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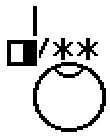

Verb agreement in Brazilian Sign Language: Morphophonology, Syntax & Semantics

Belo Horizonte
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Verb agreement in Brazilian Sign Language: Morphophonology, Syntax & Semantics

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VERB AGREEMENT IN BRAZILIAN SIGN LANGUAGE:
MORPHOPHONOLOGY, SYNTAX & SEMANTICS

by

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Verb agreement in Brazilian Sign Language: Morphophonology, Syntax & Semantics

GUILHERME LOURENÇO DE SOUZA

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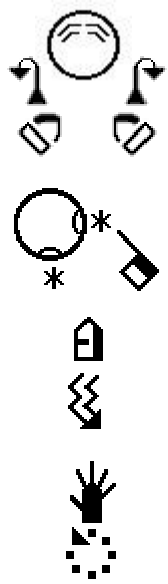
Aos Surdos brasileiros.

To all Deaf people in Brazil.



You live, you learn
You love, you learn
You cry, you learn
You lose, you learn
You bleed, you learn
You scream, you learn
Alanis Morissette

Abstract

Building on the assumption that signed languages are both similar and different from spoken languages (universal principles vs. modality effects), this dissertation discusses verb agreement in Brazilian Sign Language (Libras). Agreement in sign languages has been described as a change in orientation and direction of movement of the verb. However, I propose that agreement in Libras, and possibly in all sign languages, is not marked by the movement of the verb. Instead, the matching of location between the verb and its argument(s) is the sole agreement marker – a process I will call co-localization. The different types of path movement, on the other hand, are related to the event properties of the predicate, such as marking of telicity, for example (Event Visibility Hypothesis). Additionally, assuming a Minimalist framework within Generative Syntax, I will claim that the different agreement patterns found in Libras can be derived by assuming a single underlying syntactic structure and by the basic syntactic operations MERGE and AGREE. Finally, I will argue that there is a layering of visual information within the verb internal structure, in such a way that different morphological operations will target specific nodes of the phonological specification of the verb.

Keywords: Brazilian Sign Language, verb agreement, generative syntax, event properties, layering of visual information.

Resumo

A partir do entendimento de que as línguas sinalizadas são, ao mesmo tempo, similares e diferentes das línguas orais (princípios universais *versus* efeitos de modalidade), esta tese objetiva discutir o sistema de concordância verbal em Língua Brasileira de Sinais (Libras). Concordância nas línguas de sinais tem sido descrita como uma mudança na orientação e na direção do movimento do verbo. Contudo, proponho que a concordância em Libras, e, possivelmente, nas demais línguas de sinais que exibem esse fenômeno, não é marcada pelo movimento do verbo. É a correspondência entre a localização do verbo e de seu(s) argumento(s) que é o verdadeiro marcador de concordância – processo que chamarei de co-localização. Por outro lado, os diferentes tipos de movimento de trajetória na estrutura interna do verbo não estão relacionados à concordância, mas sim a propriedades eventivas do predicado, como, por exemplo, telicidade (Hipótese de Visibilidade do Evento). Adicionalmente, assumindo uma perspectiva Minimalista da Sintaxe Gerativa, argumentarei que os diferentes padrões de concordância encontrados em Libras podem ser derivados assumindo-se uma única estrutura sintática subjacente e pelas operações sintáticas básicas MERGE e AGREE. Por fim, proporei que há um *layering* de informações visuais na estrutura interna do verbo, de modo que diferentes operações morfológicas terão como alvo nós específicos da estrutura fonológica do verbo.

Palavras-chave: Língua Brasileira de Sinais, concordância verbal, sintaxe gerativa, propriedades eventivas, layering de informações visuais.

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Janis Joplin

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List of sign language acronyms

ASL	American Sign Language
HKSL	香港手語 – Hong Kong Sign Language
HZJ	*Hrvatski znakovni jezik* – Croatian Sign Language
ISL	שפת סימנים ישראלית – Israeli Sign Language
LGP	*Língua Gestual Portuguesa* – Portuguese Sign Language
Libras	*Língua Brasileira de Sinais* – Brazilian Sign Language
LIS	*Lingua italiana dei segni* – Italian Sign Language
LSE	*Lengua de Signos Española* – Spanish Sign Language
NGT	*Nederlandse Gebarentaal* – Sign Language of the Netherlands
RSL	*русский жестовый язык* – Russian Sign Language
SZJ	*Slovenski Znakovni Jezik* – Slovenian Sign Language
TİD	*Türk İşaret Dili* – Turkish Sign Language

Chapter 1:
Introduction

The human brain is naturally capable to acquire, develop and use a language regardless of its modality. Both spoken and signed languages are natural language systems, resulting from the very same human language capacity, also known as Language Faculty. Therefore, one should assume that despite the differences and the effects of the modality, the similarities between signed and spoken languages are much more consistent and prevalent than the dissimilarities; and that all of these languages are constrained by the same set of principles that constitute the Universal Grammar (UG).

Chomsky's Uniformity Principle sums up this fundamental assumption:

(1) **Uniformity Principle**: In the absence of compelling evidence to the contrary, assume languages to be uniform, with variety restricted to easily detectable properties of utterances (Chomsky, 2001, p. 2)

Keeping the Uniformity Principle in mind, an adequate linguistic analysis[1] of a certain linguistic phenomena in a given sign language should also account for the specific properties of the visual-manual modality and for how they affect the linguistic structure. One much known modality effect is the difference in pervasiveness of linearity and simultaneity in the linguistic signal. For instance, signed languages make use of more simultaneous strategies than spoken languages, as pointed out by Wilbur:

> Spoken languages have more segmental/sequential options available, and layered options are less frequently used. Sign languages are more likely to use simultaneous/layered options, but which ones will be

[1] Any linguistic theory should not aim just for observational and descriptive adequacy, but also and most importantly for explanatory adequacy (Chomsky, 1964, pp. 29–30).

> used and what functions they are assigned differ from language to language. […] the interaction between language and modality occurs over time, and the assignment of functions to available options simply emerges, it is not consciously decided by users (Wilbur, 2012, p. 343).

1.1 The phenomenon

Agreement in sign languages has been largely debated by many researchers based on different theoretical backgrounds (Bahan, 1996; Janis, 1995; Meir, 1998b, 1998a, 2002; Padden, 1988; Quadros & Quer, 2008; Rathmann & Mathur, 2003; *inter alia*). However, it is safe to say that it is not even close to be a solved question in the literature. What is interesting about verb agreement in signed languages is that different types of verbs show different agreement patterns.

The following examples from Libras illustrate four different types of agreement constructions:

(2) JOHN_a LOVE MARY_b

(3) JOHN_a $_a\text{HELP}_b$ MARY_b

(4) JOHN_a $_b\text{INVITE}_a$ MARY_b

(5) IX_1 BRASILIA_b $_b\text{MOVE}_c$ FLORIANÓPOLIS_c

In (2), the verb LOVE is traditionally called "plain" verb. It is claimed that this type of verb does not show any agreement morphology, once there is no movement or orientation associated with the loci of its arguments. On the other hand, (3) is considered a regular agreement verb. There is a movement that goes from the locus of the subject towards the locus of the object. The example in (4) also presents an agreement verb; however, the path of the movement goes in an opposite direction: it goes from the locus of the object towards the locus of the subject. This kind of verb is called backward agreement verb. Finally, in (5) there is an example of what has been called spatial verbs. These verbs do not agree with person features, but with locative arguments.

These different agreement patterns found in many sign languages around the world have led to different theoretical proposals. Still, the main current issues in the sign language agreement literature are:

(i) how the different agreement patterns can be derived and generated (whether thematically/semantically or syntactically);

(ii) what the agreement-classes found in different sign languages are (e.g. whether spatial verbs and person agreement verbs constitute different agreement-classes or not);

(iii) candidacy for agreement (what are the features – semantic, syntactic or phonological – that predict the realization of agreement in a given verb or verb class);

(iv) the different exponents of agreement and their respective underlying mechanisms (e.g. directionality vs. facing).

1.2 Research questions

Building on the assumption that signed languages are both similar and different from spoken language (universal principles vs. modality effects), this dissertation discusses the verb agreement system in Brazilian Sign Language (Libras). More specifically, three main research questions will guide the analyses presented here:

i. What is the morphophonological shape of agreement in Libras?

ii. How are the different agreement patterns licensed and derived during the syntactic computation?

iii. Is there any relation between agreement and the lexical aspect/event properties of the verb?

1.3 The claims

The main claims of this dissertation are:

i. Agreement in Libras, and possibly in all sign languages, is not marked by the movement of the verb. Instead, the matching of location between the verb and its argument(s) is the sole agreement marker – a process I will call co-localization.

ii. The different agreement patterns found in Libras can be derived by assuming a single underlying syntactic structure and by the basic syntactic operations MERGE and AGREE.

iii. The different types of path movement in the verb internal structure are not related to agreement, but to the event properties of the predicate, such as telicity, for example.

iv. There is a layering of visual information within the verb internal structure, in such a way that different morphological operations will target specific nodes of the phonological specification of the verb.

1.4 The structure of this dissertation

This dissertation is organized in 7 chapters. The first chapter, opened by this introduction, presents the research questions and the main claims that will be made. Chapter 2 provides a brief discussion on how agreement is treated within a descriptive framework (Corbett, 2006) and also in Generative Theory (Baker, 2008; Chomsky, 2000, 2001; Miyagawa, 2010; *inter alia*). In Chapter 3, I present the phenomena of agreement in signed languages, focusing on the different agreement patterns and also on the shape of agreement in those languages. Chapter 4 aims at presenting the claim that co-localization is the true agreement marker in Libras, and possibly in other sign languages, as well. Additionally, I present a quantitative analysis of verb agreement in Libras, in order to argue that agreement is much more pervasive than has been claimed. In Chapter 5, a unified syntactic structure will be presented and the different agreement patterns found in Libras will be derived syntactically. Chapter 6 will discuss some event properties of the predicate, relating them to the different types of movement (path features) of verbs. Additionally, I will argue that different morphological operations target different nodes of the internal structure of the verb, resulting in layering of visual information in the verb structure. Finally, some final remarks will be provided in Chapter 7.

Chapter 2: Agreement

Agreement is such a pervasive phenomenon in natural language that any serious study of the core aspects of our language faculty must grapple with it (Boeckx, 2009, p. 2).

"Agreement is a fascinating phenomenon […] and involves several different linguistic components. Yet it is not something we would include in the design of an artificial language" (Corbett, 2006, p. xv). These opening lines of Corbett's preface capture two striking characteristics of agreement in natural languages: i) it is a complex phenomenon that overarches different components of grammar; and ii) at first sight, it seems to be a superfluous and redundant mechanism with no reason to be in a language system (Corbett, 2006, p. 11; Miyagawa, 2010, pp. 6–7). Even the definition of agreement can be tricky.

In this dissertation, I will assume a concept of agreement that is based on the notion of **asymmetric covariance** between two linguistic forms by means of a **feature sharing** mechanism. The examples in (6) and (7) from Brazilian Portuguese will help us to understand this notion.

(6)	Eu	comprei	um	carro.
	1SG	buy.PST.**1SG**	a	car.
	I bought a car.			

(7)	Elas	compraram	um	carro.
	fem.**3pl**	buy.pst.**3pl**	a	car.
	They bought a car.			

In Brazilian Portuguese, the verb shows person and number agreement with the subject of the clause. Therefore, the morphological form of the verb – the inflection – will change based on the number and person specifications of the subject. This is what covariance means. The changes of one given variable (e.g. the verb) are associated with changes in a second variable (e.g. the subject).

Additionally, this covariance is asymmetric in two different ways. The first asymmetry is in terms of the direction of the association. The verb inflection is dependent on the grammatical information of the subject, but not the other way around. The other side of the asymmetry is that one of the variables carry the grammatical information that is going to be shared with another variable that lacks this information *a priori*. In the examples in (6) and (7) above, the pronouns carry the specific features of number and person, and these features are shared with the verb. However, the verb originally does not have any number or person specification.

Innumerable proposals have been suggested within different theoretical frameworks for explaining, deriving and predicting agreement patterns in languages. Here, I will pursue a minimalist treatment of agreement, combining descriptive (e.g. Corbett, 2006) and theoretical analysis (M. C. Baker, 2008; Chomsky, 2001; Miyagawa, 2010), but trying to keep the underlying generative mechanism as minimal and uniform as possible.

2.1 Corbett's typology

In his typological description of agreement, Corbett (2006) identifies five elements of agreement, to wit: a domain, a controller, a target, a feature (or a bundle of) and a condition (see ***Figure 1***).

Moreover, Corbett posits the notion of canonical agreement, which means the most expected type of agreement and comprises a series of behaviors and configurations that are expected from an agreement system. Note that when one or some of those expected behaviors are not confirmed, it does not automatically mean that the phenomenon is not agreement; only that it is not a canonical form of agreement.

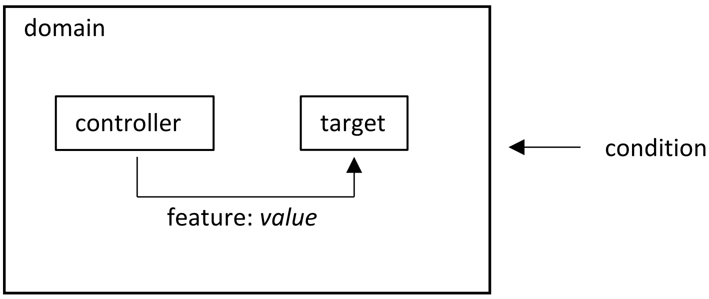


Figure 1. Elements of agreement (Corbett, 2006, p. 5).

The first element is the **domain**. It captures the fact that agreement is usually a local operation confined within a specific syntactic environment[2]. “The 'smaller' the domain the more canonical it is. That is, the smaller the structural distance between controller and

[2] Long distance agree(ment) is attested in some languages, though this kind of operation is considerably rare (Boeckx, 2009) and requires different licensing mechanisms.

target the more canonical is the instance of agreement" (Corbett, 2006, p. 21). Therefore, the most canonical type of agreement is agreement within a phrase (e.g. noun-adjective agreement), followed by agreement within the clause (e.g. subject-verb agreement), and agreement beyond the clause, but within the sentence (e.g. agreement of the relative pronoun with its antecedent)[3].

The element that determines agreement is the **controller**. In other words, the controller is the item that is not affected by the agreement operation, but carries the features that is going to be shared with the target element. Corbett (2006, p. 10) points out that the most canonical form of agreement is when the controller is present (overt) in the clause. However, some languages, also known as pro-drop languages, allow for phonetically null arguments and yet these null elements can still be the controllers of agreement[4].

The **target** of agreement is the element that bears the agreement morphology; the one whose form varies according to the controller and its features. As Corbett (2006, p. 12) points out, the target of the

[3] Agreement beyond the sentence is attested, as for instance the agreement of the anaphoric pronoun with its antecedent. However, Corbett (2006, p. 21) points out that calling this agreement is quite controversial in the literature.
[4] In fact, the licensing of null arguments is often related to the presence of rich agreement morphology (Chomsky, 1981; Perlmutter, 1971; Rizzi, 1982).

agreement is the element that is constrained by the largest number of criteria. Here, I want to highlight three of those criteria that will be the most relevant ones to the discussion I am pursuing in this dissertation.

The first one is the optionality vs. the obligatoriness of agreement. Although obligatory agreement is the most canonical form, there are some languages in which the agreement marking on the target is optional. One of these languages is the Ngan'gi[5] (Reid, 1997 *apud* Corbett, 2006, p. 14). In (8), the marker on the agreement target is optional:

(8) a-syensyerrgimi a=tyentyenmuy
ANIM-white.rock.wallaby ANIM=tame
'a tame white rock wallaby'

Therefore, the fact that the agreement morphology is optional in a given language is not a strong enough evidence to claim that the phenomenon under analysis is not agreement. Also, note that there is a difference between fully optionality and specific conditions that trigger (or constrain) the emergence of the agreement marker. As I will discuss in the next chapter, the fact that the agreement marker seems to be optional in Libras can be due to the fact that it is really optional

[5] "Ngan'gityemerri—or Ngan'gi for short—is an indigenous language spoken in the Daly River region of Australia's Northern Territory" (from *Wikipedia, The Free Encyclopedia*. "Ngan'gityemerri language." accessed November 11, 2018).

or even to some kind of condition that has not been fully understood yet – although I aim at providing some initial insights of what this condition might be.

The second criterion that I want to highlight here is productive vs. sporadic marking of agreement. In Brazilian Portuguese or in Russian, for example, every verb shows agreement with a specific controller. However, this productive marking of agreement is not found in every single agreement language. According to Corbett (2006, p. 17), for instance, there are languages where only around 30% of the verbs show agreement (e.g. Chechen[6] and Ingush[7]). Therefore, the fact that agreement is not marked in every single verb in a given language is not strong enough evidence to claim that the phenomenon under analysis is not agreement.

Note that optionality and sporadic marking are two distinct properties. When we say that an agreement marker is optional, we are

[6] "Chechen is a Northeast Caucasian language spoken by more than 1.4 million people, mostly in the Chechen Republic and by members of the Chechen diaspora throughout Russia, Jordan, Central Asia (mainly Kazakhstan and Kyrgyzstan), and Georgia" (*Wikipedia, The Free Encyclopedia*. "Chechen language" accessed November 11, 2018).

[7] "Ingush is a Northeast Caucasian language spoken by about 500,000 people, known as the Ingush, across a region covering the Russian republics of Ingushetia and Chechnya" (*Wikipedia, The Free Encyclopedia*. "Ingush language". Accessed November 11, 2018).

claiming that a given verb (target) X is capable of bearing agreement morphology, but it can optionally not. On the other hand, when we say that there is sporadic marking of agreement in a language, we refer to the fact that there is a set of elements that are marked for agreement and that there is another set of items that can not be agreement marked, even though they belong to the same part of speech.

Finally, I want to incorporate Corbett (2006, p. 15)'s discussion on the morphological shape of the agreement marker; more specifically, I want to highlight the difference between alliterative and opaque agreement. Compare the examples below from English and Swahili[8] (Welmers, 1974 *apud* Corbett, 2006, p. 16):

(9) He know*s* a lot about sign languages.

(10) *ki*-kapu *ki*-kubwa *ki*-moja *ki*-lianguka.
7-basket 7-large 7-one 7-fall
'One large basket fell.'

