), after the merger process takes place, the argument-marking properties of PATH are no longer syntactically active. However, they are still visible in the **morphology** of these verbs. To put it in more general terms, spatial thematic relations constitute a very important and basic component of the morphology of the signs, in that the form of the sign reflects the spatial relations (or spatial thematic roles) between the arguments of that sign⁶.

As was the case with agreeing prepositions, morphological marking of spatial relations is not a property unique to sign languages to the exclusion of spoken languages. Spoken languages may exhibit this property as well. For instance, in German, particles attached to verb stems may convey spatial information: motion of

⁵ Although the actual phonetic form of the inflected verb is not specified in the lexicon but rather in the discourse, the marking of the arguments as source and goal has to be specified before PATH merges with TRANSFER (see chapter 4.3.1.)

⁶ This conclusion, which was arrived at here because of the need to account for the ‘double marking’ of the arguments of agreement verbs, is quite similar to the theory proposed by Kegl (Gee and Kegl 1982, Shepard-Kegl 1985) whereby it is claimed that the basic building blocks of the entire ASL lexicon are spatial ‘verbs’. Though the two analyses differ in important respects (see chapter 7.1.), they share the following basic claim: spatial predicates are an essential component of the morphology of signs in sign languages.

the theme away from or towards the speaker, as is illustrated by the verbs in (3)⁷. The particle *ein-* in these verbs denotes motion towards the speaker, the particles *aus-* and *ver-* denote motion away from the speaker:

1.

<i>fahren-</i> - to travel	<i>einfahren</i> - to bring in, to enter	<i>ausfahren</i> - to take out for a drive
<i>gehen</i> - to go, walk,	<i>eingehen</i> - to arrive, come in	<i>ausgehen</i> - to go out, come out
<i>nehmen</i> - take, accept	<i>einnehmen</i> - to take, receive	<i>ausnehmen</i> - to take out
<i>senden</i> - to send, transmit	<i>einsenden</i> - to send in, contribute	<i>versenden</i> - to send off, export
<i>brechen</i> - to break, quarry	<i>einbrechen</i> - to break in	<i>ausbrechen</i> - to break out, escape
<i>kaufen</i> - to buy		<i>verkaufen</i> - to sell
<i>leihen</i> - borrow		<i>ausleihen</i> - lend
<i>berufen</i> - to call, appoint	<i>einberufen</i> - to convene, summon	

Samoan also has particles that indicate ‘direction away ...(or) towards the speaker’ (Marsack 1980;73.). For example, the verb *fa’atau* means ‘to exchange goods for money or money for goods’. The appropriate sense of ‘buy’ or ‘sell’ is achieved by means of the directive particles *atu* (‘away’) and *mai* (‘towards’):

2. *fa’atau atu* - to sell

fa’atau mai - to buy. (ibid., p. 73).

Several language families in North America, such as the Sahaptian and Iroquoian languages have directive affixes that indicate motion towards or away from the speaker or other deictic center (Marianne Mithun, personal communication). All

⁷ I thank Penny Boyes-Braem for bringing these German particles to my attention.

these examples show that spatial relations, and especially direction of motion towards or away from the speaker, can be conveyed by the morphology of words in spoken languages as well. Notice, though, that the **form** of these morphemes differs from language to language (as the German and the Samoan particles show). This seemingly trivial observation plays an important role in characterizing the difference between sign and spoken languages in the following sub-section.

However, again there is a difference in the extent and regularity to which this device is used by languages of the two modalities. There are many spoken languages whose morphology does not reflect spatial relations at all. And even in those languages where spatial relations are encoded morphologically, this coding is not regular. For example, the German particles in (1) do not reflect motion towards or away from the speaker in all of their occurrences. In sign languages, on the other hand, spatial relations are reflected by the morphology of a sign whenever its meaning has a spatial component in it. As claimed here, all verbs whose meanings involve motion from source to goal (a 'path') incorporate a PATH morpheme in their morphology. Thus, large portions of the signs in the sign language lexicon reflect the spatial tier of their LCS in their morphology.

Summary

When the agreement systems of signed vs. spoken languages are compared, the following differences emerge: in sign languages the elements carrying the agreement morphology are spatial predicates, and these predicates are incorporated into the morphology of a large part of the lexicon. In spoken languages, agreement is usually marked on verbs or auxiliaries, and spatial relations are not regularly reflected in the

morphology. It turns out then, that the difference between languages in the two modalities is centered on the role and realization of spatial relations in the structure of the language.

8.2 The Modality Impact: Iconicity of Spatial Predicates

The difference between modalities in this respect is largely quantitative: features which characterize sign languages (e.g., agreeing prepositions and morphological marking of spatial relations) can also be found in spoken languages, but in a more restricted and less regular manner. However, there is one feature characterizing spatial predicates in sign languages which cannot be matched in any spoken language: their iconicity. This section examines the role that iconicity plays in explaining the typological puzzles (i)-(iii) above.

8.2.1 Iconicity and Arbitrariness in Language: Spoken vs. Sign Languages

The extent to which iconicity plays a role in language has long been a matter of dispute among linguists. Ever since Saussure's "Course in General linguistics", which is considered to be the foundation of modern linguistics, the notion of the arbitrariness of the linguistic sign became one of the most widespread beliefs in modern linguistics. Saussure based this observation on spoken languages. However, the idea of the arbitrariness of the linguistic sign was so prominent, that when sign languages came to be more widely known, one of the main reasons for not regarding them as full fledged languages was precisely the non-arbitrary nature of their lexicon (see e.g., Bloomfield 1933;144, cited in Sandler 1989). Consequently, the first works in SL

linguistics put strong emphasis on proving that in spite of the iconic nature of many of the signs, iconicity does not play a role in linguistic processes in the language (Klima and Bellugi 1979), does not facilitate acquisition (Meier 1982), and is in many cases overridden by other linguistic processes or historical changes (Frishberg 1975). Though iconicity was assumed to play a role in the formation of new words in the lexicon, it was also shown that a large part of the lexicon is not iconic. Even in signs which are iconic in nature, the choice of the property of the referent which triggers iconicity is arbitrary, as is pointed out in Klima and Bellugi (1979; 21): the signs for TREE in ASL, Danish SL and Chinese SL are all iconic, though different.