In (9), the morpheme {-s} in English marks third person singular agreement and occurs only in the indicative present tense. Note,

[8] "Swahili, also known as Kiswahili, is a Bantu language and the first language of the Swahili people. It is a lingua franca of the African Great Lakes region and other parts of eastern and south-eastern Africa, including Tanzania, Kenya, Uganda, Rwanda, Burundi, Mozambique, and the Democratic Republic of the Congo" (*Wikipedia, The Free Encyclopedia*. "Swahili language." accessed November 11, 2018).

however, that this morpheme is completely opaque and unrelated to the morphological shape of the controller of the agreement. On the other hand, in (9), the agreement marker found in the targets (the numeral, the modifier and the verb) has exactly the same shape from the class morpheme {ki-} that marks the nominal 'ki-kapu'. In this sense, "the agreement marker on the target is identical to a formant of the controller" (Corbett, 2006, p. 16). Additionally, "the same agreement marker is used for different agreement targets" (ibid). This kind of agreement is called **alliterative agreement** and, according to Corbett, it is actually the most canonical form of agreement.

After discussing the domain, the controller and the target, let us now turn to the feature(s) of agreement. A feature can be understood as a property of a lexical item. As den Dikken (2000, p. 5) points out there are different types of features, such as phonological, semantic and morphosyntactic features, as shown in (11):

(11)	a. phonological features	[+back], [−ATR]
	b. semantic features	[−abstract], [+artifact]
	c. morphosyntactic features	[+PAST], [3SG], [+ACC]

However, only some features are accessible during the syntactic computation and these are the morphosyntactic features, also called **formal features** (Den Dikken, 2000, p. 5).

When it comes to features, it is also important to distinguish between the type of the feature and its value. For instance, in English, there are two possible values for number features [SINGULAR; PLURAL] and, in Portuguese, two different values for gender features [MASCULINE; FEMININE].

The last component of agreement that needs to be discussed here, is the **conditions** for agreement. In some languages, agreement is restricted to some specific contexts. For example, in Miya[9], plural number agreement is restricted to animate nouns, in such a way that animacy is a condition for agreement in the language (Corbett, 2006, p. 178). Precedence is also a condition for agreement in some languages, where whether the controller precedes the target or not will determine the agreement form (Moroccan Arabic and Russian are examples discussed by Corbett (2006, p. 180)).

In sum, although agreement is a very heterogeneous phenomenon, the basic four components posited by Corbett (2006) –

[9] "Miya (Miyawa) is an Afro-Asiatic language spoken in Bauchi State, Nigeria" (*Wikipedia, The Free Encyclopedia*. "Miya language." accessed November 11, 2018).

controller, target, feature and domain – seem to successfully describe it and capture the universal aspects of it. Therefore, these components should be considered by whatever theory of agreement one might postulate. Additionally, for some languages, a description of the conditions that trigger or restrict agreement must also be explained. That been said, let us now discuss a theory of agreement proposed within a generative framework.

2.2 Agree(ment) in Generative Theory

In the early years of Generative Theory, rewriting rules were proposed, in order to capture the internal structure of sentences and phrases (Chomsky, 1957, 1965). So, initially, the structure of a sentence could be captured by the rule S(entence) → NP VP. However, it was noticed that the relation between the subject and the predicate of the sentence is mediated by a functional structure that was called Infl(ection), giving rise to the rule S → NP Inf VP. Infl was claimed to host tense, mood and agreement.

As the theory evolved, different modifications and implementations were made, such as:

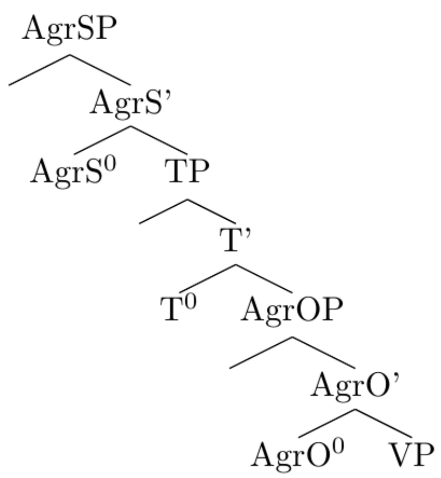
i) the inflection projection was considered the core projection of the sentence – IP, in Chomsky (1986)'s terms;

ii) the IP was exploded into, at least, two different projections T(ense)P and Agr(eement)P (Chomsky, 1989; Pollock, 1989);

iii) a specific agreement projection for object agreement (and also object Case assignment) was proposed – AgrOP (Chomsky, 1995c)[10].

Agreement then could be captured by a syntactic structure such as the one presented in (12):

(12)



[10] For a more detailed discussion on agreement projections, see Belletti (2001).

Although agreement projections have been very frequently implemented in different generative analysis of agreement, they impose a serious problem for a minimal theory of the syntactic computation. Chomsky (1995a, p. 378) argues that "the only functional categories are those with features that survive through the derivation and appear at the interfaces, where they are interpreted". In that sense, Agr projections are not conceptually adequate, because they are not interpretable at the interface levels (neither at Phonologic Form nor at Logical Form). Chomsky's interpretability requirement for function projections caused a clear-cut division between minimal structure approaches and cartographic ones[11].

By assuming a more minimalist perspective, it is possible to account for agreement just implementing the two basic operations Merge and Agree on a C-T-*v*-V-(D) system.

A C-T-*v*-V-(D) structure captures the fact that only the CP, TP, *v*P, VP and DP levels constitute the basic structure of the sentence. It does not mean that other projections are not allowed, but it does require that any other proposed projection must be interpretable at the interfaces. Additionally, the operations that take place during

[11] See Shlonsky (2010) for a discussion on the cartographic approach and its relation to Minimalist Program.

syntactic computation are actually restricted to only two: Merge and Agree.

Merge is an operation, "which takes two elements α, β, already constructed, and creates a new one consisting of the two—in the simplest case, $\{\alpha, \beta\}$" (Chomsky, 2004, p. 108). There are two types of merge: External Merge and Internal Merge. External Merge picks up an item(s) that is not yet incorporated into the derivation[12], while Internal Merge (what used to be called Move) picks up an item from an internal position and which is already part of the syntactic structure $\{\beta \{\alpha, \beta\}\}$.

The other proposed operation is **Agree** (Chomsky, 2000, 2001, 2005, 2008; Pesetsky & Torrego, 2007). Agree is a probe-goal relation, in which the probe looks down the tree for a goal within its checking domain. Then, the goal values the features of the probe.

[12] From the Numeration, for a more technical term.

(13) *Agree* (Chomsky, 2000, p. 122):

$$\alpha \quad > \quad \beta$$

AGREE (α, β), where α is a probe and β is a matching goal, ‘>’ is a c-command relation and uninterpretable features of α and β are checked/deleted.

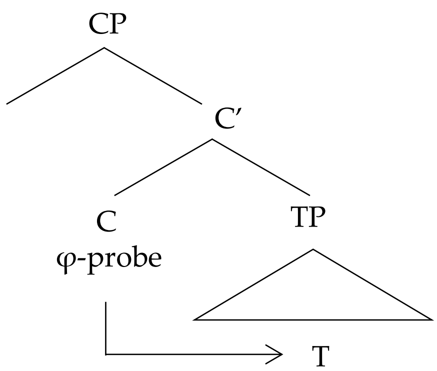
Before presenting the syntactic computation per se, let me briefly discuss how agreement could be conceptualized within a generative framework.

According to Miyagawa (2010, p. 7), agreement can be better understood based on “the duality of semantics”. When lexical items are merged, they create **lexical relations** and thus create what is called the argument structure of the sentence. On the other hand, functional heads when merged create an expression structure. Miyagawa (p. 8) argues that “functional heads substantially enhance the expressiveness of human language”, because they give rise to notions such as topic-comment, subject of a clause, focus, and content questions, among many other modes of expression. The relations between a function head and a lexical item are called **functional relations**.

Lexical relations are created by means of External Merge and are, therefore, thematic relations. Functional relations, on the other hand, are the product of Agree operations.

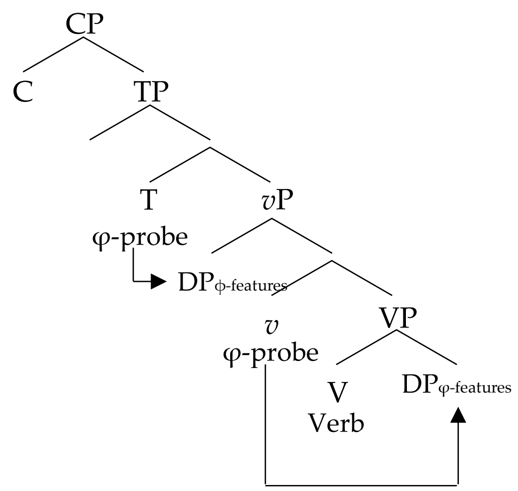
Agreement is, therefore, the result of a specific Agree relation, in which the goal values the φ-features of the probe. It is important to note that the φ-probe is merged on C and then it percolates down to T (Chomsky, 2008; Miyagawa, 2010):

(14)



The ϕ-probe on T will search for the closest DP bearing φ-features. Agreement with T (also known as subject agreement), however, is not the only type of agreement found in natural languages. Object agreement is also a result of an Agree relation, but between the φ-probe in *v* and a goal. The derivation is provided in (15):

(15)



Here, it is important to notice that Agree and agreement are not synonyms. Agree is the basic probe-goal operation of syntax that functions as a feature checking/valuation mechanism. Agreement, on the other hand, is the morphological realization of an Agree relation involving φ-features. Therefore, every agreement is considered to be the outcome of Agree, but not every Agree will be spelled-out as agreement.

Now, we can make a comparison between the elements of agreement proposed by Corbett (2006) and the derivation of agreement in a minimalist framework.

The first parallel is between the notion of domain in Corbett's description and the structural configuration required by the Agree operation. Remember that Corbett (2006, p. 21) claims that the most canonical forms of agreement are the ones that are confined within a "smaller" domain, which he calls "smaller structural distance". This definition captures the fact that Agree is a local operation, which requires a c-command configuration and which is constrained by minimality effects[13].

The main conceptual difference between Corbett's analysis and the minimalist one is the direction of agreement. In Corbett's term, the controller (e.g. the noun) shares its features with the target (e.g. the verb). However, in the minimalist terminology it is the probe

[13] Minimality is a term used in generative theory to capture the notion that syntactic relations must be local and restricted to minimal domains. For an introductory overview of minimality, see Stepanov et al. (2004); and for a more comprehensive discussion, see Rizzi (1990, 2001, 2011).

(Corbett's target) that seeks for the goal's (Corbett's controller) features.

Both perspectives agree that features are what is shared between elements in agreement, although these features might be theoretically different in their nature. The following table summarizes this comparison.

Table 1. Comparison between Corbett's terms and the minimalist ones.

Corbett's	**Minimalism**
Domain	Local (c-command)
Controller	Goal
Target	Probe
Features	Features

Before discussing agreement in signed languages, another important aspect of agreement theory must be addressed: the relation between agreement and Case.

2.3 Agreement and Case

Chomsky (2000, 2001) claims that Case[14] and agreement are two sides of the same coin: they are the result of the same Agree relation between a functional head and a nominal. If this is true, there must be a biunique relation between the Case received by the DP and the functional head that the DP agrees with. This relation is consistent in many languages, English included. The following examples from Baker (2012, p. 256) illustrate this biunique relation in English and in Icelandic:

(16) a. That she walks to work each day is good for her health.

b. For her to walk to work each day would be good for her health.

[14] The word Case is written with a capital C to make reference to the notion of abstract Case, in opposition to morphological case.

(17) a. Hún elskar Þá.
She(NOM) loves(3sS) them(ACC).
'She loves them.'

b. *Henni leiddust Þeir.*
she.DAT be.bored. with-3pS they.NOM
'She was bored with them.'

In (16) the nominative pronoun 'she' agrees with the verb 'walks'. However, the pronoun is no longer nominative in (16) and then there is no verb agreement. Similarly, in (17) we can see that the verb only agrees with the nominative DP; which is the subject in (17) and the object in (17).

Note that this Case-agreement relation is found in many languages around the world; but not in every language. There are several languages attested in which there is no relation between agreement and the Case born by the DP (for an extensive discussion on this topic, see Baker, 2008). How to explain that this Case-agreement relation is present in some languages but not in others?

Baker (2008) compares 108 different languages to see how their agreement systems work. He found out that in 40 languages agreement was dependent on the Case received by the DP (e.g. English, Portuguese, etc.). No Case-agreement relation was found in

31 languages (e.g. Amharic, Georgian, etc.) and 29 languages had no agreement at all (e.g. Sango, Yoruba, etc.). Finally, the author could not say for sure if there is or there is not a Case-agreement relation in 8 languages.

Baker concludes that the number of languages that systematically show an agreement system dependent on Case is considerably high and this dependency should not be treated as a mere coincidence. Based on that, Baker (2008, p. 155) proposes the Case-Dependency of Agreement Parameter:

(18) *The Case-Dependency of Agreement Parameter:*
F agrees with DP/NP only if F values the case feature of DP/NP or vice versa.

According to this parameter, a functional head F will agree with a DP, if this very same F assigns Case to that DP. This is exactly what happens in examples (16) and (17) provided earlier. The functional head T only agrees with the DP that receives Case from T. Once T assigns nominative Case, T only agrees with a nominative DP.

Based on Baker's proposal, we can expect that in languages that set the Case-Dependency of Agreement Parameter there will be a biunique relation between Case and agreement. Additionally, the numbers presented in Baker's investigation indicate that this parameter is set in most of the natural languages.

2.4 Summary

In this chapter, I discussed the notion of agreement under two different theoretical perspectives. First, I presented Corbett (2006)'s descriptive and typological investigation of the phenomenon, in which he identifies five important elements that are part of agreement, to wit: the domain, the controller, the target, the features and the conditions.

On the other hand, agreement is viewed within a minimalist framework as the spell-out of an Agree relation between a probe and a goal, in which φ-features are checked/valued. Additionally, it has been argued that two basic syntactic operations (Merge and Agree) are enough to account for a syntactic derivation of agreement, without the need of postulating specific Agr(eement) projections.

Although completely different in nature, both the descriptive framework and the (generative) minimalist syntax seem to identify the same elements required for agreement.

Finally, I briefly discussed the close relation between Case and agreement found in different languages and the idea that this biunique behavior is actually the result of the Case-Dependency of Agreement Parameter, proposed by Baker (2008).

After discussing the theoretical notion of agreement, let us turn our attention to agreement in sign languages in the next chapter.

Chapter 3:

Agreement in sign languages

Agreement has certainly been one of the most debated topic in sign language linguistics. Although a lot of tensions and disagreements still exist, the study of this spatial mechanism of agreement found in most signed languages around the world has shed light on two general research questions posited under formalist approaches:

i) What general properties of the human language faculty that have been claimed to exist can be falsified by the study of a language in a different modality?

ii) What are the effects of modality in the human language faculty and in the language architecture per se?

This is so, because agreement is a very common phenomenon in human languages[15], in such a way that there are plenty of descriptive and theoretical tools available, allowing for straight comparisons between spoken and signed languages. On the other hand, agreement in sign languages makes use of spatial mechanisms, which are modality specific.

Interestingly, this dualism of having a language general phenomenon being externalized by a modality specific mechanism has led to two different positions in the sign language linguistics literature: one that treats agreement as agreement, vis-à-vis spoken language agreement; and the other one that claims that this is not even agreement, but a fusion of morphemic and deictic gestural elements[16]. In this dissertation, I clearly assume that sign language agreement is indeed agreement.

[15] Miyagawa (2005, 2010, 2017) claims that agreement is actually universal, found even in the so-called agreement-less languages, like Japanese.

[16] For strong argumentation against the gestural analysis, see Lillo-Martin and Meier (2011), Quer (2011) and Wilbur (2013).

Before discussing verb agreement per se, some comments must be made upon the referential use of space in sign languages.

3.1 The grammar of (referential) space

Sign languages "are made by the hands moving in space; it is dimensions of space and movement which the language uses for its grammatical processes" (Klima & Bellugi, 1979, p. 274). That said, space is a main concept in most, if not any, sign language linguistic analysis. As Perniss (2012, p. 413) points out, space plays a role in phonological, morphosyntactic, semantic and pragmatic levels. Space is possibly the most intriguing modality-specific feature of sign languages; because "unlike oral [spoken] languages where space is referred to, in sign languages, space is physically available for representation" (Padden, 1990, p. 118).

The most relevant aspect of the grammar of space for the topic under scrutiny in this dissertation is the association of specific locations with discourse referents. One of the first descriptions of the establishment of referents in space in a signed language was made by Lynn Friedman (1975). She noticed that in ASL pronominal references can be made by pointing ("indexing" in Friedman's terminology):

i) to the actual location of the referent (referring to a person, object or location) present in the actual environment of the signer, or

ii) to a specific and arbitrary point in space that is then associated to a referent that is not necessarily found in the actual environment (Friedman, 1975, p. 946)[17].

This distinction between present and non-present referents has consistently been claimed to be relevant to the establishment of referents in space, as we can see in Cormier (2012)'s description:

> If the referent is present, the signer uses a pronoun or other agreement/indicating device to point to the location of the referent. If the referent is not present, the signer may establish a point in space for the referent, which could be motivated in some way (e.g. pointing towards a chair where a person usually sits) or could be arbitrary. Once a location in space for a referent has been established, that same location can be referred to again and again unambiguously (Cormier, 2012, p. 229).

Although the space is used for reference establishment and tracking, it does not mean that the interpretation of this spatial mechanism is topographic in nature. There is a clear distinction

[17] Interestingly, Friedman also describes that specific time references can also be associated to points in space.

between the canonical referential, non-topographic point and the real topographic mapping of the world in the sign space (Emmorey, Corina, & Bellugi, 1995).

Additionally, sign languages make use of the signing space to mark grammatical person. Different claims have been made on what are the relevant person distinctions in different sign languages. For instance, Friedman (1975, p. 947) proposes a three-person system for ASL (see also ***Figure 2***):

(19) *Friedman's three-person system*:

- Pointing inward, toward the signer: 1st person.
- Pointing outward, toward the addressee: 2nd person.
- Pointing outward, away from both the signer and the addressee: 3rd person(s), or any locative or temporal referent other here and now.

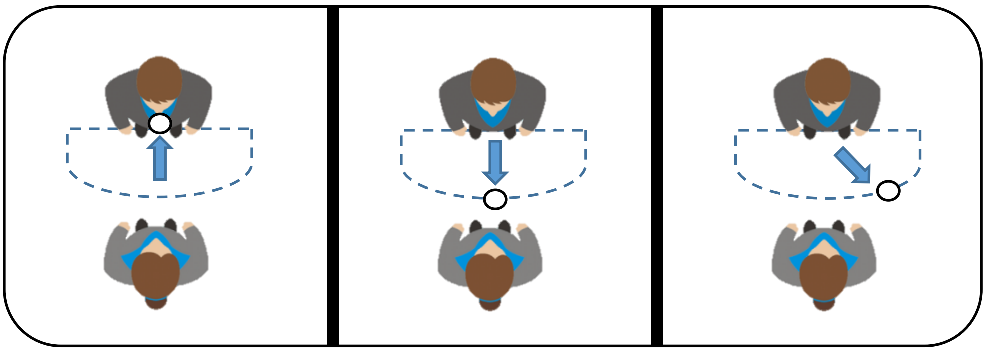


Figure 2. Pointing locus for 1st person, 2nd person and 3rd person, respectively.

This three-person system has also been assumed by Klima and Bellugi (1979) and Padden (1988) for ASL; and also for Austrian Sign Language (HZJ) (Alibašić Ciciliani & Wilbur, 2006), Libras (Berenz, 1996, 2002; Quadros, 1999; Quadros & Karnopp, 2004)[18] and others.

Although the pointing pattern observed by Friedman (1975) and others seems to be consistent, there is some debate on whether the three-person distinction is actually a *grammatical* distinction. Meier (1990), for instance, claims that the only true relevant distinction in ASL is between 1st (singular and plural) and non-1st person (***Figure** 3*).

[18] Although not explicitly, Quadros (1999) and Quadros and Karnopp (2004) seem to assume a three-person distinction for Libras.

1st singular	1st plural
Non-1st	

Figure 3. Two-person system for ASL (Meier, 1990, p. 189).

The argument is based on the fact that the first person bears a fixed location in the sign space and also is morphologically marked differently compared to 2nd and 3rd person referents. It is important to notice, however, that the two-person system does not "suggest that ASL cannot distinguish reference to an individual who happens to be the addressee [2nd] from reference to a nonaddressed participant [3rd]"; it just posits that there is not a "grammatical contrast between second and third persons" (Meier, 1990, p. 189). A two-person distinction has also been proposed by Emmorey (2002), Engberg-Pedersen (1993), Lillo-Martin (2002), Padden (1990), Rathmann & Mathur (2002), and others.

Despite the debate on whether the distinction between 2nd and 3rd person is grammatically relevant or not, another issue has been raised concerning the spatial mechanism used pronominally in sign languages: the listability problem. The fact that points in space are virtually infinite in number can potentially generate an indefinite number of pronominal forms. Therefore, a signer could establish as many points in space as possible, ending up with an immense number of distinct pronominal references. This is exactly the point of Lillo-Martin and Klima (1990):

> between any two points that have been associated with various referents, another could in principle be established. Thus, […] the distinct pronominal forms […] are not listable. There are, of course, perceptual and memory limitations to the performance of this system (p. 194).
>
> If there are a potentially infinite number of formally distinct pronoun sign forms, then there will be an infinite number of distinct pronoun signs in the signer's mental lexicon. […] Hence the lexicon would have to list an infinite number of forms, one directed toward each possible locus [point in space] (p. 198).

This listability problem led Lillo-Martin & Klima (1990) to propose that there is no grammatical person distinction in ASL. The authors call each referential point in space a R(eferential)-locus and according to their analysis the infinite number of R-loci is not listed in the lexicon, because the locus is not a lexical item. Therefore, there is "no list at all" (p. 198).

The R-locus analysis claims that there is one single pronominal form in the lexicon, a general PRONOUN. Each PRONOUN bears an abstract referential index that is assigned before the item enters into the syntactic derivation. Once each nominal bears a distinct referential index, these R-indices can overtly be realized as different R-loci. Note that Lillo-Martin & Klima (1990)'s model considers the spatial mechanism as a surface-level modality phenomenon: both spoken and signed languages assign referential indices to their nominal elements, but only sign languages overtly utter them by associating them to specific points in space.

The idea that there is an abstract "element" that is relevant for syntactic computation and which is later pronounced in the shape of points in space has become frequent in the sign language literature on pronominal reference and verb agreement. In Lillo-Martin & Klima (1990)'s R-locus analysis, this element is an abstract variable. On the other hand, Kuhn (2016) claims that it is featural in nature. For Neidle et al. (2000, p. 31), the spatial location is an overt instantiation of φ-features. Similarly, Rathmann & Mathur (2002, 2008) propose that the φ-features person and number are relevant for syntax computations and are later converted into gesture elements (points) by a specific module of the human cognition, the Gesture Space, that interfaces with and mediates the architecture of grammar.

Although a fine grained identification of the linguistic mechanism that underlies the referential use of space is desirable, Wilbur (2013) and Quer (2011) argue that the current discussion on the nature of the physical point is actually misleading. Both of them claim that there is no listability issue and that the "point" in space that is linguistically relevant is not the actual physical point, but instead a geometric *point*, which can be categorically perceived (Quer, 2011, p. 190). So, instead of suggesting a system that is made of an infinite set of physical points in space that need to be listed, Quer (2011) and Wilbur (2013) argue that the linguistic *point* just need to be categorically perceived and bear distinctiveness properties. This argument is also clear in Wilbur (2008):

> the indication of a point (*p*) within a linguistic context signals nothing other than that there is something associated with that particular location. […] My claim is that the point (*p*) as a form is morphologically mapped with the set-theoretic semantic *meaning* 'individual (*x*)' (p. 238).
>
> the morpheme is not 'this particular point in space where the sign movement or indicator pointing just stopped'; rather it is the geometric point in space (*p*), which indicates an individual (*x*), no matter where it is made in space (p. 239).

I will thereby call the association between (*p*) → (*x*) a **location**[19], to make clear that I am not referring just to the point in space, but to this specific semantic mapping. Additionally, in order to identify different locations, subscript indices will be used as illustrated in ***Figure 4***:

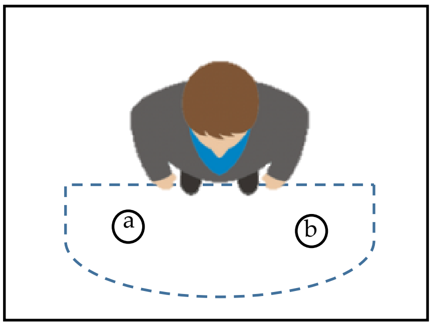


Figure 4. Locations assigned to nominals. If location *a* is associated to the nominal X and *b* is assigned to Y, then the glossing will be X_a and Y_b respectively.

In previous works (Lourenço, 2014b, 2014a; Lourenço & Duarte, 2014), I have assumed a featural analysis a la Rathmann and Mathur (2002, 2003, 2011), in which φ-features of the nominal are later converted into spatial points. I am no longer assuming this position in this dissertation, as will be made clear when I discuss the features that are relevant for agreement in Libras (Chapter 5).

[19] This is the same terminology adopted by Costello (2015).

Given this discussion on how points in space can be associated to individuals resulting in a *location*, let us now describe verb agreement in sign languages.

3.2 The shape of agreement

Once there are *locations* (geometrical points in space (p) linked to specific referential entities (x)) assigned to nominals, a group of verbs can be modified in such a way that the beginning point and the endpoint of their movement will coincide with the location associated to their arguments. This systematic modification of the verb based on the locations of its arguments has been called **verb agreement**. This is the case, for example, of the verb HELP in Libras:

Figure 5. JOHN$_a$ $_a$HELP$_b$ MARY$_b$.

Notice that in **Figure 5**, the verb HELP starts at the location assigned to JOHN and moves to the location associated to MARY. This is so that the interpretation of the sentence is that the beginning location of the verb marks the subject and the endpoint indicates the object. Additionally, the palm of the dominant hand faces towards the location of the object MARY.

HELP is a canonical example of agreement verb in a sign language. This is so because it exhibits the three main characteristics that have been identified as exponents of agreement in the current literature, to wit: i) a path movement; ii) it goes from the subject's location toward the object's location; and iii) it shows facing toward the syntactic object (see ***Figure 6***). This is how, for example, Sandler and Lillo-Martin describes verb agreement in ASL:

> A verb which agrees […] will generally make use of the referential space by using the locus for the subject as the beginning **LOCATION of the verb**, and the locus of the object as the ending point. In signing the verb, then, the hand **MOVES** from the locus of the subject to the locus of the object. In addition, **the direction in which the hands are FACING** is also generally affected in agreeing forms (Sandler & Lillo-Martin, 2006 - emphases added).

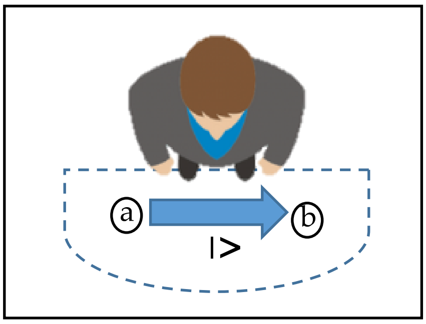


Figure 6. A visual representation of regular agreement in sign languages. The verb exhibits a path movement from location (a) to location (b) and the palm of the (dominant) hand faces (|>) towards location (b).

While these three components have been claimed to mark verb agreement, the only one that is mostly referred to by different authors is the path movement, as shown in ***Table 2***:

Table 2. The description of agreement in sign languages.

	Movement (Path)	**Location (points)**	**Facing**
Sandler & Lillo-Martin (2006, p. 27)	✓	✓	✓
Mathur & Rathmann (2010, p. 173)	✓		✓
Fischer & van der Hulst (2003, p. 320)	✓		✓
Neidle et al. (2000, p. 33)	✓	✓	
Mathur & Rathmann (2012, p. 137)	✓		✓
Quadros & Quer (2008, p. 531)	✓	✓	
Meir (1998, p. 15)	✓		✓
Padden (1988, p. 27)	✓	✓	

Although there is some consensus in assuming the path movement as an agreement marker, the roles of location and facing are still debatable. For instance, there are some analyses that treat the facing of the hand(s) as a different agreement mechanism (Meir, 1998a, 2002; Pfau, Salzmann, & Steinbach, 2011).

In addition to the description of the agreement marking in the manual domain, Bahan (1996) and Neidle et al. (2000) argue that nonmanual markers are also part of the agreement system in sign languages. Bahan (1996) claims that head tilt and eye-gaze are another possibility of subject and object agreement (***Figure 7***). Neidle et al. (2000, p. 75) go even further and claim that "agreement can be expressed nonmanually in clauses containing verbs without overt [manual] morphological agreement inflection". This means that even verbs that do not have a path movement between its arguments are marked for agreement non-manually – but see Thompson, Emmorey, & Kluender, (2006) for empirical evidence against this claim.

Figure 7. The verb GIVE in ASL. In Bahan's analysis, the head tilt overtly marks agreement with the subject location and the eye-gaze marks agreement with the object locus. Images from Bahan (1996, p. 129).

One final consideration I want to point out in this section is related to the internal structure of the verb. Assuming a very simplified version of the Prosodic Model (Brentari, 1998), we can identify four main components or nodes in the phonological structure of the sign: the nonmanual articulators; the manual articulators; the place of articulation (location); and the prosodic features (movement)[20]. If we compare that structure with the different agreement markers that have been identified in the literature, we end up assuming that agreement changes all the internal structures of the verb:

[20] We will go back to the internal structure of the verb in Chapter 4.

SIGN LANGUAGE AGREEMENT

- *The nonmanual articulators* → eye gaze and head tilt mark subject and object;
- *Manual articulators* → the hand faces toward the object;
- *Place of articulation (location)* → the beginning location of the verb coincides with the location of the subject and the endpoint with the location of the object;
- *Prosodic features (movement)* → there is a path movement between the locations of the arguments.

Although it seems that agreement is everywhere in the internal structure of the verb, I will argue in Chapter 4 that this description is inaccurate. Instead, my claim is that agreement in Libras is expressed solely by the sharing of the location specification of the argument(s) with the verb, by a process I call co-localization.

3.3 Agreement verb classes?

One striking characteristic of sign language agreement is that not every verb shows the agreement pattern described in the previous section. In fact, Mathur & Rathmann (2012, p. 152) claim that "the agreement process in sign languages is restricted to a smaller set of verbs, whereas agreement in spoken languages, if it is marked at all, is usually marked on the whole set of verbs". Therefore, there is a notion of **agreement classes**. That means that there is a group of verbs that shows agreement and a group of verbs that does not.

The first classification of verbs in terms of their agreement pattern was made by Padden (1988). She proposes that there are three different types of verbs in ASL: i) agreement verbs[21](Padden, 1990) that mark for person and number; ii) spatial verbs that mark for location and position (locative agreement); and iii) plain verbs that are not marked for agreement at all.

Agreement verbs are the ones that behave like HELP in Libras, moving from the location of the subject toward the location of the object. However, we can identify three different types of agreement verbs: i) double regular agreement verbs; ii) single regular agreement verbs; and iii) backward agreement verbs.

Double regular agreement verbs are the ones that have two agreement slots and, therefore, agree with the subject and with the object. Examples are provided in (20)[22]:

[21] Initially, Padden (1988) calls these verbs inflecting verbs, but she modifies her terminology latter, adopting "agreement verbs" (Padden, 1990).
[22] All the examples in this section are from Libras.

(20) a. MARY$_a$ $_a$TELL$_b$ JOHN$_b$
'Mary told John (something)'.

b. IX $_1$ $_1$GIVE$_2$ IX$_2$ BOOK[23]
'I gave you the book'.

c. YESTERDAY IX$_1$ $_1$SHOW$_2$ IX$_2$ BOOK ENGLISH
'Yesterday, I showed you the English book'.

Single regular agreement verbs are those that only have one agreement slot and agree only with the object, examples in (21). The fact that single agreement verbs agree with the object and not with the subject has been called the primacy of object over subject by Lillo-Martin & Meier (2011) and Meir et al. (2007, 2008).

(21) a. MARY$_a$ ABANDON$_b$ CHILD$_b$
'Mary abandoned the child'.

b. IX$_1$ TAKE-CARE$_b$ TURTLE$_b$
'I take care of the turtle'.

c. IX$_2$ SEE$_b$ CAR$_b$ NEW
'You saw the new car'.

[23] In ditransitive sentences, the verb agrees with the syntactic subject and with the object$_{goal}$. A derivation of agreement in ditransitive constructions is provided in Chapter 5.

There is a group of verbs that moves from the locus of the object towards the locus of the subject; the opposite direction compared to the regular agreement verbs. They are called **backward agreement verbs**:

(22) a. MARY$_a$ $_b$INVITE$_a$ JOHN$_b$ PARTY HOUSE$_a$ POSS$_a$
‘Mary invited John to a party at her house’.

b. IX$_1$ $_b$TAKE$_1$ BOOK$_b$
‘I took the book’.

c. IX$_2$ $_1$CHOOSE$_2$ IX$_1$
‘You chose me’.

The second type of verb identified by Padden (1988) is the group of **spatial verbs**. These verbs, according to her analysis, do not mark for person or number, but take locative affixes:

(23) a. IX$_1$ BRASILIA$_a$ $_a$MOVE$_b$ FLORIANÓPOLIS$_b$
‘I moved from Brasilia to Florianópolis’.

b. IX$_2$ $_a$WALK$_b$
‘You walked from there to there’.

c. JOHN$_a$ STAY$_a$ HOUSE$_a$[24]
'John stayed home'. (Bos, 2017)

Finally, there is a group of verbs that are considered to not show agreement. Padden (1988) calls them **plain verbs**. They have no movement between the locus of the subject towards the locus of the object.

(24) a. MARY$_a$ LIKE JOHN$_b$
'Mary likes John'.

b. JOHN$_a$ WORK EARLY EVERY^DAY
'John works early every day'.

c. YESTERDAY IX$_1$ FEEL GOOD NOT
'Yesterday I wasn't feeling good'.

In sum, Padden (1988) proposes a tripartite classification of verbs in ASL, based on their agreement pattern (agreement, spatial and plain verbs).

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[24] Notice that in this example, the subject and the locative occupy the same locus. In Padden's analysis, the verb is agreeing with the location of HOUSE not JOHN. Bos (2017), on the other hand, would argue that the locus of JOHN and the locus of HOUSE are merged; and, therefore, it will be hard to track which is the true agreement controller, if you try to separate these two loci.

A different classification is proposed by Quadros (1999) and Quadros & Quer (2008). They argue in favor of a binary classification of verbs, to wit: agreeing versus non-agreeing (plain) verbs. In the class of agreeing verbs they include spatial verbs.

Quadros (1999) claims that there is no syntactic evidence that spatial and agreeing verbs behave differently (although, there might be semantic distinctions). Instead, she claims that both types of verbs check their features (agreement) in the same functional category in the phrase structure (Quadros, 1999, p. 100). Additionally, the classification of a given verb can be tricky, because some "verbs can occur in more than one class" (p. 97).

Further, Quadros & Quer (2008) claim that a verb can agree with both locative and personal arguments and that "agreement with person and locative features is often indistinguishable on the surface" (p. 548).

Regardless of what kind of classification is assumed, the pure idea of agreement classes brings up the question of what features predict that a verb will show agreement or not, and what is the nature of these features (phonological, semantic, syntactic?).

Padden (1988), for instance, takes a lexical approach, claiming that agreement is lexically specified. Janis (1995) postulates a hierarchy based on the grammatical relation of the arguments and also their semantic roles, in order to predict agreement. Meir (2002), on the other hand, offers a semantic/thematic approach, in which the thematic roles of the arguments determine the agreement pattern. There is also an analysis based on animacy of the arguments (Rathmann & Mathur, 2002).

What we observe here is that the notion of agreement classes comes along with the notion of 'candidacy for agreement' and a need to predict which verbs will bear agreement morphology and which will not.

This fact brings us back to Mathur & Rathmann (2012, p. 152) 's words that "the agreement process in sign languages is restricted to a smaller set of verbs". This can lead us to think that agreement in signed languages is somewhat different from agreement in spoken languages; because it does not seem to be the rule, but the exception.