The ‘arbitrariness hypothesis’ is nonetheless not uncontroversial, even with respect to spoken languages. It has been suggested (Haiman 1980, Haiman 1985 and works in that volume, Landsberg 1995 and works in that volume) that language is much more iconic than meets the eye, and indeed that iconicity could be regarded as a functional explanation for various aspects of linguistic form. More specifically, these works assume that “linguistic forms are frequently the way they are because, like diagrams, they resemble the conceptual structures they are used to convey.” (Haiman 1985;1).

Iconic representations in spoken languages are by and large of two types:

(1) Onomatopoeia - isomorphism between the form of a word and its meaning.

Onomatopoeic words are words whose sounds are imitative of the natural sounds they represent, e.g., animal sounds, the splashing of water, the sound of a bell.

(2) Diagrammatic iconicity - iconicity in the configurational and schematic characteristics of language structure. In this type of iconicity the arrangement of the linguistic signs with respect to one another mirrors the relationship between

their referents, like a diagram. The form of each sign, though, need not resemble its referent in any way (Haiman 1980;515). The most straightforward example of diagrammatic iconicity is that of temporal sequence, where the order of the sentences in a narrative corresponds to the temporal sequencing of the events they describe. Other examples of diagrammatic iconicity have been also argued for. For example, Bybee (1985) argues that the order of inflectional morphemes vis. a vis. their stems reflects the degree of relevance of the corresponding semantic categories to the meaning of the verb. The more relevant a morphological category is to the verb, the closer its marker is predicted to occur with respect to the verb stem. This prediction is borne out in the language sample investigated by Bybee, where aspect markers are the closest to the verb stem, to be followed by tense, mood and person markers. Another example of diagrammatic iconicity is given by Givon (1985), who argues that there is a correspondence between the degree of accessibility of a discourse referent and the linear position in the sentence of the NP denoting that referent.

The majority of works on iconicity in spoken languages deal with diagrammatic iconicity. Iconicity in the lexicon, i.e., isomorphism between sound and meaning as in onomatopoeic words, has figured much less prominently in these works⁸. It seems that the common assumption is that “grammar is iconic, but that the lexicon is arbitrary - or that iconicity is only marginal to it” (Waugh and Newfield 1995).

⁸ But see Waugh and Newfield (1995), the main claim of which is that “there is a much stronger iconic correspondence between form and meaning in the lexicon with respect to specifics of sound than has hitherto been recognized: in many respects, the sounds of a given word are an iconic cue to its meaning”. (ibid., p. 190).

Sign languages differ from spoken languages in that respect: one of the most striking features of sign languages is the iconic nature of their lexicon. The forms of many signs directly represent the visual properties of the elements they designate (Klima and Bellugi 1979). Thus, signs such as HOUSE, TREE, CAT, EAT, BOUNCE-BALL, can be regarded as onomatopoeic representations of some visual properties of their designata. Moreover, a large class of morphemes in sign languages encodes the visual properties of entities, namely - Size and Shape Specifiers (SASS's), (Supalla 1986, Schick 1990, Valli and Lucas 1992 and references cited there).

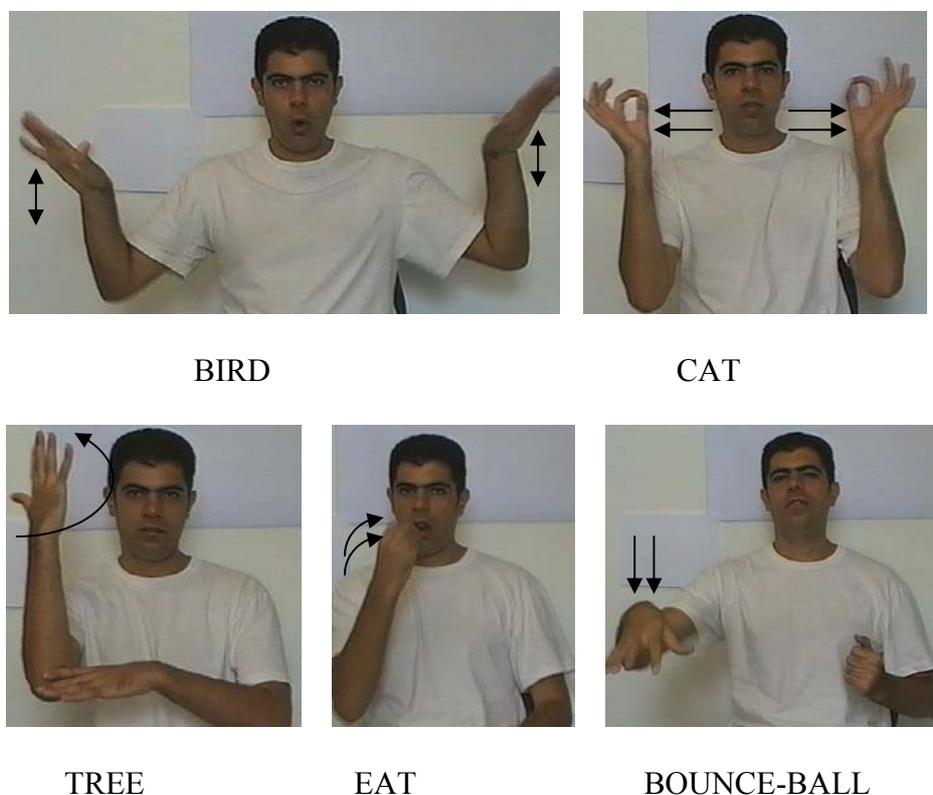


Figure 8.2: Visual iconicity in the form of some ISL lexical items.

However, iconicity in sign languages is not restricted only to representing the visual properties of referents. It also plays a central role in the expression of relations between referents, most notably spatial relations. The position or motion of the hands with respect to each other and/or the signer's body can be used to represent in a

transparent manner the spatial relationship between two entities, an entity and a location, or the path that an entity traverses between two locations. The iconic nature of spatial relation representation is especially salient in classifier predicates and predicates denoting location and motion. Several analyses of the morphological structure of these predicates have posited the existence of verbal roots denoting basic spatial relations, whose form is an iconic representation of the relation they represent, e.g., TO and FROM (Gee and Kegl 1982, Shepard-Kegl 1985), ‘linear’, ‘arc’ and ‘circular’ (Supalla 1982), MOV (‘move’, Schick 1990). These spatial-verbal roots, however, are not restricted to verbs denoting real-world motion and location. As is argued extensively by Kegl in the works mentioned above (concerning ASL), other semantic domains, such as possession, emotion and perception, can be derived by metaphorical extension of these basic verbal roots. In that sense, ASL can be said to represent iconically not only real-world entities and relations, but also elements of conceptual structure, such as the abstract spatial thematic relations which hold between a predicate and its arguments. Therefore, the morphology of ASL can serve as a tool for the investigation of thematic structure:

“The ASL verbal system ... is shown to be “semantically perspicuous”, that is, the morphological structure of ASL mediates a virtual one-to-one map (isomorphism) between its phonetic structure and its semantic structure. This perspicuity gives us a “window” onto semantics, rendering ASL an invaluable resource for the study of lexical (word) semantics.”
(Gee and Kegl 1982; 186).