In the next Chapter, I will argue against these current classifications and claim instead that agreement is the rule in Libras and, possibly, in other sign languages, as well. The main point of my analysis rests in changing what we consider the agreement marker in sign languages.

3.4 Summary

In this chapter, a brief overview of agreement in sign languages was presented. First, the referential use of space was described. Sign languages do use space to establish and track referents in discourse. Although different analyses have been carried out on what the relevant person distinctions are, what is central to agreement is the notion of **locations**. Following Wilbur (2008), I assume location to be a semantic mapping, in which a geometrical point in space (p) is linked to a specific referential entity (x).

Since there are locations, a verb can move between the locations associated to its arguments – and this systematic modification of the verb based on the locations of its arguments has been called verb agreement.

Different descriptions of agreement have been provided in the literature, concerning what is the form/morphology of agreement. Three main components of the sign have been claimed to mark agreement, to wit: the (path) movement; the changing of location; and the facing of the hand. Even nonmanual markers (head tilt and eye gaze) are considered by some authors to be part of agreement. Under these descriptions, agreement seems to modify the whole verb internal structure – a point I will argue against in this dissertation.

Finally, I presented the idea of agreement classes, as introduced by Padden (1988), according to which groups of verbs behave differently in terms of their agreement pattern. Assuming a Paddenian tripartite classification, verbs can be classified as agreement verbs, spatial verbs, and plain verbs. On the other hand, a binary classification (agreement versus plain verbs) has also been proposed (Quadros, 1999; Quadros & Quer, 2008).

Based on these descriptions, we can ask: i) does sign language agreement really change the whole internal structure of the verb? ii) is sign language agreement really "restricted to a smaller set of verbs"? These questions will lead the discussions of the next chapter.

Chapter 4:
Morphophonology of agreement

The goal of this chapter is to analyze the morphophonological properties of agreement in Libras and to postulate that what really marks agreement in the language is not the path movement as has consistently been claimed in the literature. I will argue that the true agreement marking mechanism in the language – and, possibly, in others sign languages as well – is solely the sharing of location specification between the argument (controller, in Corbet’s terms) and the verb (goal).

By changing what we consider to be agreement in Libras, the notion of agreement classes will be challenged. Further, I will show that agreement is much more pervasive than usually assumed: agreement is the rule, not the exception in Libras.

4.1 The internal structure of the sign

Different phonological models have been proposed to describe the internal structure of the sign in signed languages.[25] In order to discuss the morphophonological properties of agreement in Libras, I will adopt the Prosodic Model of sign language phonology (Brentari, 1998). In this model, a feature tree (feature geometry) is proposed to represent the phonological structure of the sign.

The main idea is that the traditional phonological parameters[26] are organized in a hierarchical structure, as the one given in ***Figure 8***.

[25] The most referenced ones are the Cheremic Model (W. C. Stokoe, 1960; W. C. Stokoe, Casterline, & Croneberg, 1965), the Hold-Movement Model (Liddell, 1984, 1992; Liddell & Johnson, 1989), the Hand Tier Model (Sandler, 1989, 1992, 1993), the Moraic Model (Perlmutter, 1992), the Dependency Phonology Model (van der Hulst, 1993, 1995, 1996) and the Prosodic Model (Brentari, 1998).

[26] "Taken together, the five sign language parameters of Handshape, Place of Articulation (where the sign is made), Movement (how the articulators move), Orientation (the hands' relation towards the Place of Articulation), and Nonmanual behaviors (what the body and face are doing) function similarly to the cavities, articulators and features of spoken languages. Despite their different content, these parameters (i.e., phonemic groups of features) in sign languages are subject to

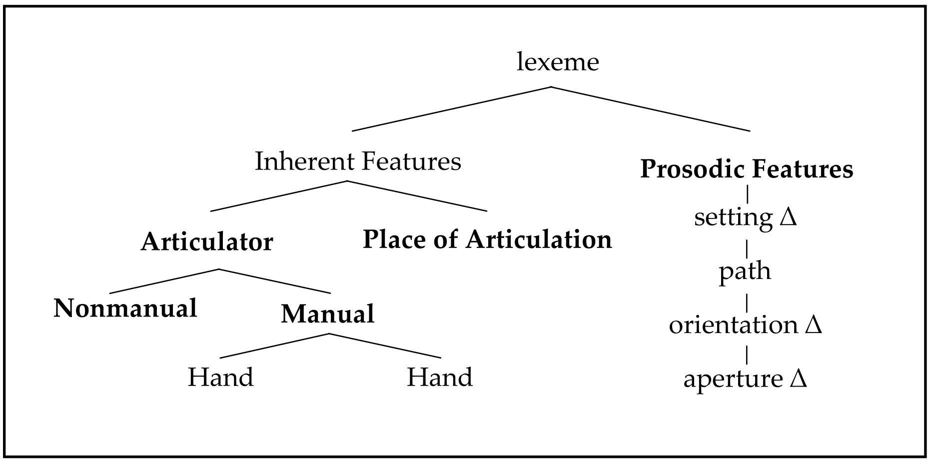


Figure 8. The phonological structure of the sign. (Brentari, 1998, p. 94, adapted).[27]

Each lexeme is formed by a structure of Inherent Features and a structure of Prosodic Features. Brentari defines each of these as follows:

> *Inherent features* are those properties of signs in the core lexicon that are specified once per lexeme and do not change during the lexeme's production (e.g., selected fingers, major body place) (Brentari, 1998, p. 22).

operations that are similar to their counterparts in spoken languages" (Brentari, 2012, p. 22).

[27] Notice that the highest node, the root, is an entire lexeme. This is different from what has been proposed for spoken languages in feature geometry models, in which you have units like vowels and consonants as roots (Brentari, 2012, p. 22).

> *Prosodic features* are those properties of signs in the core lexicon that can change or are realized as dynamic properties of the signal (e.g., aperture, setting) (ibid).

The Inherent Feature class node branches into two nodes: the Articulator (***Figure 9***) and the Place of Articulation (***Figure 10***) nodes. Under the Articulator node, you find the Nonmanual tier and the Manual tier. The Nonmanual tier contains features that specify nonmanual behaviors in sign production, such as eye-gaze or tongue wagging. The Manual tier contains the features that specify the handshape of the sign and it further branches into $Hand_1$ (H_1) and $Hand_2$ (H_2) nodes, in such a way that the hands may carry the same manual specifications (hand symmetry) or different ones (hand dominance). The Place of Articulation node contains features that specify the location in which the sign is produced, in respect to a given plane of articulation.

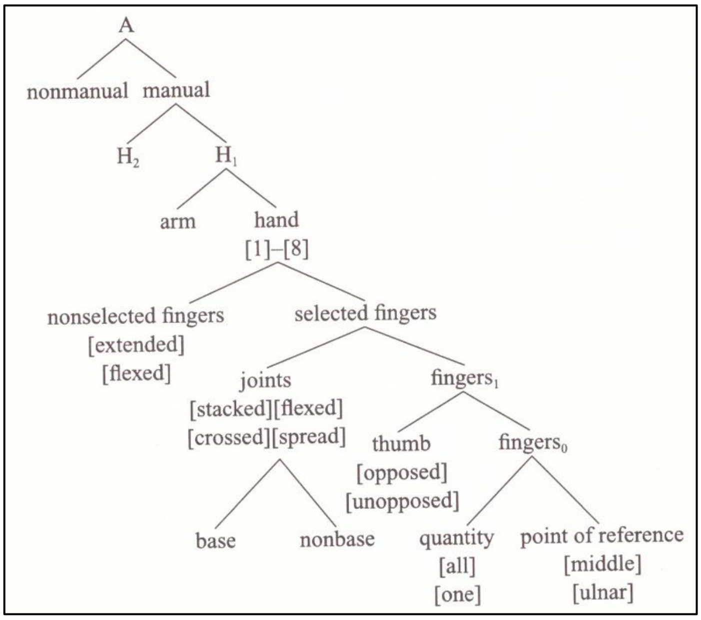


Figure 9. The Articulator class node (Brentari, 1998, p. 100).

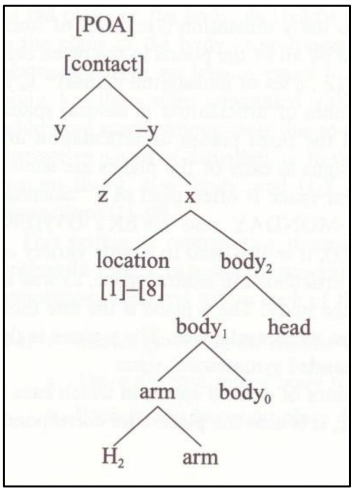


Figure 10. The Place of Articulation class node (Brentari, 1998, p. 119).

The Prosodic Feature structure (***Figure 11***) contains "the features that spell out the inventory of all underlying types of movement" (Brentari, 1998, p. 129). Additionally, the prosodic features are realized sequentially in time and, therefore, they may change during the production of the sign.

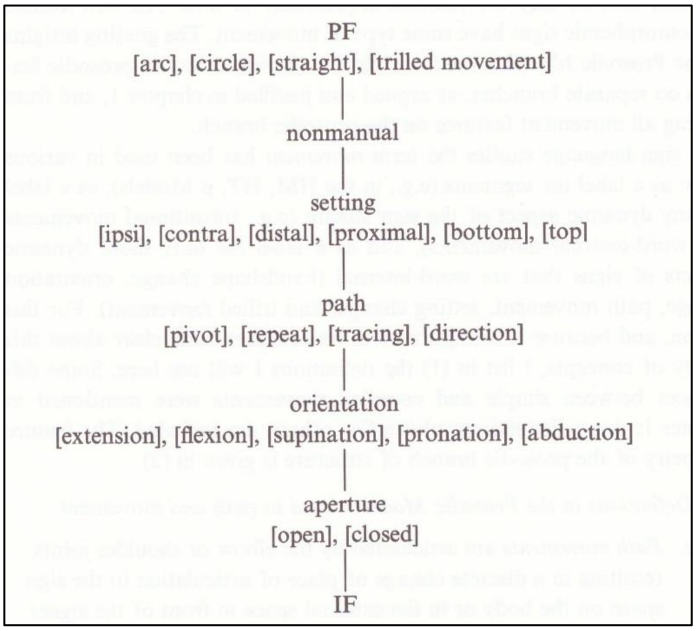


Figure 11. The structure of Prosodic Features (Brentari, 1998, p. 130).

Notice that Brentari's model captures the main phonological parameters claimed to form a sign. The Articulator contains information related to the Handshape and to the Nonmanual Markers. The Place of Articulation node spells out the Location of the sign. Finally, Movement is represented by the whole Prosodic Feature structure. Orientation, on the other hand, is a relation property that does not require a specific structure of its own. Instead, it is the byproduct of a two-part relation involving the handpart (Articulator structure) and the plane of articulation (Place of Articulation structure) (Brentari, 1998, sec. 3.6). These equivalences are shown in *Figure 12*.

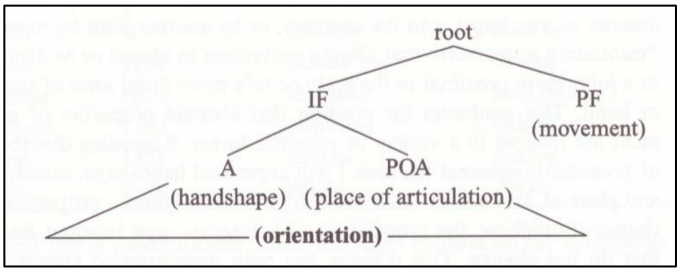


Figure 12. Traditional parameters in the Prosodic Model (Brentari, 1998, p. 26).

The Prosodic Model will help us to discuss how agreement is realized in Libras and I am going to propose a group of phonological features that predicts which verbs will not inflect for person agreement.

4.2 Where is agreement in the verb structure?

In Chapter 3, I compared how different authors describe agreement in signed languages. **Table 2** is repeated below as ***Table 3***:

Table 3. The description of agreement in sign languages.

	Movement (Path)	Location (points)	Facing
Sandler & Lillo-Martin (2006, p. 27)	✓	✓	✓
Mathur & Rathmann (2010, p. 173)	✓		✓
Fischer & van der Hulst (2003, p. 320)	✓		✓
Neidle et al. (2000, p. 33)	✓	✓	
Mathur & Rathmann (2012, p. 137)	✓		✓
Quadros & Quer (2008, p. 531)	✓	✓	
Meir (1998, p. 15)	✓		✓
Padden (1988, p. 27)	✓	✓	

As the table shows, three main markers have been claimed to be part of agreement:

i) the path movement of the verb;

ii) the beginning point and the end point of the verb (location);

iii) and the facing of the hand.

Additionally, nonmanual markers are also considered to mark subject and object agreement in ASL (Bahan, 1996; Neidle et al., 2000).

If we map the claimed agreement markers to the internal structure of the verb, we will see that agreement, as it is currently described, seems to change the whole verb structure. The path movement is related to the Prosodic Feature structure. The beginning point and the endpoint are mapped in the Place of Articulation node. The facing of the hand is basically orientation specification and, in the Prosodic Model, it is a two-part relation involving the handpart (Manual node) and the plane of articulation (Place of Articulation structure). Finally, the nonmanual markers are enconded in the Nonmanual node.

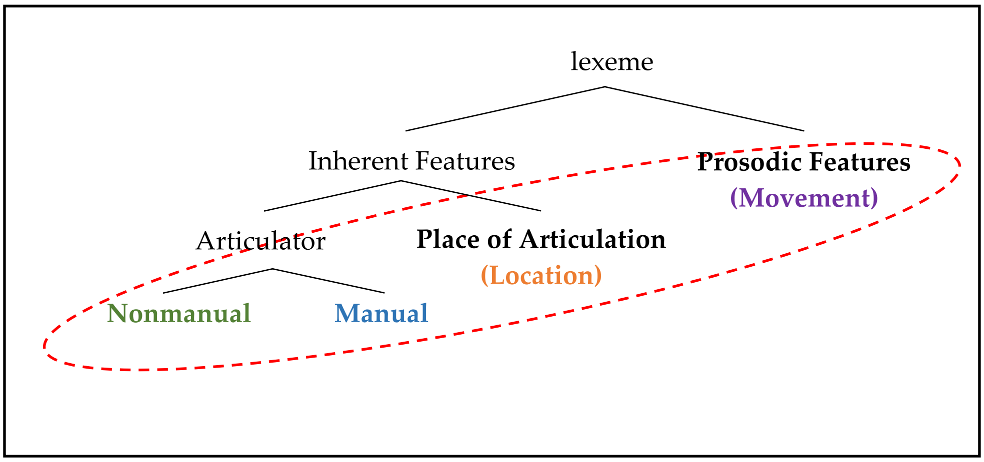


Figure 13. Internal structure of the verb and claimed targets of morphological modification for agreement marked by a red dashed circle.

Although it seems that agreement is everywhere in the internal structure of the verb, I will argue that these descriptions are inaccurate. Instead, my claim is that agreement is expressed solely by the sharing of the location specification of the argument(s) with the verb.

Assuming that location matching, a process I call co-localization, is the true and only agreement marker changes not only the way agreement is described, but also challenges the current notions of agreement classes presented in Chapter 3.

4.2 Co-localization as the agreement marker

Let us start by analyzing the following example from Libras:

(25) IX_a $WORK_a$ $TEACHER_a$ ALL-DAY, IX_1 $_1HELP_a$ $HOUSE_a$
‘She works as a teacher all day. So, I help her with the house.’

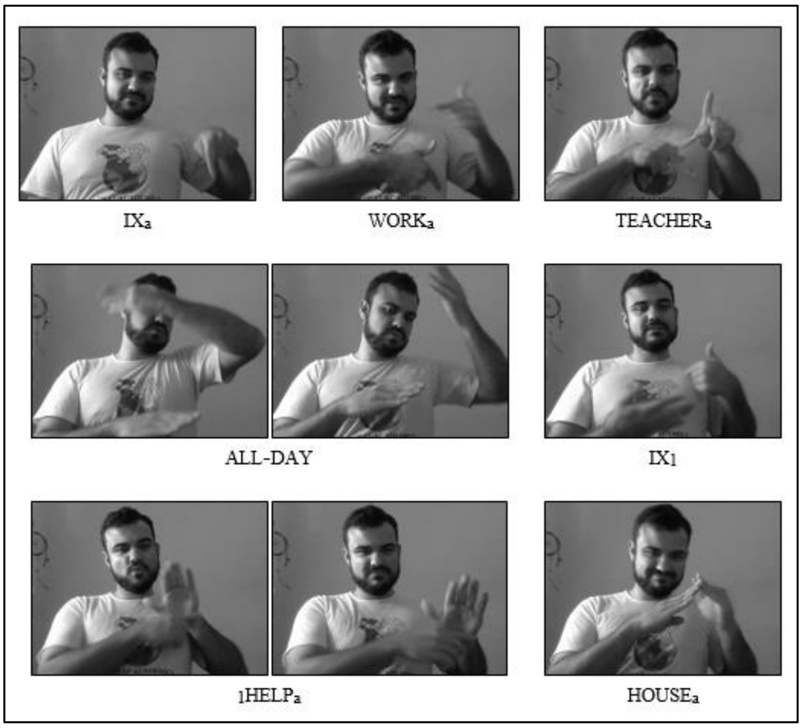


Figure 14. IX_a $WORK_a$ $TEACHER_a$ ALL-DAY, IX_1 $_1HELP_a$ $HOUSE_a$

In this example, the verb WORK is considered a plain verb because it does not move from the locus of the subject to the locus of the object. There is no directional path movement at all. On the other hand, the verb HELP is a typical agreement verb. It goes from the 1st person locus to the locus associated with the 3rd person IX_a (she). This analysis is correct, iff we consider that a directional path movement is what marks agreement in sign languages. However, the verb WORK is not signed in a "neutral" space. The verb is pronounced on the same locus where the subject was marked. Why does the verb need to match the location of the subject?

Fischer & Gough (1978) already noticed this verb behavior in ASL and they called this process "locationality": "a third way a verb sign may show its grammatical relations is in displacement of the dez [handshape], as what acts, to the proximity of the location of one of its arguments" (ibid, p. 30). The fact that plain verbs can be "localized" to match the locus of an argument is also attested by other authors (Bergman, 1980; Costello, 2015; Engberg-Pedersen, 1993; Meir, 1998b; Padden, 1988, 1990; Quadros & Quer, 2008; Smith, 1990). However, not everyone considers this "locationality" to be agreement.

Initially, Padden considers this phenomenon to be true agreement, as shown in the following excerpt:

> Not all inflecting verbs contain a linear movement between two distinct points of location. Certain inflecting verbs, for example, WANT, FLUNK, ARREST inflect for either the subject (WANT) or the direct object (FLUNK, ARREST, WANT). In these cases, the form of the verb lacks a linear movement, and the sign is articulated in a single location. Despite these differences, morphologically these verbs behave as inflecting verbs except that agreement is expressed with only one nominal (Padden, 1988, pp. 27–28).

However, in Padden (1990), she claims that these verbs are not agreement verbs. Instead, she claims that they contain pronoun clitics. Part of her argumentation is based on the ambiguity found in examples (26) and (27) below:

(26) WOMAN $_a$WANT; MAN $_b$WANT (ASL)
'The woman$_i$ is wanting and the man$_j$ is wanting, too.'
'The woman wants it$_i$ and the man wants it$_j$.'

(27) WOMAN $_a$WANT $_b$WANT $_c$WANT (ASL)
'The women$_{i,j,k}$ are each wanting.'
'The woman wants this$_i$, that$_j$ and that one$_k$, too.'
(Padden, 1990, p. 121)

According to her analysis, the marking in these sentences is ambiguous, referring to either the subject or the object. In comparison, true agreement verbs are not ambiguous. They overtly and systematically mark the subject in the first position (beginning point) and the object in its final position (endpoint).

However, there is a flaw in this reasoning. What is triggering the ambiguity is not the marking on the verb itself, but the referential ambiguity of the loci. Once the locus is a semantic mapping between a point (*p*) and an entity (*x*), what is at stake in examples (26) and (27) is actually a problem of what *x* is mapped onto each *p*, either the subject or the object. Although one may argue that this semantic mapping is straightforward and leaves no place for ambiguity (e.g. Cormier, 2012, p. 229; Meir, 2002, p. 419), Quer (2011) claims just the opposite:

> These considerations bring us naturally to the widely held view that SL referential loci and thus pronouns are unambiguous as a result of their association with overt referential loci. First of all, let us dwell on the basic fact that 3rd person loci for non-present referents are always ambiguous, as their interpretation cannot be directly read off the immediate context. The impression of non-ambiguity results from the locus being held constant over a stretch of discourse, which anyway can be pretty short. Moreover, empirical evidence from Catalan SL (LSC) in Barberà (2010) seems to limit the validity of this generalisation: it is often the case that in connected discourse the locations associated with the same referent are not always consistent. A further aspect to remind ourselves in this connection is that, unlike in languages like English, even 1st and 2nd person pronouns are

> ambiguous in SLs, as they can refer to non-present discourse referents when embedded in reported discourse (Quer, 2011, p. 192).

Additionally, Meir (1998b) argues that in ISL (Israeli Sign Language) the reading in which the verb is agreeing with the subject is only possible under some specific discourse functions and is, therefore, more pragmatically marked. This could be because, regardless if the verb is agreeing with the subject or the object, in both interpretations there are dropped objects in those sentences. The object agreement reading would be preferred over the subject agreement one, because anaphoricity is a requirement for object dropping (Keller & Lapata, 1998; Schwenter, 2006). If the dropped object is mapped onto a locus in the signing space, then the agreement marker functions also as a reference tracking mechanism, which would explain why the object agreement reading is preferred.

Meir (1998b, pp. 94–95) also shows that this co-localization is also sensitive to the syntactic structure of the sentence, marking the internal argument in transitive clauses (BREAK, GROW-UP), but marking the (syntactic) subject in intransitive ones (BREAK, CATCH):[28]

(28) a. STICK IX_a CL:F-$BREAK_a$ (ISL)
'The stick broke.'

b. STICK IX_a IX_1 CL:F-$BREAK_a$
'I broke the stick.'

c. BOY IX_3 GROW-UP_3
'The boy grew up.'

d. POLICEMAN IX_a THIEF IX_b $CATCH_b$
'The policeman caught the thief.'
(Meir, 1998b, p. 94)

Based on this evidence, Costello (2015) considers these localized verbs to be true agreement in LSE (*Lengua de Signos Española*):

> […] the phenomenon of single argument agreement, in which a verb is localized to mark just one of its arguments. This mechanism has been generally overlooked in the literature, but appears to show a systematic use of space

[28] This alignment seems to resemble an ergative(-like) system. Although I have claimed that backward agreement verbs in Libras are ergative constructions (Lourenço, 2014b), a more detailed analysis is needed in order to claim that the whole agreement marking mechanism is an ergative one.

> to mark a verb's argument, in the same sense that (prototypical and backwards) agreeing verbs do. As such, it will be included in the possible list of candidates for agreement to be assessed in LSE (Costello, 2015, p. 130).

I will not just consider these localized verbs to be agreement verbs, but I want to make the stronger claim that the matching of location is actually the true morphological realization of agreement in Libras, and possibly in other sign languages, too. If this is so, the verb WORK in Libras (***Figure 14***), for example, should be considered an agreeing verb.

Costello (2015, p.128), following Bergman (1980), adopts the term localization to describe the mechanism by which "a sign is articulated at a specific point in the signing space". I will then call **co-localization** the output of the agreement operation that shares the location specification of the controller with the goal.

A quick look at the Libras Corpus (Quadros, Schmitt, Lohn, & Leite, n.d.) gives us a lot of examples of "plain" verbs that are co-localized in space, matching the locus of their arguments (***Figure 15***).

Figure 15. Plain verb signs in Libras (PUT-UP-WITH, STUDY, EXPLAIN, WORK and PLAY) displaying agreement with the locus of the controller, extracted from the Libras Corpus (Quadros et al., n.d.).

Co-localization as agreement is also true for the canonical agreeing verbs, like the verb HELP. What changes is what we consider to be the morphological exponent of agreement on the verb. It is not the directional path of movement that marks the agreement, but the matching of the location of the beginning point and the end point of the verb to the location of its arguments. The path movement in the so-called agreeing verbs is actually related to the event properties of the predicate, as consistently argued by Wilbur (2008, 2010) and others, as I will further elaborate in Chapter 6.

Based on the notion of location as the agreement marker, I propose the following definition for verb agreement:

(29) *Verb agreement in sign languages*:
A verb shows agreement with its argument(s) when the location of the verb is changed in order to match the location of the argument(s), a process called co-localization.

4.3 The pervasiveness of agreement

Once a different definition for agreement is adopted, we need to go back to the previous classification of verbs and the classical distinction between plain and agreement verbs. The point here is to see if the claim that only a (small) subset of verbs show agreement still holds true when the definition given in (29) is considered. An important question here is: how pervasive is agreement?

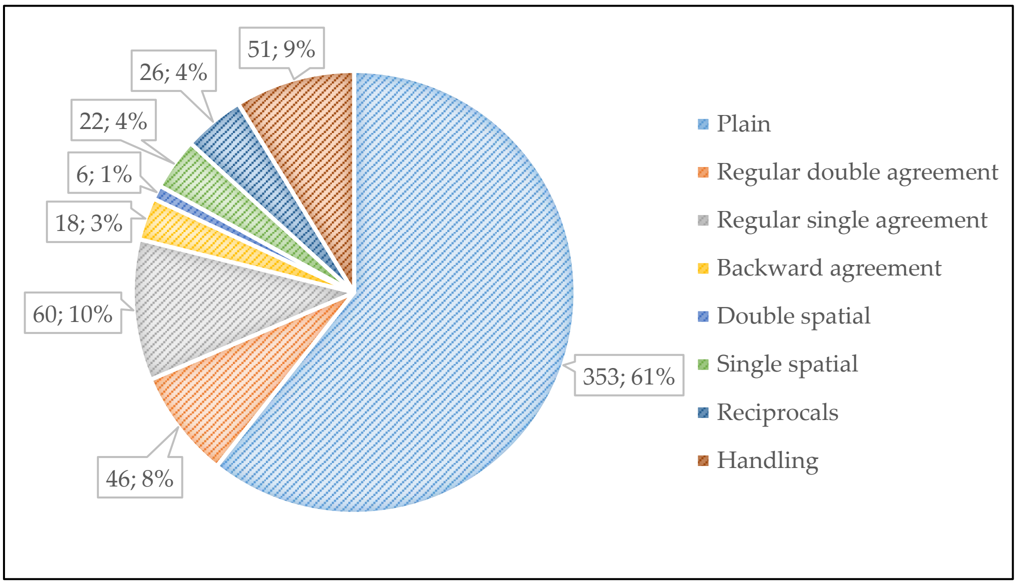
In order to identify the pervasiveness of agreement in Libras, we analyzed 583 Libras verbs extracted from a Libras dictionary (Capovilla, Raphael, Temoteo, & Martins, 2017). The full classification criteria is given in ***Table 4*** and the detailed discussion of the methodology is given in ***Appendix 1***.

Table 4. Verb classification criteria.

1. Type of agreement marking
a. Subject agreement? Yes/No
b. Object agreement? Yes/No
c. Locative agreement? Yes/No
d. Locative agreement on first slot (beginning point)? Yes/No
e. Locative agreement on second slot (end point)? Yes/No
2. Agreement class (following the traditional Paddenian classification):
a. Regular double agreement verb
b. Regular single agreement verb
c. Backward agreement verb
d. Double spatial agreement verb
e. Single spatial agreement verb
f. Plain verb
g. Handling verb
3. On "plain" verbs:
a. Can be co-localized? Yes/No
4. Body-anchoring:
a. Fully body-anchored
b. Body-anchored at the beginning point
c. Body-anchored at the endpoint
5. Path features (Brentari, 1998, p. 137):
a. [tracing]
b. [direction]
6. Event structure :
a. Process
b. Transition
c. State
7. Transitivity:
a. Transitive
b. Intransitive
i. Unergative
ii. Unnacusative
c. Ditransitive
d. Impersonal
e. Reciprocal

First, the verbs were classified in terms of their agreement pattern, assuming the traditional Paddenian classification, with some modifications. The results are shown in ***Graphic 1*** and the full list of verbs can be found in ***Appendix 2***.

Graphic 1. Number of verbs per verb agreement class.[29]



Plain	353
Regular double agreement	46
Regular single agreement	60
Backward agreement	18
Double spatial	6
Single spatial	22
Reciprocals	26
Handling	51

[29] The total of verbs classified in terms of agreement classes is 582. The verb COMPARAR (*COMPARE*) was excluded because there was no consensus on how to classify its agreement pattern.

First, two distinct categories were added to Padden's classification: handling verbs and reciprocals. Handling verbs have "a handshape that is a replication of an actual hand holding an object" (Schick, 1990, p. 360). The verb CUT(WITH-SCISSORS) is an example from Libras (***Figure 16***):

Figure 16. The handling verb CUT(WITH-SCISSORS) in Libras (Ferreira & Naves, 2014, p. 380).

Lourenço & Silva (2015) analyze handling verbs in Libra as cases of incorporation à la Baker (1988) and they claim that handling verbs agree with the direct object. This is why I considered them as a separate category, but still relevant for the agreement pervasiveness discussion.

The second category I added to my analysis was the inherently reciprocal verbs. Reciprocal inflection, adopting Klima & Bellugi (1979)'s terminology, can be described as a "dual form in which the end points of each one-handed form either (a) are adjacent, or (b) have the same agreement marker as the other's beginning point" (Padden, 1988, p. 45). This is an inflectional process that can modify some verbs, creating a reciprocal interpretation (Fischer & Gough, 1978, pp. 43–45). Examples from ASL are the modification of the verbs LOOK-AT (***Figure 17***) and INFORM (***Figure 18***).

Figure 17. LOOK-AT and LOOK-AT[reciprocal: each-other] in ASL (Klima & Bellugi, 1979, p. 280).

Figure 18. INFORM and INFORM[reciprocal: each-other] in ASL (Klima & Bellugi, 1979, p. 280).

Although this is a quite productive morphological process, some verbs are inherently reciprocal, in such a way that each hand shows agreement with the subject and the object of the sentence. Examples from Libras are COMMUNICATE, WAR and DISCUSS (*Figure 19*).

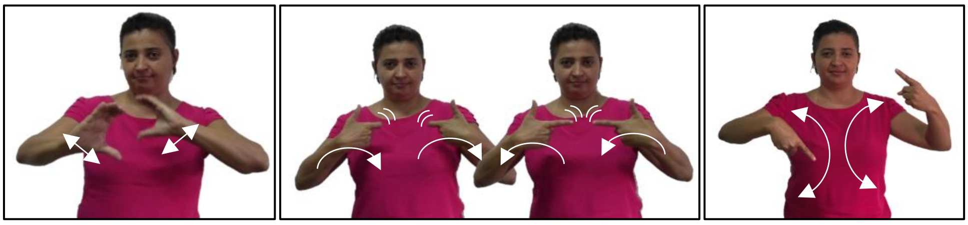
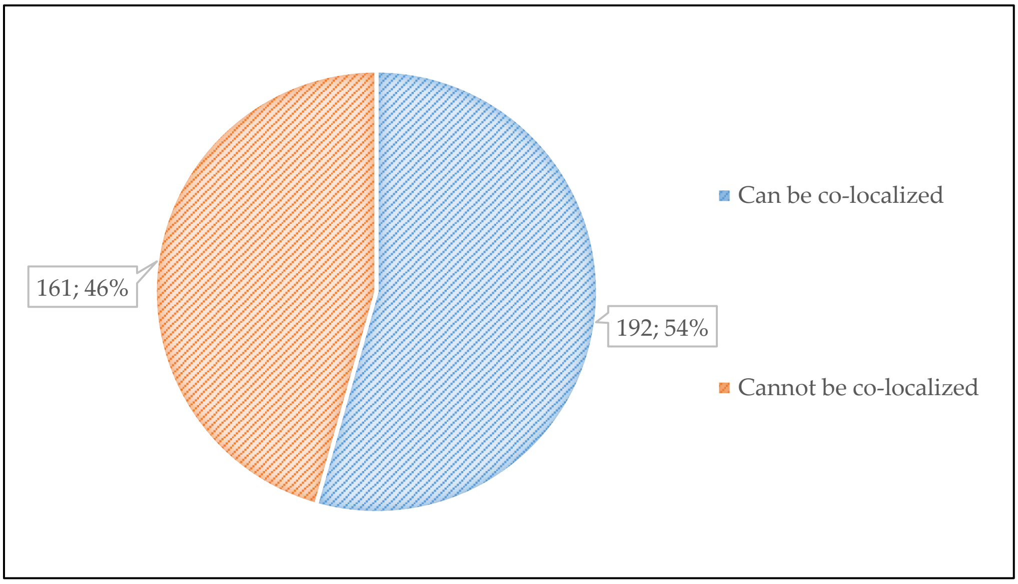


Figure 19. The reciprocal verbs COMMUNICATE, WAR and DISCUSS in Libras.

Returning to the quantitative analysis of agreement, it is interesting to notice that if we conflate all the "agreeing" classes, we end up with 39% of the verbs in Libras showing some type of agreement, whereas 61% of the verbs are plain verbs. This seems to somehow confirm the claim that agreement is restricted to a smaller set of verbs (Mathur & Rathmann, 2012, p. 152).

However, if we consider co-localization to be true agreement, we need to see how many of those "plain" verbs can show change of location in order to match the loci of their arguments. The results are shown in ***Graphic 2*** and the full list of verbs is given in ***Appendix 3***.

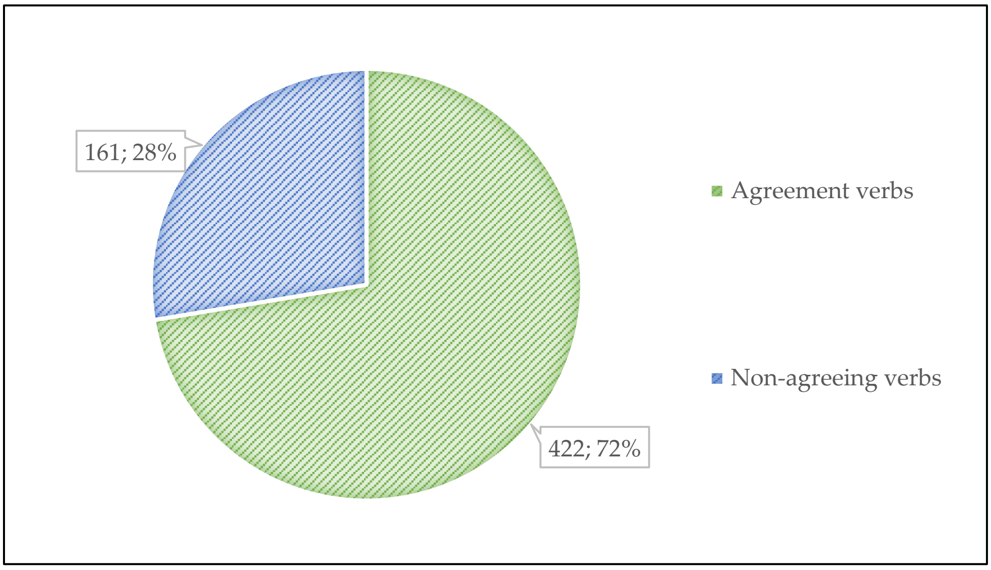
Graphic 2. "Plain" verbs that can be co-localized.



Can be colocalized	192
Cannot be co-localized	161

If we conflate all the agreement classes, including the "plain" verbs that can be co-localized, the situation changes considerably. Now, 72% of the verbs in Libras show agreement by co-localization, whereas only 28% of the verbs cannot be co-localized (***Graphic 3***).

Graphic 3. Agreement verbs vs. non-agreeing verbs.