The morphology of verbs in ISL is semantically perspicuous in the same way as ASL. This special semantics-morphology mapping was captured in the Thematic Structure Agreement Analysis suggested here by the PATH morpheme, and this analysis seems

to be by and large applicable to the facts of ASL. Moreover, this special semantic perspicuity seems to characterize sign languages in general. Sign languages then are iconic in a very specific manner, which is not manifested in spoken languages. This tackles the typological puzzles from a different angle, which is examined in the next section.

8.2.2 Iconicity in Verb Agreement

A comparative perspective on the facts of verb agreement helped us formulate the typological puzzles (i)-(iii) above, and helped us locate the key to explaining these puzzles, namely - the iconic representation of spatial predicates. In this section I present the special contribution offered by sign languages by looking at these typological puzzles from the point of view of iconicity in verb agreement. Two points are presented:

1. The typological puzzle is re-stated in terms of iconicity, thereby focusing on the point which distinguishes between languages of the two modalities. The question to be asked is then - why is it that all sign languages exhibit the kind of semantic perspicuity mentioned above, while spoken languages do not? Examining the problem from this narrow perspective will enable us to get some insight as to the interaction between iconicity, language and modality.
2. The nature of this semantic perspicuity is further explored, in light of the role it plays in the morphology of verb agreement. This examination pinpoints the uniqueness of this type of iconicity, and suggests an explanation as to why it cannot occur in spoken languages, thus emphasizing the unique contribution of sign languages to linguistic theory in this respect.

8.2.2.1 Iconicity and Modality: Iconicity as the Preferred Strategy

A. The iconicity hypothesis:

The manual-visual modality makes use of a 3-dimensional space. The 3-dimensionality of the manual-visual modality enables languages transmitted in that modality to have iconic spatial predicates, predicates whose form is a direct iconic representation of their meaning. The auditory modality, on the other hand, cannot offer this possibility. The nature of the acoustic signal is so different from the 3D space where spatial relations take place as to render impossible any direct mapping between spatial relations and sounds. Therefore, the expression of spatial relations in speech is necessarily arbitrary. And it is this arbitrariness which explains the diversity of spoken languages. There is no one combination of sounds which is better than others to convey the notion of source, goal, path, or any other spatial relation. Consequently, there is a wide variety of forms for conveying spatial relations in spoken languages.

Sign languages, transmitted in space, differ from spoken languages in that respect, because the manual-visual modality enables them to convey spatial relations iconically. Hence, predicates denoting spatial relations in visual languages **can** be iconic. However, the fact that **all** sign languages seem to convey spatial relations in the same way points to a much stronger statement: it is not only the case that the

visual modality makes it possible for sign languages to have iconic spatial predicates; rather, the following hypothesis suggests itself:

(I) The Iconicity Hypothesis:

Iconicity is the preferred cognitive and communicative strategy, and is used whenever possible. Only when iconicity cannot be resorted to, other strategies are activated.⁹

I find this rather strong conclusion a necessary implication of the uniformity of sign language verb classification and agreement patterns. If iconicity were just one possible strategy among others, then we would expect sign languages to vary in that respect. Alongside sign languages with iconic spatial predicates, we would expect to find also sign languages with non-iconic spatial predicates, spatial predicates whose form does not reflect their meaning. An example could be a sign meaning PATH, signed on the nose, with double movement and final contact, an articulation which actually occurs in the non-spatial ISL sign TRY. However, I know of no such non-iconic spatial predicate in ISL, nor in any other sign language. In fact, it even seems impossible or inconceivable to think of such a sign. Non-iconic spatial predicates seem unnatural. This sense of ‘unnaturalness’, and the cross-linguistic uniformity of sign language agreement systems, find a natural explanation if we assume the iconicity hypothesis above.

⁹ Givon (1985) states the following ‘iconicity meta-principle’:

“All other things being equal, a coded experience is easier to store, retrieve and communicate if the code is maximally isomorphic to the experience.” (ibid., p.189)

This meta-principle might serve as an explanation to the Iconicity Hypothesis, i.e., it may explain why iconicity is the preferred cognitive and communicative strategy.

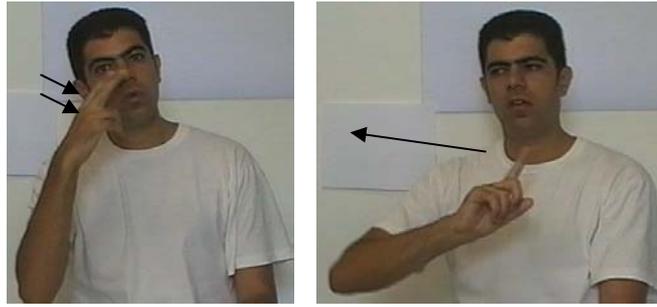


Figure 8.3: TRY vs. PATH

This line of argumentation is further supported by the fact that iconicity does exist in spoken languages, e.g., onomatopoeia, in that such words show that spoken languages resort to iconicity whenever they can¹⁰. The paucity of such words in the lexicons of spoken languages may be the result of the fact that auditory images play a much more marginal role in conceptual structure than e.g., spatial relations¹¹.

A different type of supportive evidence is provided by cases where signing systems developed in the absence of a sign language linguistic model: homesign, and newly-emerged sign languages. Homesign systems are visual communication systems developed by deaf individuals growing up in a strictly non-signing environment. These allow us to observe communication systems that developed in the absence of a linguistic role model. Goldin-Meadow and her colleagues studied the structural properties of home sign systems of several children (Goldin-Meadow 1993, and

¹⁰ Notice, however, that spoken languages usually do not use animal sounds to represent the animals themselves (I thank Mark Aronoff for pointing it out to me). That is, the word *meow* in English does not represent a cat, but rather the sound a cat makes. Interestingly, small children often use animal sounds to represent the animals themselves, but this is not characteristic of the adult language. This is in contrast with sign languages, where in many cases a visual property of the animal in question is used as the word denoting that animal (e.g., whiskers for a cat, trunk for an elephant). I do not know why sign languages differ from spoken languages in that respect.