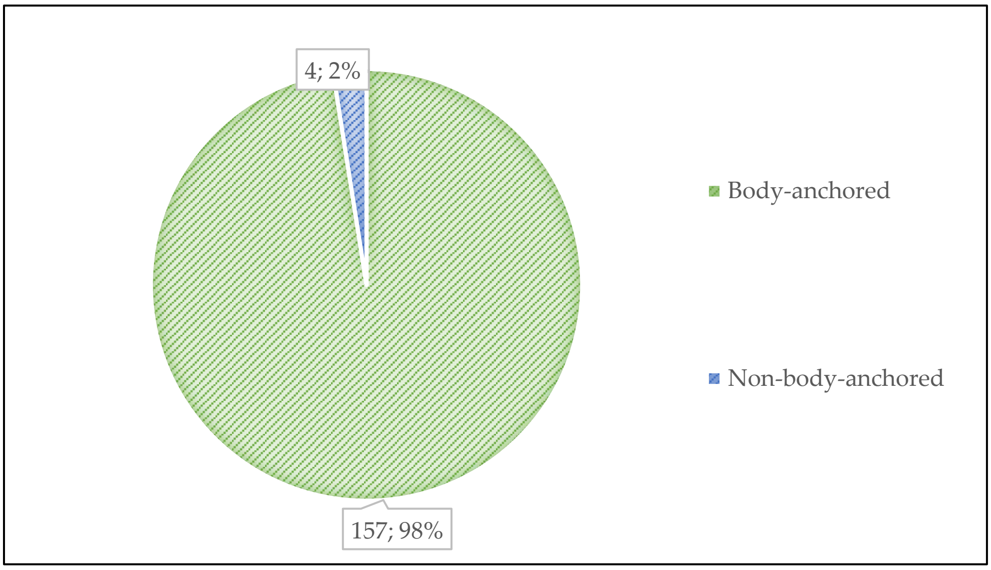
Agreement verbs	422
Non-agreeing verbs	161

Although agreement seems to be much more pervasive than it has traditionally been claimed, it is still desirable to identify what the features are that actually block agreement. Are some verbs not capable of showing agreement because of some syntactic or semantic reason or because of their morphophonological specification?

4.4 Phonological features that block agreement

One interesting question is what blocks agreement in those verbs that cannot match the loci of their arguments. This is easily answered if we look at their phonological shape, in terms of body-anchoring[30] (***Graphic 4***).

Graphic 4. Non-agreeing verbs and body-anchoring.



Body-anchored, non-agreeing verbs	422
Non-body-anchored, non-agreeing verbs	161

[30] Body-anchored signs are those articulated on the body of the signer.

These results show that 98% of the plain verbs that cannot be co-localized are body-anchored. Curiously, the remaining 2% is actually represented by four exceptions of verbs that are not lexically body-anchored but still cannot take location features from an argument. These verbs are given in ***Figure 20***. Notice that although they are not body-anchored per se, they must be pronounced close to the body and they are also highly iconic.

Figure 20. The verbs MAKE-EFFORT, MEDITATE, BEG and RUN in Libras.

This indicates that a verb will show agreement unless it is already fully specified for location. What do we mean by fully specified for location? Assuming the Prosodic Model (Brentari, 1998) we can predict which verbs cannot take their argument's location specification from their phonological features.

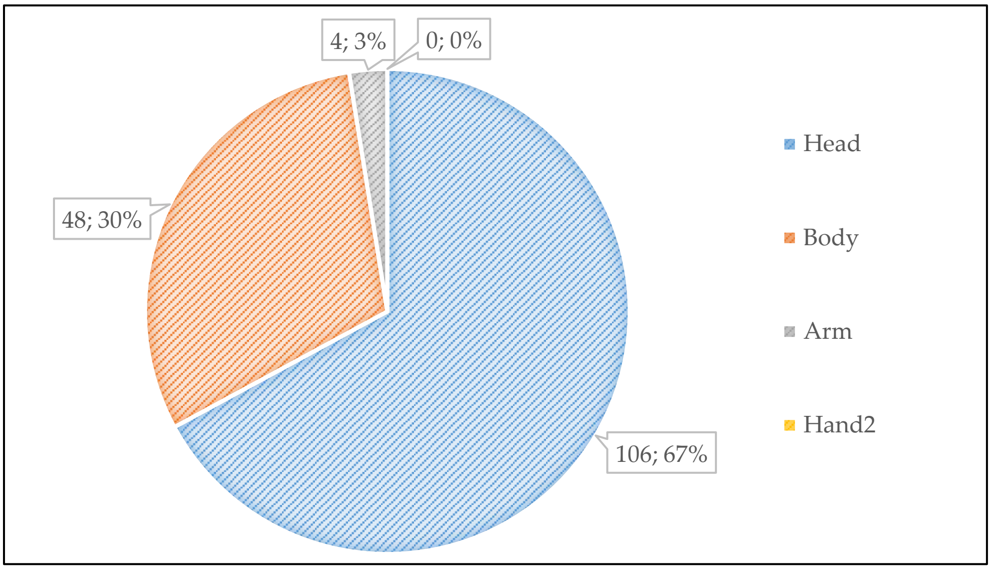
In Brentari's model, "for those signs articulated with respect to the body, […] there are four major body regions (head, arm, body and H_2), each of which also has eight place distinctions" (Brentari, 1998, p. 121). The place distinctions for *head*, *arm, body* and *hand₂*, are given in ***Table 5***:

Table 5. Places of opposition on each major body part.

Head	[1] top of the head [2] forehead [3] eye [4] cheek/nose	[5] upper lip [6] mouth [7] chin [8] under the chin
Body	[1] neck [2] shoulder [3] clavicle [4] torso-top	[5] torso-mid [6] torso-bottom [7] waist [8] hips
Arm	[1] upper-arm [2] elbow-front [3] elbow-back [4] forearm-back	[5] forearm-front [6] forearm-ulnar [7] wrist-back [8] wrist-front
Hand$_2$	[1] palm [2] finger fronts [3] back of palm [4] back of fingers [5] radial side of selected fingers	[6] ulnar side of elected fingers [7] tip of selected fingers/thumb [8] heel of hand

The non-agreeing, body-anchored verbs were further classified in terms of body part. Results are given in ***Graphic 5*** and the full list of verbs is given in ***Appendix 4***.

Graphic 5. Body-anchored verbs and major body parts.



Head	106
Body	48
Arm	4
Hand$_2$	0

An interesting observation is that none of the non-agreeing, body-anchored verbs is articulated on the non-dominant hand (Hand$_2$). This can be explained by the fact that, although these verbs are considered body-anchored, like WATCH and CARESS, the hand$_2$ can still be moved in order to match the location of the argument; therefore, the verb can still be co-localized.

This observation gives rise to a straightforward restriction for agreement in Libras, based on the phonological shape of the verb:

(30) *Phonological restriction for agreement:*
A verb can be co-localized unless it is already lexically valued for one of the following *body*$_2$ nodes:
- *head*
- *body*$_0$
- *arm*

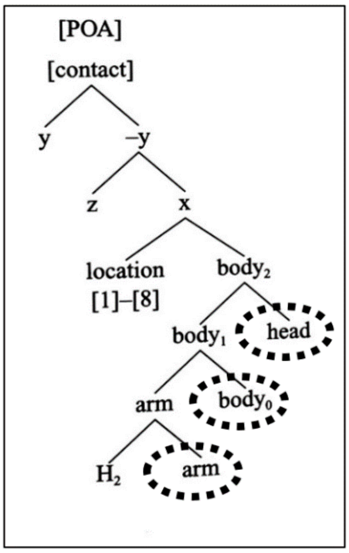


Figure 21. The Place of Articulation (POA) structure in the Prosodic Model (Brentari, 1998, p. 119). The nodes that are marked by dashed lines are the ones that block agreement when lexically specified.

4.5 The role of path in agreement

Additional relevant phonological information is the type of path feature that the verb carries. I have mentioned so far that path movement has been analyzed in the literature as the agreement marker in sign languages. Here, I challenge this notion, by claiming that the true exponent of agreement is the matching of location. However, the type of path feature is indeed relevant for agreement as it predicts how many slots for co-localization, hence agreement, a verb will carry.

Although it has been claimed that traditional agreement verbs have path, a more fine grained phonological analysis helps to avoid terminological misunderstandings. In the Prosodic Model, five types of path features are described. I will discuss two of them, as they are the most representative ones: [direction] and [tracing], although all five types are illustrated in ***Figure 22***. The following definitions are extracted from Brentari (1998, pp. 136–137):

(31) [direction]
a phonologically specified straight path executed at a 90º angle to (notated [>|]) or from (notated [|>]) a point in a plane of articulation, either from such a point or to such a point.

(32) [tracing]
a line with an arc, straight, or circle shape articulated with respect to a single point within a plane.

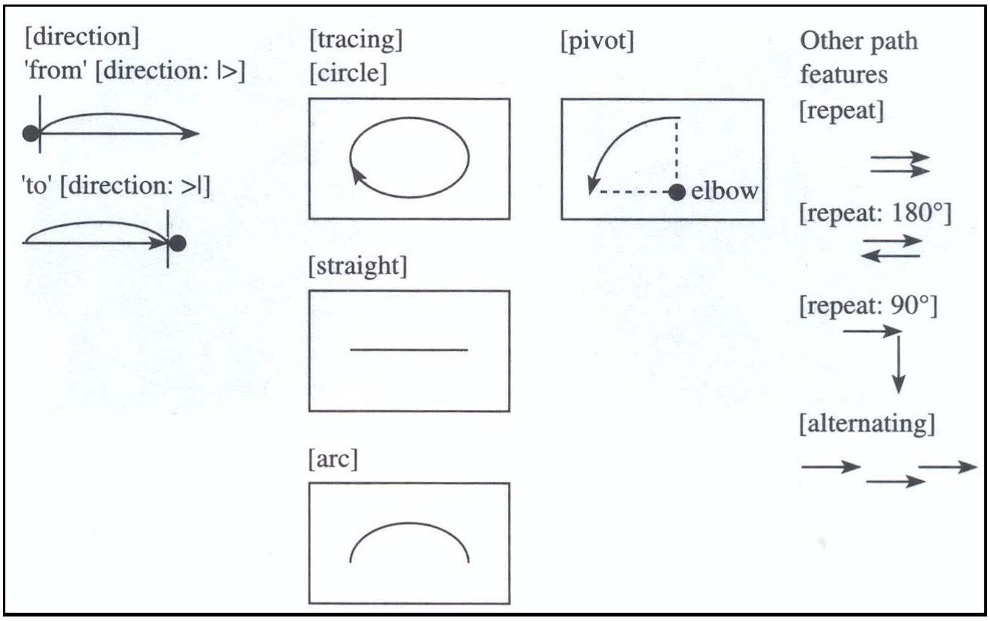


Figure 22. The surface realization of path features (Brentari, 1998, p. 137).

What is special about traditional agreement verbs is not that they are the only ones that can show agreement, but that they are capable of agreeing with two arguments (usually subject and object) because of their [direction] type of path. Once they have direction, they can have two *different* specifications for Place of Articulation, one in each timing unit under their Prosodic Feature representation (***Figure 23***):

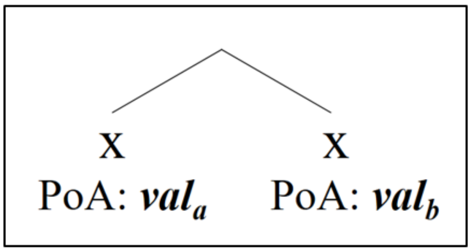


Figure 23. Verbs with [direction] can bear two different set of PoA specifications in their phonological structure, one in each timing unit.

On the other hand, so-called "plain" verbs do not have [direction]. They have [tracing] or one of the other types of path features. Consequently, they are articulated on a "single point within a plane", as stated by Brentari (1998, p. 136), and can take location specification from only one argument.[31]

Notice, however, that the path features do not mark agreement by themselves. They are, as stated before, related to the event properties of the predicate (see Wilbur (2008, 2010b, 2010a) for a more extensive discussion of event properties, such as activities, achievements, and accomplishments). The path conveys some semantic notions, such as the temporal unfolding of the event; and even the transfer semantics claimed to be central to agreement (Bos, 2017; Meir, 1998b, 2002) is just one (sub)type of event for which properties are inferable from the path movement. A preliminary analysis of verb event structure in Libras will be provided in Chapter 6.

[31] Verbs with [tracing] also have two abstract timing units in their prosodic feature specification. However, these two timing units must bear the same set of features for POA (Brentari, 1998, sec. 5.2).

4.6 Summary

In this chapter, I claimed that the location matching is the true agreement marker in sign languages, using data from Libras. The main corollaries of this analysis are:

- Agreement is analyzed as the matching of location between the verb and its argument(s) (co-localization).
- Agreement is everywhere! No longer exclusive to a subset of verbs.
- A verb shows agreement unless it is phonologically restricted not to do so. The set of phonological features that block agreement is easily identified.
- The path movement ([direction]) found in traditional agreement verbs is actually related to the event properties of the predicate and to aspectual modifications; although it does contribute to agreement, in the sense that verbs with [direction] have two slots for co-localization, one under each timing unit.

Chapter 5:

Syntax of agreement

At first glance, different types of verbs (agreement, plain, spatial, backward, and so on) seem to be different only in terms of agreement morphology. However, the different agreement patterns also reflect on syntax. A main distinction can be drawn between verbs that show agreement and verbs that do not[32]. The presence (or absence) of agreement will affect the word order in Libras, the licensing of empty categories and even the distribution of negation in the sentence. These asymmetries have led to some proposals that claim

[32] Traditionally, the so-called plain verbs are the ones claimed not to show agreement in sign languages. However, in my analysis, I will already assume the revised definition of agreement presented in Chapter 4, that considers co-localization as true agreement marker. In order to avoid terminological confusion, I will refer to those body-anchored verbs which cannot be co-localized as “non-agreeing verbs”, instead of using the term “plain verbs”.

different syntactic structures for agreement and non-agreeing verbs (Quadros, 1999; Quadros & Lillo-Martin, 2010).

The goal of this chapter is to provide a unified syntactic derivation for verb agreement in Libras. I aim, therefore, at pursuing a one-for-all core structure, adopting a minimalist syntactic spine and the minimal operations MERGE and AGREE. The differences between agreement and non-agreeing verbs lie on the presence of (un)valued [location] features during the syntactic computation.

5.1 Agreement asymmetries

Agreement and non-agreeing verbs behave syntactically differently in Libras[33] (Lourenço, 2017; Lourenço & Quadros, 2018; Quadros, 1999; Quadros & Lillo-Martin, 2010). The most relevant piece of data comes from word ordering, null argument licensing and negation distribution.

[33] I will only focus on Libras data in this chapter. However, agreement asymmetries have also been attested in other sign languages, like ASL for instance (Fischer, 1975; Lillo-Martin, 1986, 1991; Quadros & Lillo-Martin, 2010).

Libras is an SVO language (Quadros, 1999), which also exhibits pro-drop behavior (Quadros, 1995). However, word order flexibility and null argument licensing are agreement dependent.

Let us start by looking at the different word order possibilities, summarized in ***Table 6***. These data were first analyzed by Quadros (1999).

Table 6. Agreement and word order in Libras.

Order	Type of verb	Grammaticality	Example
SVO	Agreement verbs	✓	JOHN$_a$ $_a$HELP$_b$ MARY$_b$
	Non-agreeing verbs	✓	JOHN$_a$ LIKE MARY$_b$
SOV Object-shift constructions	Agreement verbs	✓	JOHN$_a$ MARY$_b$ $_a$HELP$_b$
	Non-agreeing verbs	*	*JOHN$_a$ MARY$_b$ LIKE
OSV Object topicalization < > indicates topic	Agreement verbs	✓	<MARY$_b$> JOHN$_a$ $_a$HELP$_b$
	Non-agreeing verbs	*	*<MARY$_b$> JOHN$_a$ LIKE
		✓, iff OSVO (resumptive strategy)	<MARY$_b$> JOHN$_a$ LIKE IX$_b$ Lit. 'Mary, John likes *her*.'

There is a clear relation between agreement marking and word order flexibility, in such a way that object displacement by means of object shift (SOV) or topicalization (OSV) is freely allowed in agreement verb constructions. On the other hand, non-agreeing verbs show a more rigid word order.

Additionally, agreement verbs allow argument dropping whereas non-agreeing verbs do not (Quadros, 1995, 1999):

(33) (JOHN$_a$) $_a$HELP$_b$ (MARY$_b$).

(34) *(JOHN$_a$) LIKE *(MARY$_b$).

Finally, agreement also influence on the distribution of negation in Libras. In Libras, negation is marked by different elements: the sign NO (lexical negation) and a negative nonmanual marker (glossed as ___$_{neg}$). The following examples show the structure of negation in agreement constructions and in non-agreeing ones:

(35) a) JOHN$_a$ NO $_a$GIVE$_1$ CAR.

$\overline{\text{NO }_a\text{GIVE}_1\text{ CAR}}^{neg}$

'John did not give me the car'.

b) JOHN$_a$ $\overline{_a\text{GIVE}_1\text{ CAR NO}}^{neg}$.

(36) a) *JOHN$_a$ $\overline{\text{NO DESIRE CAR}}^{neg}$.

'John does not want the car'.

b) JOHN$_a$ $\overline{\text{DESIRE CAR NO}}^{neg}$.

Note that, in agreement verb constructions, negation is allowed in a pre-verbal position and in the final position of the sentence (35)[34]. Note also that, although the negative item is not pronounced in the position preceding the verb in the example in (b), the scope of negation is marked from the position before the verb and it spreads over the rest of the sentence, through the nonmanual marker.

[34] Some corpus data (Quadros et al., n.d.) has shown a clear preference for negation to occupy the final position of the sentence. Additionally, it seems to point out that the pre-verbal position is not available to all signers. Maybe, there are competing grammars in the language or even a change in progress (Quadros, in preparation). More corpus studies on negation are needed to give us a clearer picture of the distribution of negative particles in Libras.

On the other hand, the examples in (36) show that negation cannot occur in a pre-verbal position in non-agreeing verb constructions. In these sentences, lexical negation is allowed only in final position. However, the nonmanual marker has the same behavior as in non-plain verb constructions: its scope starts on the verb and spreads through the end of the sentence. This indicates that, in both constructions, negation is located in a NegP projection. However, it is important to explain why lexical negation in non-agreeing verb sentences is only allowed in final position.

5.2 The antisymmetric structure

Based on the asymmetries discussed in the previous section, Quadros (1999) and Quadros & Lillo-Martin (2010) propose that agreement and non-agreeing verbs have different syntactic structures.