¹¹ For example, in various theories of the lexicon, the list of basic conceptual functions contains spatial functions such as PATH, PLACE, GO, BE, and functions related to the event structure of the predicate, e.g., EVENT, STATE, CAUSE (e.g., Jackendoff 1987, 1990a, Rappaport and Levin 1988, ,

references cited there). Despite the lack of linguistic model, these systems exhibit some structural language-like properties. One of these properties is the referential use of space, both for pronominal and for verb agreement purposes. With respect to signs denoting motion, Goldin-Meadow notices that “the child moved his “go” gesture toward the open end of the car-trailer to indicate that cars go into the trailer” (Goldin-Meadow 1993:75). This description is like PATH in ISL, in that the path movement is towards the location of the goal.

Similar evidence comes from studies of newly emerged sign languages. One well-documented case is the emergence of a sign language in Nicaragua (Kegl, Senghas and Coppola 1995, Senghas 1995). This language emerged when deaf children and adolescents were brought together in great numbers for the first time, because of a change in the national policy towards special education and the education of the deaf. These children brought with them highly idiosyncratic homesign or gestural systems. Upon contact, they developed a pidgin sign language. Younger children, who entered these schools for the deaf in subsequent years, when the pidgin sign language was already in use, developed a much richer and more structured linguistic system, referred to as Idioma de Signos Nicaragüense (ISN) (Kegl and Iwata 1989). As in the case of home-sign, in ISN verbs of motion such as GO have a path movement from source to goal. For example, “ in the sentence ‘The man went to the restaurant’, the verb GO is produced with a movement that ends at the locus associated with the restaurant.” (Senghas 1995:46).

Grimshaw 1990, Booij 1992 among others). But none of these theories contains an auditory image as a conceptual primitive.

Both in homesign and in newly emerged sign languages, the notion of PATH is conveyed in a very similar manner to that of primary sign languages. However, in these systems, gestures or signs had to be invented from scratch, as linguistic input either did not exist, or was much poorer than the resulting system. Thus, the fact that the notion of PATH is nevertheless iconic and similar to more mature languages, strongly supports the above hypothesis of iconicity as the preferred strategy, being used whenever possible.

B. The 'direct mapping' hypothesis:

There is still one missing link in the chain of argumentation presented in the previous sub-section. Sign languages not only use the same strategy; they are also **similar in form**. In all sign languages, to the best of my knowledge, PATH is expressed in the same way, by moving the hand(s) on a horizontal plane from one location in space to another. This formal similarity seems to me to point to the following: when conveying spatial relations by the movement of the hands, there is one form which seems to be the natural one. For example, the most natural way to represent a path that an entity traverses is by moving the hand horizontally from one location in space to another. This is the most direct mapping of notions such as source, path and goal. Hence, the similarity in the **form** of spatial predicates (and signs incorporating these predicates) in various sign languages is the result of the non-arbitrary connection between form and meaning in these predicates, and the fact that there is one form superior to all others. The hypothesis concerning the form of iconic representation is stated in (II):

(II) **The 'Direct Mapping' Hypothesis:**

When representing a notion iconically, the best form is that which provides a more direct or complete mapping between form and meaning¹².

The cross-linguistic similarity between sign languages in expressing the notion of ‘path’ is the consequence of two factors: (a) All sign languages use the same strategy for that purpose – iconicity (because of principle (I)). (b) This strategy favors one particular form for expressing ‘path’ (according to principle (II)). This form is manifested in the morphology of signs whenever their meaning involves the conceptual functions PATH, SOURCE and GOAL. In that sense, we can say that there is a direct link between the spatial tier of the LCS and the morphology of sign languages, as spatial conceptual functions, such as ‘path’, are overtly manifested by the morphology of the lexemes in these languages. Languages are quite similar to one another in their conceptual structures, and especially in the thematic roles (or semantic relations) which predicates assign to their arguments. If the LCS’s of verbs in all languages were fully transparent, then languages would exhibit much more cross-linguistic resemblance. This is precisely the situation in sign languages: their LCS’s are more transparent, as some specific conceptual functions are overtly represented in the form of these words, and hence their cross-linguistic resemblance. Spoken languages, to which this strategy is not available, have to resort to other

¹² The question of what can be considered an ‘optimal’ or successful iconic representation is a very problematic and complicated issue, which I do not intend to tackle here. (See Givon 1985 for some of the problems involved in determining whether a form can be considered an iconic representation, and Bouissac 1995 for the need to develop such a procedure). Notice that in some cases there is more than one successful iconic representation. For example, the concept ‘bird’ can be iconically represented by its beak, or by its flapping wings (as is evidenced by the signs for BIRD in ASL and ISL respectively). However, when representing spatial relations such as ‘path’, there seems to be only one optimal way of doing so. I deduce this from the fact that all sign languages that I know of exhibit the same form for PATH. Thus, it seems that some concepts or referents lend themselves to several possibilities of iconic representations, while other concepts (or conceptual relations) do not. This difference poses interesting questions and challenges for a theory of iconicity.

means of expressing spatial notions, all of which are necessarily arbitrary, hence their diversity.

8.2.2.2 ‘Conceptual Onomatopoeia’:

Semantic Perspicuity in Sign Language Verb Morphology

The spatial notions encoded by the PATH morpheme are not necessarily real-world relations. PATH represents actual motion only in the case of spatial verbs. Verbs of transfer (that is, agreement verbs) do not necessarily involve actual motion. The spatial notions that are part of the meaning of verbs of transfer (PATH, SOURCE and GOAL) are abstract **linguistic/conceptual entities**, which have no independent existence other than in our minds and our use of language. Hence the relationship here is not between a real-world entity/relation and its iconic mapping in the linguistic system, but rather a relationship between a conceptual unit and its iconic linguistic realization.

This type of iconicity is different both from the iconicity exhibited by cases of onomatopoeia on the one hand, and from diagrammatic iconicity displayed by phenomena such as word order and morpheme order on the other hand. PATH differs from onomatopoeic words in the following respect: onomatopoeia involves the iconic representation of specific properties of real-world referents, properties which are perceived by one of our senses: vision in the case of visual properties such as size and shape, hearing in the case of sounds. PATH, on the other hand, (in the case of agreement verbs) is the iconic representation of abstract conceptual entities and relations, not concrete properties.

It also differs from phenomena referred to as diagrammatic iconicity, since in the latter, iconicity is achieved in terms of the structural organization of linguistic elements, while in the case of PATH iconicity is manifested by the form of the sign. To make this point clearer, take for example word order as coding accessibility/predictability (as is suggested in Givon 1985). Givon argues that there is a correspondence between the degree of accessibility of a discourse referent and the linear position in the sentence of the NP denoting this referent. Notice, though, that accessibility is not marked by the form of that NP, but rather by the arrangement of elements in the sentence with respect to each other. PATH is different in that respect: the spatial thematic relations assigned by PATH (and by those verbs that incorporate PATH) are directly reflected in its form: path movement on the horizontal plane, from one location to another. The iconic mapping in the case of PATH is therefore between conceptual functions and the form of the predicate in question. In a way, PATH can be regarded as an onomatopoeic representation of a conceptual function¹³.

To the best of my knowledge, such ‘conceptual onomatopoeia’ has no equivalent in spoken language. Morphemes in spoken languages cannot iconically represent conceptual functions, presumably because conceptual functions are non-acoustic in nature. Conceptual functions such as PATH, SOURCE, GOAL, PLACE, and even CAUSE and AFFECT are relational; they do not emit sounds, nor do they have corresponding acoustic representations. The significance of morphemes such as PATH for linguistic

¹³ This conceptual onomatopoeia is not to be confused with metaphoric extension. Spatial terms in spoken languages are often metaphorically extended to other semantic domains, e.g., temporal relations, change of state etc. However, PATH in ISL is not metaphorically extended in such a way; it does not participate in the morphology of verbs denoting change of state or change of identity. Hence, its presence in agreement verbs indicates that an event of transfer is conceptually conceived of as involving motion.

theory is therefore that it can serve as a ‘window’ to conceptual structure of human language (see quotation from Gee and Kegl 1982 above), since the morphology of a sign is much more accessible than its conceptual structure. As such, it provides a tool for linguistic analysis which spoken languages cannot offer. Therefore the study of sign languages makes a unique contribution to the study of human language and linguistic theory.

8.3 Methodology for Future Research: the Facing of the Hands

The approach suggested here assumes that morphological properties common to all sign languages could be the result of the fact that the visual modality allows for a direct (iconic) mapping between certain concepts and their linguistic realization. Sign languages exploit this possibility, presumably because iconicity is a preferred mapping strategy. Hence, by examining morphological properties common to all sign languages, and by trying to locate their semantic/conceptual correlates, it is hoped to arrive at a better understanding of conceptual structure.¹⁴ So far we have focused only on spatial relations. I suggest here that this approach could be expanded to other areas as well. One particular intriguing morphological property which lends itself to such approach is the facing of the hands in agreement verbs. Let us take a closer look at the analysis of the facing in agreement verbs in light of the discussion of conceptual iconicity presented above.

¹⁴ This is the approach of Shepard-Kegl (1985) with respect to locative relations in ASL. A similar approach with respect to diagrammatic iconicity (based on spoken languages) is put forth in Haiman (1980):

“In much recent work, it has been a fruitful article of faith that systematic syntactic homonymy is semantically motivated: similar morphological shape or syntactic behavior of

The facing of the hands was analyzed here as the realization of the dative case marking of the syntactic object. This analysis was based on the facts of ISL, but seems to hold for at least ASL as well. Let us assume for now that this description of the role of the facing is indeed common to sign languages in general. Following the approach I suggest here, we may suppose that the facing is the iconic mapping (or iconic realization) of a conceptual function. However, the facing does not mark any spatial thematic role. In fact, it is not related to a specific argument position on the spatial tier, as it can mark both source and goal. Rather, it refers to a specific position on the **action** tier: the second argument of AFF(ect), the argument affected by the act of transfer. On the face of it, the realization of the syntactic object, or the affected argument, by the facing of the hands and not by any other morphological device seems rather arbitrary and opaque. In fact, it casts doubt on the entire approach outlined above. There are two possible ways to proceed: either to abandon this approach, and try to find a different type of explanation to the typological puzzles above (the similarity between sign languages and the diversity of spoken languages); or to maintain the approach, and try to excavate deeper into the structure of the conceptual representation of agreement verbs in order to identify the elusive semantic/conceptual function that is encoded by the facing. Evidently, I suggest pursuing the second possibility, since I find the approach promising and convincing in the case of the realization of spatial relations. The task is then to identify a conceptual function which is iconically realized by the facing of the hands, and is related to the syntactic role of ‘object’, or the thematic notion ‘affected argument’.

(apparently disparate) categories may be an icon of their underlying semantic homogeneity.” (ibid., p. 517).

I do not have as yet a definitive solution to this challenge, but I would like to propose a possible candidate. It has been suggested (H. Clark 1973, Lyons 1977) that the front-back dimensions of our body is relevant for describing ‘the canonical encounter’ situation:

“The most important factor in the assignment of canonical orientation in the horizontal plane is what was referred to earlier as confrontation. When two people are involved in conversation or some other kind of interaction (in a canonical encounter) they normally confront one another: i.e., each turns his front to the other.” (Lyons 1977;698).

It seems to me plausible that the facing of the hands is the iconic representation of the position of the speaker/signer in ‘the canonical encounter situation’. Recall that TRANSFER imposes selectional restrictions on its arguments: they both have to be possible possessors, and hence are more likely to be human. Thus, an event of transfer is an event which typically involves the interaction of two humans. One of them is active, the actor or agent instigating the event. The facing of the hands might be regarded then as representing the ‘transfer situation’ from the point of view of the actor/agent, hence the facing is always towards the ‘other participant’, realized syntactically as the object. The facing of the hands in agreement verbs might therefore be the iconic representation of some conceptual function related to the action tier in an event of transfer (or a canonical encounter). Since the facing is analyzed here as a dative case marker, the question which suggests itself is whether the dative case should be regarded as basically the case marking of the non-actor participant in a ‘canonical encounter situation’. This is not all that implausible, as dative arguments in many spoken languages are usually human/animate and non-agentive¹⁵. Further research is needed in order to assess this hypothesis. However, even if it is proved to

be wrong, the methodology is nevertheless useful, as raises questions concerning conceptual functions and iconic mapping which would be left unasked otherwise.