The following representation is the syntactic spine proposed for non-agreeing verbs, which, according to the authors, does not project any agreement projection:

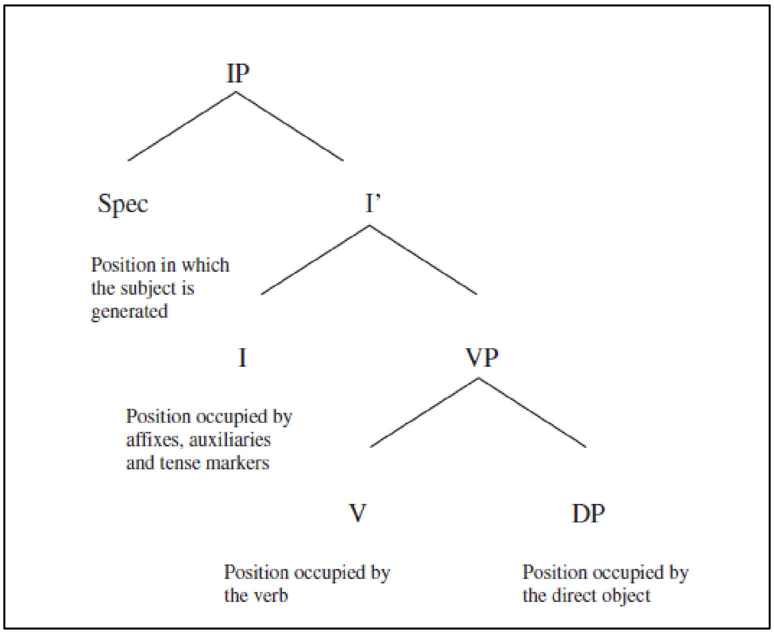


Figure 24. The syntactic structure for non-agreeing constructions in the asymmetrical model (Quadros & Lillo-Martin, 2010, p. 249).

Quadros (1999) claims that there is an adjacency requirement between IP and VP in order to allow the combination of the verb with Inflection. In this sense, when a NegP is inserted between IP and VP, it cannot keep its phonological material inside the projection, because of the adjacency requirement. So, the lexical item NO must be moved and it moves to the focus position. The fact that NO comes in the final position of the sentence could be explained by postulating that IP moves up to Spec,FocusP in order to check a [+focus] feature, resulting in an SVONO order (Quadros, 1999, pp. 252–254).

On the other hand, the structure for agreement verbs is the following one:

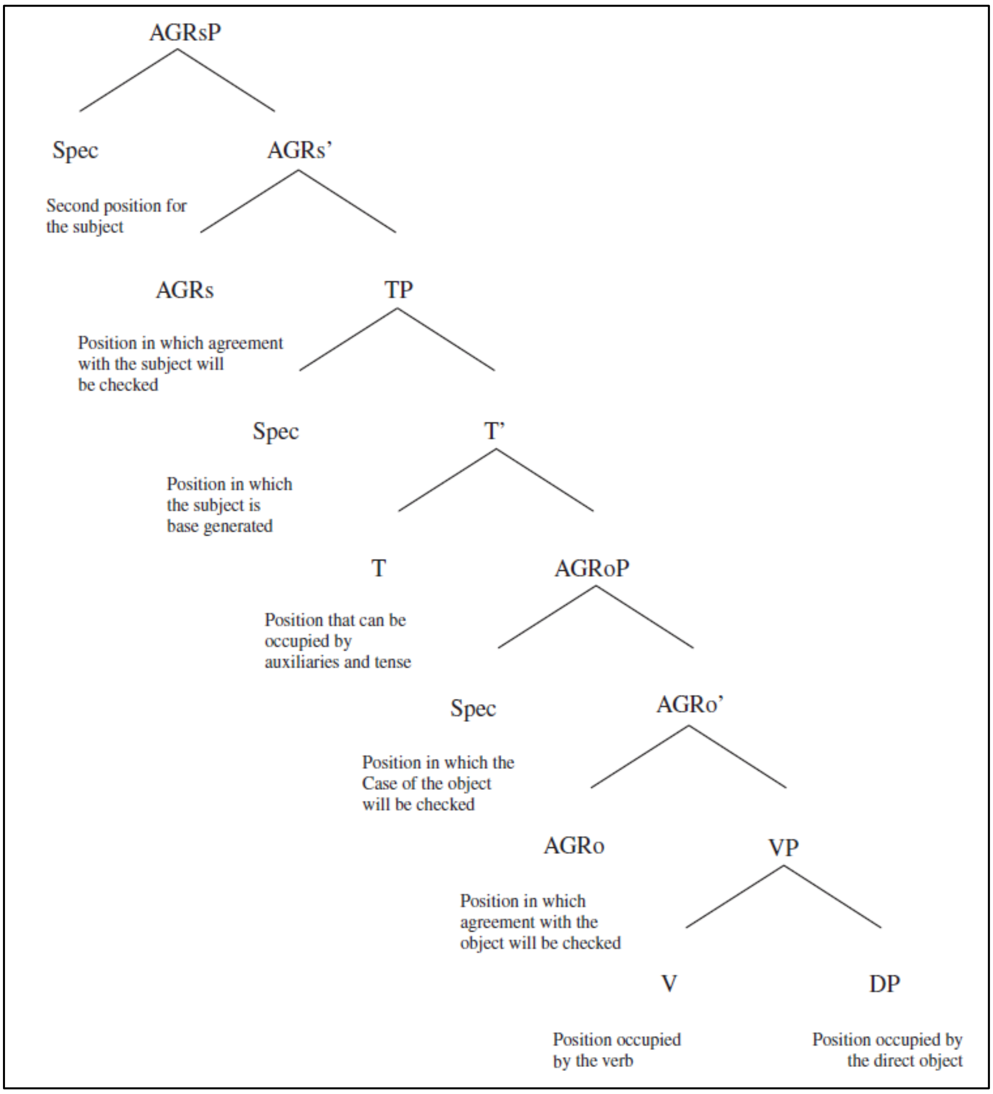


Figure 25. The syntactic structure for agreeing constructions in the asymmetrical model (Quadros & Lillo-Martin, 2010, p. 248).

Quadros (1999) proposes that there is no adjacency requirement in agreement verb constructions, once there are agreement projections. In this sense, when NegP is inserted in the structure, it does not have to move its phonological material. So, lexical negation could stay in situ.

Although the antisymmetric structure seems to capture the main facts about Libras structure, it does face some theoretical challenges and even some empirical ones.

First, if we assume a more minimalist framework, Chomsky's interpretability requirement for function projections should be taken into consideration. As previously discussed in Chapter 1, Agr projections are not conceptually adequate, because they are not interpretable at the interface levels and "the only [true] functional categories are those with features that survive through the derivation and appear at the interfaces, where they are interpreted" (Chomsky, 1995b, p. 378). Therefore, it would be highly desirable to have a syntactic analysis of Libras agreement that only implements the two basic operations Merge and Agree on a C-T-*v*-V-(D) system.

Another issue that comes up with the antisymmetric structure is the nature of the XP movement of IP to Spec,FocusP. This movement is claimed to happen in order to check some kind of [+focus] feature on Focus° (Quadros, 1999), which could be interpreted as some sort of edge (EPP-like) feature in FocusP. This strong feature must be checked because the NO sign needs to move up from Neg° to Focus° in non-agreeing constructions because of the adjacency requirement.

However, Libras allow for doubled lexical negation without, however, a double negative reading.

(37) IX_1 NO $_1HELP_a$ (IX_a) NO.
'I do/did not help her/him.'

(38) IX_1 (NO) $_1HELP_a$ (IX_a) NO.
'I do/did not help her/him.'

(39) IX_1 NO $_1HELP_a$ (IX_a) (NO).
'I do/did not help her/him.'

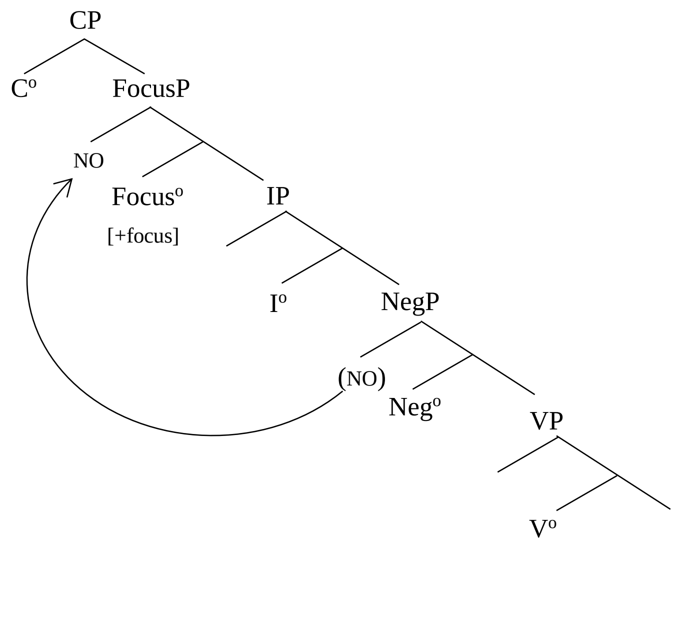
That indicates that Libras is a negative concord language. In fact, it has been claimed that Libras exhibits strict negative concord (Arrotéia, 2005).

To keep it simple and short, Arrotéia (2005) claims that in Libras the head of the NegP projection is not the manual NO sign. Instead, the nonmanual negative marker sits at Neg°. The NO sign occupies the

Spec,NegP position, similar to what has been proposed to DGS (Pfau, 2015).

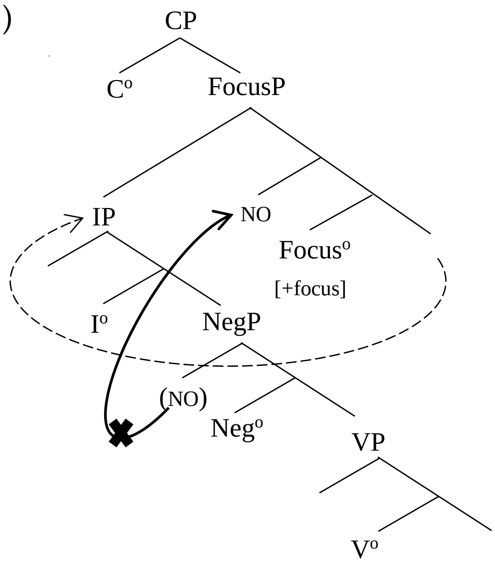
Considering this alone, the movement of NO to the head of FocusP is already ruled out. This item should move to the Spec,FocusP projection, not to the head, because of the Structure-preserving Constraint – see the derivation in (40). This movement alone would be enough to satisfy any edge feature requirement that might exist in the Focus projection.

(40)



Further, if any remnant movement is postulated to move IP to a higher position, this would break the c-command relation between the two copies of the NO element, a condition required for the negative concord.

(41)



Considering the shortcomings of the antisymmetric structure, a unified derivation is desirable, in the same spirit of some accounts that propose a single syntactic spine for verbs in sign languages (Aarons, Bahan, & Neidle, 1992; Costello, 2015; Lourenço, 2017; Pfau, Salzmann, & Steinbach, 2018).

5.3 One structure for all: operations, features and basic projections

In this section, I will outline the core properties of the syntactic derivation of agreement in Libras, assuming:

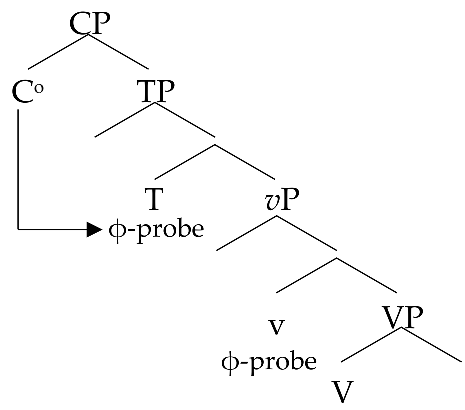
i. a C-T-*v*-V-(D) system;

ii. the operations Merge and Agree (probe-goal operation);

iii. a feature [location].

The basic assumption is that there are two ϕ-probes in the derivation: one merged on C° and that percolates down to the head of TP (Chomsky, 2008; Miyagawa, 2010); and the other one merged on the head of *v*P. Each agreement slot on the verb corresponds to the spell-out of one specific ϕ-probe. Therefore, double agreement verbs are the ones that can overtly spell-out the values of both probes. Single agreement verbs can only spell-out the value of a single probe. Finally, non-agreeing verbs (body-anchored ones) cannot spell-out any value at all.

(42)



(43) a. Double agreement verbs: $_{\phi\text{-probe}}$VERB$_{\phi\text{-probe}}$

b. Single agreement verbs: VERB$_{\phi\text{-probe}}$

c. Non-agreeing verbs: VERB

One should remember that the ability to show agreement (i.e. to be co-localized) or not, and how many agreement markers, comes from the phonological shape of the verb, as I proposed in Chapter 4. In other words, a verb will be able to match the location of an argument if the verb does not come already lexically fully specified for location, under the nodes *head*, *body* or *arm*.

Based on this assumption, the actual feature shared between the probe and the goal in sign language agreement should bear some value that will be spelled-out as a location specification. Additionally, if the verb already has a lexically specified location, this would block the pronunciation of any agreement marker on the verb. This blocking could be claimed to be part of a post-syntactic operation, more specifically, a PF operation. If this is so, an Optimality Theory account could postulate a series of constraints that would prevent the generation of an infelicitous output. This is exactly the analysis presented by Costello (2015) for LSE.

However, the syntactic asymmetries discussed previously indicate that any sort of agreement restriction that the verb may have is relevant for the syntactic structure in Libras. A post-syntactic treatment like the one proposed by Costello (2015) would require some sort of reconstruction operation, that would track back any movement operation applied during the syntactic computation that changed the basic word order, in case of non-agreeing verbs. Those syntactic asymmetries advocate in favor of a feature that is already there in the syntax and that would block Agree and any further movement operation.

Some proposals have been made in the literature that considers the traditional set of φ-features, number and person, to be relevant for sign language verb agreement. For example, Rathmann & Mathur (2005, 2008, 2011) claims that person and number are the features that control agreement in signed languages. The different possibilities of these features, according to them, are given below:

(44) Morphosyntactic features:

a. Person

First:	[+1] ↔ on/near chest (marked)
Non-first:	[– 1] ↔ Ø

b. Number

i. Features

Plural (collective):	[+ pl] ↔ horizontal arc (marked)
Singular:	[– pl] ↔ Ø

ii. Reduplication: exhaustive (distributive), dual

(Rathmann & Mathur, 2008, p. 200)

Although it seems interesting the idea that a bundle of φ-features would be later converged into a *location*, there would not have been enough featural specification in order to distinguish the different loci assigned to the two entities RESTAURANT in the following example:

(45) IX$_1$ LIKE IX$_a$ RESTAURANT$_a$, BUT IX$_1$ LIKE-NOT IX$_b$ RESTAURANT$_b$. SO IX GO+++$_a$ ALWAYS.[35]
'I like that restaurant$_a$, but I do not like that other restaurant$_b$. So I always go to that one$_a$'.

Notice that in the example (45), there are two entities RESTAURANT$_a$ and RESTAURANT$_b$ that share exactly the same number and person features and occupy the same syntactic position, resulting in the very same grammatical functions and grammatical relations. However, the reduplicated verb GO+++ agrees unambiguously with only the entity RESTAURANT$_a$. If agreement was controlled by the traditional number and person features, the locative object of the verb GO would be ambiguous. Once there is no ambiguity at all, additional featural information must be posited.

Costello also points out another problem to consider person as the feature that controls agreement in signed languages:

> Additionally, maintaining the person feature for this general agreement mechanism would create a typological anomaly: person plays a role only in verbal agreement and not in other domains, such as adjective noun agreement (Baker 2008). The agreement mechanism I consider here is a generalized process that goes beyond verbal agreement. If the locations in space were a reflex of person agreement,

[35] A similar example is given by Costello (2015, p. 172).

> it would be necessary to explain why person agreement is not limited to the verbal domain (Costello, 2015, p. 250).

If we go back to the example (25), repeated below as (46), we can see that the verb is not the only element that changes its location to match the location of the controller:

(46) IX$_a$ WORK$_a$ TEACHER$_a$ ALL-DAY, IX$_1$ $_1$HELP$_a$ HOUSE$_a$
'She works as a teacher all day. So, I help her with the house.'

Notice that not only the verb, but also other elements seem to agree with the locus of the controller: the adverb-like modifier TEACHER and the possessed nominal HOUSE. These other agreement processes are out of the scope of this dissertation, but I certainly would analyze them as true agreement, once they are also instances of co-localization. Therefore, sign languages seem to exhibit more than just verb agreement, akin to languages like Swahili in the Bantu family.

This is why I propose that there is an additional feature that truly controls agreement in Libras and possibly in other sign languages as wel. This idea is very similar to the 'identity' feature proposed by Costello (2015), in such a way that it is a feature that can distinguish one discourse entity from another (Costello, 2015, p. 253).

However, it seems to me that the identity feature fails to capture the distinction between the following pair of examples in Libras:

(47) MOTHER ALWAYS TAKE-CARE$_{neutral}$ CHILD.

(48) MOTHER ALWAYS TAKE-CARE$_{b}$ CHILD IX$_{b}$.

What is interesting in these examples is that there is no difference in meaning, according to the Deaf consultants, between (47) and (48). Nevertheless, because both signs MOTHER and CHILD are body anchored in Libras, they will not be localized; but they can have a locus assigned if an indexical pointing (IX) is signed. This seems to be a discourse option. However, the presence (or absence) of localization will impact on agreement, which will impact on the sentence structure. For instance, if there is no agreement in the sentence, even if the verb is a traditional agreement verb, negation cannot occur pre-verbally (49). Therefore, Costello's idea[36] that the identity feature is

[36] "The fact that location is not always used raises an important question: is the underlying identity feature optional, or, alternatively, is the feature present but (sometimes) phonologically null? Given that the identity feature reflects a fundamental underlying concept, it seems more likely that it is present but may give rise to a phonologically null realization" (Costello, 2015, p. 286).

always present but may or may not be pronounced fails to capture its effect on the syntactic structure of the clause.

(49) a. IX_1 NO $_1HELP_a$ IX_a MOTHER.

b. ?/*IX_1 NO $HELP_{neutral}$ MOTHER.

c. IX_1 $HELP_{neutral}$ MOTHER NO.

This is why I am assuming that the relevant feature for agreement is not even Costello's [identity]; but a feature that informs the computation about the presence of a specific semantic mapping between an entity and an abstract geometrical point (*p*): a feature I will call **[location]** and that is part of the bundle of features called φ-features. For simplicity and to make my point clearer, I will, from now on, explicitly make reference only to the feature [location], instead of talking about φ-features or φ-probes.