8.4. Conclusions

The theory developed in this thesis set out to resolve two problems: (a) Can general linguistic theory account for agreement in all natural languages, regardless of modality? and (b) Is it possible to account for and predict the agreement patterns of verbs in ISL? By developing a particular componential analysis within current general linguistic theories, this investigation has shown that the answer to both questions is affirmative. Moreover, it was shown that both issues are accounted for by one and the same analysis, the Thematic Structure Agreement Analysis. The present chapter evaluated this analysis from the point of view of its contribution to linguistic theory in general. It was shown that although the analysis was developed to account for the phenomenon of agreement, its implications bear on issues which are beyond agreement per se. These issues concern the interrelation between language and other domains, such as the physical modality through which the language is transmitted, and certain cognitive or perceptual principles.

By examining the ISL facts from a cross-linguistic perspective, it becomes evident that the peculiarities of ISL agreement constructions are not language particular, but rather modality particular. In my view, such a conclusion has far-reaching consequences for linguistic theory. If modality determines certain aspects of linguistic structure, then a comprehensive theory of language should be expanded to encompass

¹⁵ See Schutze (1993) and references cited there concerning dative arguments in Icelandic.

the interaction between language and modality. That such theoretical developments are necessary has been suggested by Sandler (1993b). The results obtained in this thesis take us a step farther in determining what specifically needs to be explored. I shall return to this point shortly. From a cross linguistic perspective, the contribution of the analysis presented in this thesis is two-fold: it provides a detailed account of one particular sign language hardly studied so far, ISL, and it provides a rigorous theoretical framework for a cross-linguistic study of agreement.

Considering ISL verb agreement from a cross-linguistic perspective gave rise to the ‘typological puzzles’ presented at the beginning of this chapter. The explanation for the puzzles developed here touches upon three general theoretical issues: the centrality of spatial relations in language, the role of modality in linguistic structures, and the interaction between language and iconicity.

The centrality of spatial relations in language is not a novel idea, as is evidenced by the comprehensive literature on the subject (see references in section 8.2). The Thematic Structure Agreement Analysis illuminates this point from yet another angle, as it shows that important aspects of sign language morphology are best captured in spatial terms. The study of pronominal agreement is of special interest here. It shows that even a construction which is basically syntactic in nature, is related to spatial notions in sign languages. Though the agreement relation is stated in configurational terms, the morphological generalizations regarding the direction of the path movement and the class of elements which inflect for agreement, are captured in spatial thematic terms. In that respect, sign languages support a model such as

Jackendoff's in which generalizations can be made in spatial terms. However, their contribution is not merely in providing supportive evidence for such theories. Rather, sign languages offer special insight into what the structure of spatially based grammatical models might be, because of the transparent nature of central aspects of their morphology (referred to as 'conceptual onomatopoeia' in section 8.2.2).

The second theoretical point of interest pertains to the role of modality in determining linguistic structure. The thematic analysis showed that the sign language facts can be accounted for by general linguistic principles, thus supporting the view that language is a unified cognitive domain regardless of modality. Yet, it is also evident that language modality determines certain important aspects of linguistic structure. For example, languages in the two modalities differ with respect to the choice of the agreeing elements, and the morphological expression of spatial relations. Thus, although languages of different modalities share many significant formal features, the physical modality of languages cannot be ignored. It is important to note that similar conclusions about the interaction between linguistic structure and modality were arrived at in studies of other linguistic phenomena, e.g., the phonological structure of ASL (Sandler 1993b, Uyechi 1994, Brentari forthcoming), the phonological structure of SL of the Netherlands (van der Hulst 1993), the inflection of nouns in Italian SL (Pizzuto and Corazza 1996), and Noun Incorporation in ISL (Meir 1997). This indicates that the role of modality is restricted neither to one particular phenomenon, nor to one linguistic level; its effects are much more general. Obviously, then, restricting linguistic investigation to languages of one modality would hinder the development of a theoretical framework which will explain this interaction. From this aspect as well, then, sign languages are indispensable.

The third point concerns the interaction between language and two cognitive hypotheses sketched in section 8.2 - the Iconicity Hypothesis and the Direct Mapping Hypothesis. The role of iconicity in language has been the subject of extensive study. However, sign languages offer us a special perspective on the matter. Once again, agreement is especially instructive here: it shows that sign languages resemble each other not so much because their lexicon is iconic, but rather because important aspects of their **grammar** are iconic. In particular, verb agreement inflection, manifested morphologically by the direction of the path movement, is iconic, since the agreeing element – PATH - is an iconic representation of the spatial notions of ‘path’, ‘source’ and ‘goal’ (as I argued in section 8.2). The iconicity of PATH, coupled with two cognitive hypotheses concerning iconicity, is the basis for understanding the striking similarities in the agreement systems of unrelated sign languages. These hypotheses can now be tested with respect to other sign languages, and can be further developed to account for other grammatical processes in both sign and spoken languages.

Important aspects of linguistic structure, then, are determined by the physical modality and more general cognitive principles. The study of sign languages teaches us that language is a unified cognitive domain, yet not an isolated one.

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Appendix A: AGREEMENT VERBS

A list of agreement verbs in ISL

1st. Regular agreement verbs	2nd. Backwards verbs
<p style="text-align: center;">A.1. Di-transitive verbs</p> <p>GIVE PAY~ SEND SHOW THROW-TO</p> <p style="text-align: center;">A.2. Monotransitive verbs</p> <p>ANSWER* APPROACH ASK* BE UNFAITHFUL TO CALL (TELEPHONE) CATCH DEFEND EXPLAIN* FAX FEED~ FINGERSPELL FIRE (a person) FORCE GUARD HATE (REBUFF) HELP INFLUENCE* INFORM* IRRITATE KEEP-AN-EYE-ON LIE-TO LOOK REVENGE SEE SHOOT SHOW-AFFECTION-TO SHOW-BELIEF-TOWARDS SHOW-CARE-FOR TEACH~ TEASE TELL* TELL-STORY VIDEO-TAPE VISIT WARN* YELL-AT</p>	<p style="text-align: center;">B.1. Di-transitive backwards verbs</p> <p>GRAB RECEIVE/GET MOOCH TAKE</p> <p style="text-align: center;">B.2. Monotransitive backwards verbs</p> <p>ADOPT CHOOSE COPY~ EXTRACT~ INVITE RESCUE SUMMON TAKE-ADVANTAGE-OF</p>
<p>*Verbs which may have an additional sentential complement. ~Verbs which may occur both as monotransitive and as di-transitive verbs</p>	

Thematic analysis of agreement verbs: the spatial tier of the LCS¹

A. Regular agreement verbs

A.1. Di-transitive verbs

GIVE	CAUSE_{poss} ([α], [Go_{poss} ([], [PATH [α] [β])])]/by letting
PAY~	CAUSE_{poss} ([α], [Go_{poss} ([sum of []], [PATH [α] [β])])]/by releasing
SEND	CAUSE_{poss} ([α], [Go_{poss} ([], [PATH [α] [β])])]/by releasing
THROW-TO	CAUSE_{poss} ([α], [Go_{poss} ([], [PATH [α] [β])])]/by releasing ²

A.2. Monotransitive verbs

ANSWER*	CAUSE_{poss} ([α], [Go_{poss} ([ANSWER], [PATH [α] [β])])])
APPROACH	CAUSE_{poss} ([α], [Go_{poss} ([APPROACH], [PATH [α] [β])])])
ASK*	CAUSE_{poss} ([α], [Go_{poss} ([QUESTION], [PATH [α] [β])])])
CALL (TELEPHONE)	CAUSE_{poss} ([α], [Go_{poss} ([TELEPHONE-CALL], [PATH [α] [β])])])
CATCH	CAUSE_{poss} ([α], [Go_{poss} ([FIST], [PATH [α] [β])])])
DEFEND	CAUSE_{poss} ([α], [Go_{poss} ([DEFENSE], [PATH [α] [β])])])
EXPLAIN*	CAUSE_{poss} ([α], [Go_{poss} ([EXPLANATION], [PATH [α] [β])])])
FAX	CAUSE_{poss} ([α], [Go_{poss} ([FAX-NOTE], [PATH [α] [β])])])
FEED~	CAUSE_{poss} ([α], [Go_{poss} ([FOOD], [PATH [α] [β])])])
FINGERSPELL	CAUSE_{poss} ([α], [Go_{poss} ([FINGERSPELLING], [PATH [α] [β])])])
FORCE	CAUSE_{poss} ([α], [Go_{poss} ([FORCE], [PATH [α] [β])])])

¹The action tier of all agreement verbs is:

AFF ([] ^{α} , [] ^{β})

² The difference between SEND and THROW TO is that the latter involves real motion of the theme, and the theme has to be a concrete object. The verb THROW TO can incorporate various classifiers denoting different objects (e.g., throw a ball, throw a stick, etc.).

LOOK AFTER	CAUSE_{poss} ([α], [$G_{o_{poss}}$ ([GAZE], [PATH [α] [β]])])
HATE	CAUSE_{poss} ([α], [$G_{o_{poss}}$ ([DETESTATION], [PATH [α] [β]])])
HELP	CAUSE_{poss} ([α], [$G_{o_{poss}}$ ([HELP], [PATH [α] [β]])])
INFLUENCE*	CAUSE_{poss} ([α], [$G_{o_{poss}}$ ([INFLUENCE], [PATH [α] [β]])])
INFORM*	CAUSE_{poss} ([α], [$G_{o_{poss}}$ ([INFORMATION], [PATH [α] [β]])])
LIE-TO	CAUSE_{poss} ([α], [$G_{o_{poss}}$ ([LIE], [PATH [α] [β]])])
LOOK	CAUSE_{poss} ([α], [$G_{o_{poss}}$ ([GAZE], [PATH [α] [β]])])
REVENGE	CAUSE_{poss} ([α], [$G_{o_{poss}}$ ([REVENGE], [PATH [α] [β]])])
SEE	CAUSE_{poss} ([α], [$G_{o_{poss}}$ ([GAZE], [PATH [α] [β]])]) ³
SHOOT	CAUSE_{poss} ([α], [$G_{o_{poss}}$ ([SHOT/BULLET], [PATH [α] [β]])])
SHOW-AFFECTION-TO	CAUSE_{poss} ([α], [$G_{o_{poss}}$ ([AFFECTION], [PATH [α] [β]])])
SHOW-BELIEF-TOWARDS	CAUSE_{poss} ([α], [$G_{o_{poss}}$ ([BELIEF], [PATH [α] [β]])])
SHOW-CARE-FOR	CAUSE_{poss} ([α], [$G_{o_{poss}}$ ([CARE], [PATH [α] [β]])])
TEACH~	CAUSE_{poss} ([α], [$G_{o_{poss}}$ ([information/material/knowledge], [PATH [α] [β]])])
TEASE	CAUSE_{poss} ([α], [$G_{o_{poss}}$ ([LAUGHTER], [PATH [α] [β]])])
TELL*	CAUSE_{poss} ([α], [$G_{o_{poss}}$ ([SAYING], [PATH [α] [β]])])
TELL-STORY	CAUSE_{poss} ([α], [$G_{o_{poss}}$ ([STORY], [PATH [α] [β]])])
VIDEO-TAPE	CAUSE_{poss} ([α], [$G_{o_{poss}}$ ([GAZE (via camera)], [PATH [α] [β]])])
VISIT	CAUSE_{poss} ([α], [$G_{o_{poss}}$ ([VISIT], [PATH [α] [β]])])
WARN*	CAUSE_{poss} ([α], [$G_{o_{poss}}$ ([WARNING], [PATH [α] [β]])])
YELL-AT/SCOLD	CAUSE_{poss} ([α], [$G_{o_{poss}}$ ([SCOLDIND], [PATH [α] [β]])])

³ The difference between LOOK and SEE lies in the volition of the subject: LOOK necessarily has a volitional subject, while in SEE volitionality is not a necessary component in the meaning of the verb. As volitionality does not play a role in the present analysis, I do not represent it here.

B. Backwards verbs**B.1. Di-transitive backwards verbs**

GRAB	CAUSE_{poss} ([α], [Go_{poss} ([β], [PATH [β] [α])])]/by grasping impatiently
RECEIVE/GET	CAUSE_{poss} ([α], [Go_{poss} ([β], [PATH [β] [α])])])
MOOCH	CAUSE_{poss} ([α], [Go_{poss} ([β], [PATH [β] [α])])]/by mooching
TAKE	CAUSE_{poss} ([α], [Go_{poss} ([β], [PATH [β] [α])])]/by grasping

B.2. Monotransitive backwards verbs

ADOPT	CAUSE_{poss} ([α], [Go_{poss} ([β], [PATH [β] [α])])]/by grasping
CHOOSE	CAUSE_{poss} ([α], [Go_{poss} ([β], [PATH [β] [α])])]/by picking
COPY~	CAUSE_{poss} ([α], [Go_{poss} ([material[β]], [PATH [β] [α])])])
EXTRACT~	CAUSE_{poss} ([α], [Go_{poss} ([information[β]], [PATH [β] [α])])]/by extracting
INVITE	CAUSE_{poss} ([α], [Go_{poss} ([β], [PATH [β] [α])])]/by inviting
RESCUE	CAUSE_{poss} ([α], [Go_{poss} ([β], [PATH [β] [α])])]/by rescuing
SUMMON	CAUSE_{poss} ([α], [Go_{poss} ([β], [PATH [β] [α])])]/by summoning
TAKE-ADVANTAGE	CAUSE_{poss} ([α], [Go_{poss} ([ADVANTAGE], [PATH [β] [α])])])

Appendix B

A list of plain verbs in ISL (according to the classification in chapter 4)

1. Intransitive verbs

ACHE	ACT	BOIL
CHAT	COUGH	CRY
DIE	DISAPPEAR	DREAM
EARN	ERR	EXIT
FAIL	FALL	FALL ASLEEP
FEEL	GET HURT	GET SCARED
GET UP	GET-UP	GOSSIP
GROW	HAVE-FUN	HESITATE
INTERPRET	KNOCK	LEARN
LEAVE	LIE	LISTEN
MAKE AN EFFORT	PLAY	REST
RETURN	SAD	SCREAM
SHAVE	SIT	SLEEP
STAND	STAY	SUCCEED
SWEAT	TELEPHONE	THINK
TRY-HARD	WAIT	WAKE-UP
WALK	WORK	

2. Verbs which select abstract or sentential object

ALLOW	ASK-FOR	ASK-FOR-A-FAVOR
BEG	BEGIN	COMPLAIN
CONTINUE	DECIDE	FINISH
FORGET	GUESS	HOPE
KNOW	LECTURE	PERCEIVE
PROVE	READ	REFUSE, REJECT
REGRET	REMEMBER	START
SUGGEST, OFFER	SUSPECT	UNDERSTAND
WAIT	WANT	WONDER

3. Verbs which do not impose animacy restrictions on their objects

ABSORB	ADD	ADMIRE
ANALYZE/RESEARCH	BOIL	BREAK
CANCEL	CHANGE	CHECK, EXAMINE
CLOSE	COOK	CUT
DISTINGUISH	DO, MAKE	DRESS (PUT-ON)
DRINK	EARN	EAT
ESTABLISH	FAIL	FIND
FOUND	GROW	HEAR
HIDE	HOLD	IMPORT
INTERPRET	INTERRUPT	LEARN
LEAVE	LEAVE	LIGHT, SET ON FIRE
LISTEN	LOOK-FOR	LOSE
OPEN	ORDER	PARTICIPATE
PICK	PLAY	POSTPONE
PREPARE	READ	READ

SAY
SWALLOW
WASH
XEROX

SMELL
THINK
WATCH

SMOKE
USE
WATER

4. Verbs of creation

DRAW
INVENT
SEW
WORK

5. Verbs denoting change of state

BREAK
CLEAN
KILL

6. Psych verbs

BE AFRAID
BE HAPPY
FEAR
GET MAD AT
KNOW (A PERSON)
PITY

BE ANGRY
BE SHY
GET EXCITED
GET SCARED
LIKE
REGRET

BE ASTONISHED
ENVY
GET HURT
HATE
LOVE
WORRY

7. Plain verbs because of phonological factors

AGREE
BUY
CONVINCE
ENCOURAGE
STEAL
TAKE-PHOTOGRAPH

Appendix C: Subject-Object Asymmetry in ISL

Evidence for Subject-Object asymmetry in ISL comes from two phenomena: subject pronoun copy, and binding.

A. Subject pronoun copy:

Pronoun copy is a phenomenon where a pronoun appears in clause final position, co-referring to an argument within the same clause. Pronoun copy in ISL is illustrated in (1):

1. **BOY INDEX_a** READ BOOK INDEX_b **INDEX_a**.

‘The boy read the book, he.’

Pronoun copy in ISL is restricted to the subject argument. Object pronoun copy is ungrammatical¹:

2. . ***BOY INDEX_a** READ BOOK **INDEX_b INDEX_b**.

‘*The boy read the book, it.’

3. **MOTHER₃ MY** ₃**GIVE₁** **BOOK INDEX_a** $\left. \begin{array}{l} \text{INDEX}_3 \\ *INDEX_1 \\ *INDEX_a \end{array} \right\}$

‘My mother gave me a book, $\left. \begin{array}{l} \text{she} \\ *I \\ *it \end{array} \right\}$ ’

¹ Pronoun copy has been reported to occur in other sign languages, e.g., ASL (Padden 1983) and SL of the Netherlands (Bos 1995). In these languages as well, it is restricted to the subject.

4. FRIEND MY INDEX₃ ₃INVITE₁ PARTY $\left\{ \begin{array}{l} \text{INDEX}_3 \\ * \text{INDEX}_1 \end{array} \right\}$

‘My friend invited me to the party, $\left\{ \begin{array}{l} \text{he} \\ * \text{me} \end{array} \right\}$ ’

B. Binding of pronouns and anaphors:

A pronoun in object position may be bound by a nominal inside the subject, but not vice versa, as is illustrated in (5) and (6). This asymmetry indicates that the subject NP is syntactically more prominent than the object.

5. ORNA MOTHER POSSESSIVE₃ LOVE INDEX₃

‘Orna_i’s mother loves her₁’.

6. *MOTHER POSSESSIVE₃ LOVE ORNA₃

* ‘Her_i mother loves Orna_i.’

Likewise, an NP in subject position can bind an anaphor in object position, but an anaphor in subject position may not bind an NP in object position, as is indicated in (7) and (8):

7. DANNY INDEX₃ LETTER ₃SEND₃ INDEX₃ SELF₃

‘Danny sent a letter to himself.’

8. *INDEX₃ SELF₃ LETTER ₃SEND₃ DANNY INDEX₃

* ‘Himself wrote a letter to Danny.’