Additionally, I will adopt Pesetsky & Torrego (2007)'s model for feature valuation and interpretability. More specifically, I will assume that probes are unvalued features in the derivation, and not heads. Also, I will only discuss the valuation process of [location] features during the syntactic computation, not making any claim on their interpretability status. Therefore, I will notate a valued location feature as [location:*val*] and an unvalued location feature as [location:___].

It is important to point out that the [location] feature is not a phonological value, but it will be spelled out as a location (*p*) in the Phonological Form. Additionally, there are two different sources for [location:*val*]. First, a [location] value can be inserted in the numeration as a discourse option, in such a way that this feature is not intrinsic to a specific entity or noun. Therefore, it will be merged during the syntactic computation in a specific functional head. Following some previous claims (Bertone, 2006, for LIS; Costello, 2015, for LSE), I will assume that **discourse [location]** is merged on D^o.[37] On the other hand, there are some lexical items that are lexically specified for [location] because of their phonological form. This is the case of **lexical [location]**.

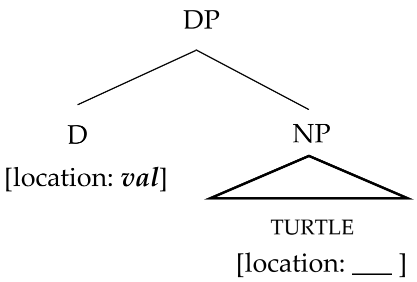
[37] The term "discourse" is tricky because of its polysemy. The intended meaning here is the idea that a given value for [location] is not part of the lexical specification of a noun or a verb. Another possibility would be to call this type of [location] feature, "referential [location]", reinforcing the idea that a location is a mapping between an entity (x) and a geometric point (p). Regardless of terminology, the main idea here is that [location] is a formal feature relevant for syntactic computation.

Let us start with nouns. The same phonological restriction found in verbs for agreement is also found in nominals. If a nominal is pronounced on the head, on the chest or on the arm, this nominal cannot take a [location] value from the discourse. On the other hand, a nominal that is not specified under the nodes *head*, *body* or *arm*, can be localized in space. Examples are the nouns DOG and TURTLE in Libras:

Figure 26. DOG and TURTLE in Libras.

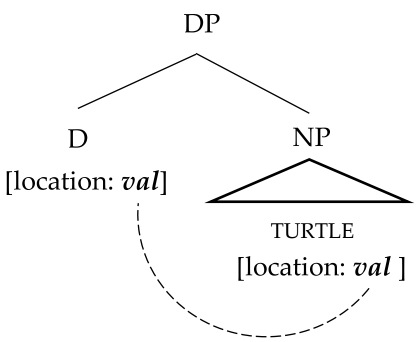
The sign TURTLE is not pre-specified for [location]. So, it enters into the derivation with its [location] feature unvalued.

(50)



When a [location] value is merged on D, this value can spread down through the DP domain and it is copied to the noun, which possibly would be a concord operation. Once this value is shared between the D and the N, it creates a chain, in such a way that some kind of chain reduction operation may or may not be applied in PF.

(51)



So, three different possibilities emerge:

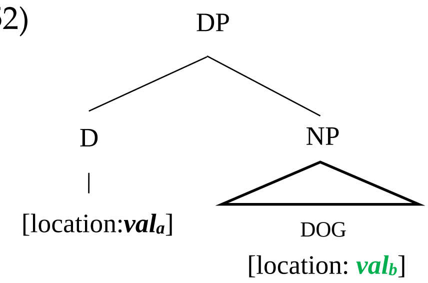
i. The value is pronounced in both D and N. Once there is no phonological material on D, the spell out of [location] on D is the indexical pointing (IX) – similar to a do-support operation. Ex.: IX_a $TURTLE_a$

ii. The value is pronounced only on D. Once there is no phonological material on D, the spell out of [location] on D is the indexical pointing (IX). Ex.: IX$_a$ TURTLE

iii. The value is pronounced only on N. Ex.: TURTLE$_a$

The sign DOG, on the other hand, is signed near the mouth, so it is fully specified under the node *head* in its phonological structure. As proposed before, it is lexically valued for the feature [location].

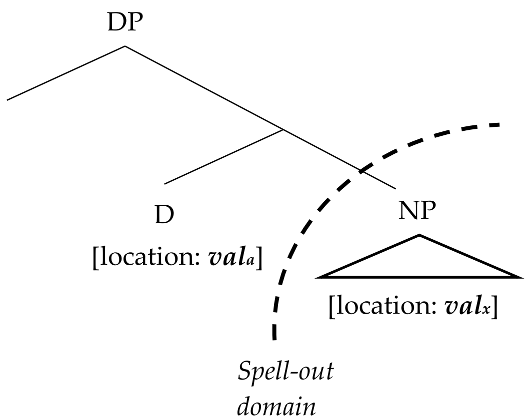
(52)



Once the noun is already valued for [location], the only choice here, when a discourse value for [location] is merged on D, is to pronounce the indexical pointing (IX): IX$_a$ DOG.

Although a noun can bear a lexically specified value for [location], this value will never be available for verb agreement because of phase considerations. If we assume the DP to be a phase (cf. Bošković, 2005), N and its [location] value are inside the spell-out domain, not being visible to following syntactic operations. This would block, for example, a verb to be produced near the head of the signer just because its argument is lexically specified for *head* features.

(53)



Once identified the type of feature that controls agreement by co-localization in the controller, to wit, the [location:*val*] feature on the head of the DP, let us turn our attention to the verb.

The idea I want to pursue here is that verbs, just like other lexical items, can be underspecified for [location:___], therefore, available for agreement; or already lexically specified [location:*val*] when their phonological shape is marked for features under the relevant nodes *body*, *head* or *arm*. Additionally, a verb may have one or two possible slots for Place of Articulation features in their Prosodic Feature representation. When the verb carries only one unvalued slot for PoA in its phonological structure, the verb is a single agreement verb. If the verb has two unvalued slots, it is a double agreement verb. Lastly, if the verb has no unvalued slot for PoA, it shows no agreement at all.

(54) a. Double agreement verbs:
Two underspecified slots for PoA - $_{\text{[location:__]}}$VERB$_{\text{[location:__]}}$

b. Single agreement verbs:
One underspecified slot for PoA - VERB$_{\text{[location:__]}}$

c. Non-agreeing verbs:
No underspecified slot for PoA - VERB

Double agreement verbs have the path feature [direction]; therefore, they have two **unvalued** slots for PoA, one in each timing unit under their Prosodic Feature representation. Examples of double agreement verbs are HELP, TELL, GIVE, SHOW, etc.

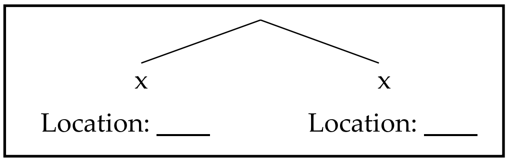


Figure 27. Two unvalued slots for PoA in double agreement verbs.

Some verbs also have [direction], but only one of the slots for PoA is underspecified. The other one is fully marked for location under the node *body, head* or *arm*. Interestingly, if the verb has the slot under the first timing unit fully specified (***Figure 28***) and the second slot unvalued, this is a single regular agreement verb, like SEE, RESPECT, SPEAK, CALL-PHONE, etc.

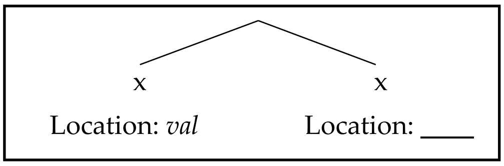


Figure 28. Single regular agreement verbs have [direction], but their first slot for PoA is lexically specified.

On the other hand, if the first slot is unvalued and the second slot if fully specified, this is a case of a single backward agreement verb. Only five verbs behave like that in my data: BREATHE, ASSIMILATE, SMELL, MEMORIZE and TRAUMATIZE. These verbs have their endpoint in some place on the head, but their beginning point is underspecified, in such a way that it can match the location of the object.

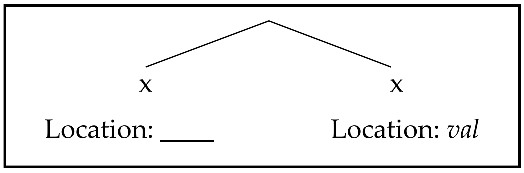


Figure 29. Single backward agreement verbs have [direction], but their second slot for PoA is lexically specified.

Another possibility for single agreement verbs is to have not [direction], but [tracing] or any other type of path feature that is articulated on a single point in space. In that case, both timing unit slots share the same feature. If this shared slot for PoA is unvalued, the verb can agree with an argument, but with only one. This is the case of the verbs discussed in Chapter 4, that used to be considered *plain* verbs in traditional classifications, only because they do not have directional movement. However, as I have been arguing here, these verbs can be co-localized. Examples are again the verbs PUT-UP-WITH, STUDY, EXPLAIN, WORK and PLAY, presented in ***Figure 15***, repeated below as ***Figure 31***.

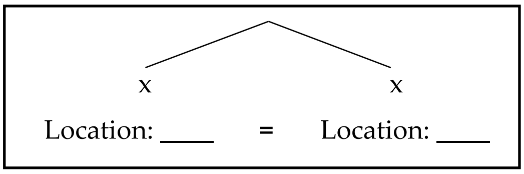


Figure 30. Single agreement verbs with [tracing] and only one slot for PoA in their prosodic structure.

Figure 31. Plain verb signs in Libras (PUT-UP-WITH, STUDY, EXPLAIN, WORK and PLAY) displaying agreement with the locus of the controller, extracted from the Libras Corpus (Quadros et al., n.d.).

Non-agreeing verbs are the ones that are inserted in the derivation already fully specified for PoA features from the lexicon. Those verbs, as discussed in Chapter 4, are the ones that are body anchored (*head, body* and *arm*).[38] Again, the type of [path] feature can indicate how many slots for PoA values a certain verb has: one or two. Basically, all of the non-agreeing verbs have only one slot for [location], which is lexically valued.

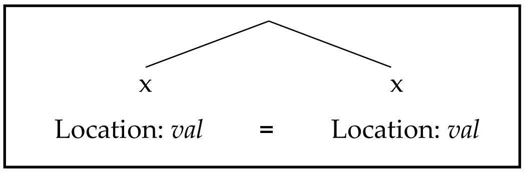


Figure 32. Non-agreeing verbs have only one slot for PoA, which is already lexically specified.

Curiously, there are two examples in my data of non-agreeing verbs that have [direction] and, therefore, have two slots for PoA features. Both slots, however, already carry lexical [location]. Moreover, the two directional non-agreeing verbs could be considered synonyms and are used in different geographic regions of Brazil. Both verbs mean RECOGNIZE-SELF (see ***Figure 34***).

[38] Even the four exceptions of verbs that cannot be co-localized (BEG, MAKE-EFFORT, MEDITATE and RUN) need to pronounced close to the signer's body. So, these verbs are also lexically marked for [location].

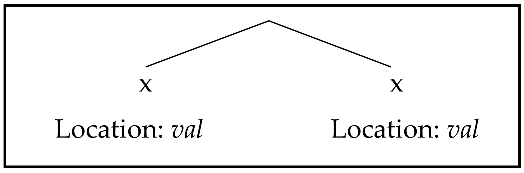


Figure 33. Non-agreeing verbs can even have two slots for PoA features and both will be lexically specified.

The following table summarizes the full paradigm and some pictures of signs are provided in ***Figure 34***:

Table 7. The interaction between path features and agreement.

Path	Lexical Valuation	Agreement pattern	Example
[direction]	[location: __] [location: __]	Double agreement verb (regular or backward)	${}_{x}$HELP$_{y}$, ${}_{x}$INVITE$_{y}$
	[location: *val*] [location: __]	Single regular agreement verb	⬩ RESPECT$_{y}$
	[location: __] [location: *val*]	Single backward agreement verb	${}_{y}$SMELL⬩
	[location: *val*] [location: *val*]	Non-agreeing verb	⬩RECOGNIZE-SELF⬩
[tracing]	[location: __]	Single agreement verb	WORK$_{x}$
	[location: *val*]	Non-agreeing verb	LIKE⬩

Figure 34. Signs from Table 7.

After presenting the different possibilities for lexical feature valuation, we may now discuss how the different agreement patterns are derived and their syntactic structure.

5.4 Double agreement verbs: regular and backward agreement

In Chapter 2, the close relation between Case and agreement was discussed based on Baker (2008, p. 155)'s Case-Dependency of Agreement Parameter:

(55) *The Case-Dependency of Agreement Parameter:*
F agrees with DP/NP only if F values the case feature of DP/NP or vice versa.

According to this parameter, a functional head F only agrees with a DP if this very same F assigns Case to this DP. The functional head T only agrees with the DP that receives Case from T. Once T assigns nominative Case, T only agrees with a nominative DP. Based on Baker's proposal, we can expect that in languages that set as positive the Case-Dependency of Agreement Parameter there will be a biunique relation between Case and agreement.

It is very plausible to assume, in the absence of evidence to the contrary, that this parameter is also set positive in Libras. Moreover, I have developed in previous works (Lourenço, 2014b, 2016b; Lourenço & Duarte, 2014) the idea that Case and agreement in Libras are in a biunique relation. Once there is no morphological case marking in Libras, the distribution of agreement will indicate which functional head assigns which Case to each DP.

As discussed before, regular double agreement verbs have two unvalued slots for [location] and they always show this agreement pattern:

(56) MARY$_a$ $_a$TELL$_b$ JOHN$_b$
'Mary told John (something)'.

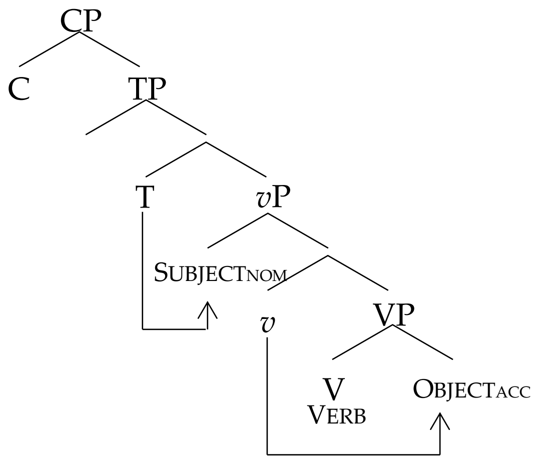
(57) SUBJECT $_{subject}$VERB$_{object}$ OBJECT.

Assuming that Libras is a nominative language (Lourenço, 2014b; Quadros, 1999), the subject DP receives nominative Case and the object bears accusative Case. Considering this Case assignment pattern and the Case-Dependency of Agreement Parameter, we can rewrite the formalization above as it follows:

(58) $\text{SUBJECT}_{\text{nom}}$ $_{\text{nominative.DP}}\text{VERB}_{\text{accusative.DP}}$ $\text{OBJECT}_{\text{acc}}$

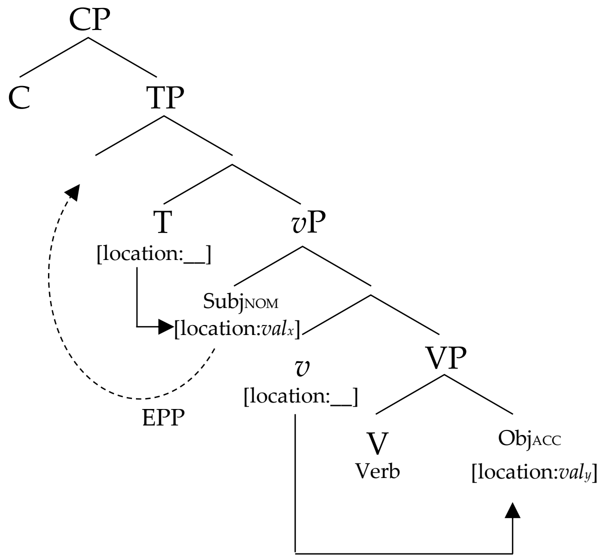
This new formalization captures the fact that the first agreement slot agrees with a nominative DP, which is the subject of the sentence, and the second slot agrees with an accusative DP. Following what is widely assumed in Case Theory, we must observe that nominative Case is assigned by the head of TP, whereas accusative Case is assigned by the head of *v*P. That said, we can consider that the first slot of agreement is actually agreement with T and the second slot marks agreement with *v*. The syntactic derivation of the Case assignment pattern of a regular double agreement verb sentence is given in (59):

(59)



Now, it is easy to explain how agreement is triggered. According to the Case-Dependency of Agreement Parameter, the [location:__] feature in T acts like a probe but it can only Agree with the DP which Case was assigned by T, to wit: the nominative subject. In the same fashion, the [location:__] feature in *v* can only Agree with the DP that received its Case from *v*: the accusative object. The Agree relations are illustrated in (60):

(60)



Note, however, that we need to explain how the two agreement markers occur on the verb, once the verb in Libras does not move up to T (Lourenço, 2014b; Quadros, 1999), nor even to *v*. This is a clear case of affix hopping, also present in other spoken languages, such as English; and that has been widely discussed in Generative Theory. In simple terms, affix hopping is the result of a morphological operation by which an affix that sits on T, for instance, is lowered onto a verb. This attachment occurs in a post-syntactic component, the Phonological Form.

Newton (2008, 2009) proposes a derivation for affix hopping based on the idea that there is an Agree relation between T and V, in such a way that the φ-features on T are also shared with V (Chomsky, 2000). Once there are, at least, two copies of these features, one must be deleted by PF operations. So, *Chain Reduction* (Nunes, 1995, 2004) applies and deletes all the copies of the same feature in the derivation, leaving only one that will be phonetically realized. This operation tends to delete the lower copies, leaving the higher/leftmost one to be pronounced. However, the *Stranded Affix Filter*[39] (Lasnik, 1981, 1995) predicts that a [+affixal] element must attach to a [-affixal] one, obligatorily. Once there is no [-affixal] element on T, this higher copy cannot be pronounced and must be deleted. Therefore, the φ-features must be pronounced on V.

The idea I assume here is that the Agree relations between T-and-V and *v*-and-V will guarantee the spell-out of the [location] values on the verb, even if it is in situ and does not move up to other functional projections.

[39] In Newton's (2008, 2009) analysis, the Stranded Affix Filter is a PF condition.

Now, let us see how backward double agreement constructions behave in terms of Case. Some examples given in (22) are repeated below as (61):

(61) a. $MARY_a$ $_bINVITE_a$ $JOHN_b$ PARTY $HOUSE_a$ $POSS_a$
'Mary invited John to a party at her house'.

b. IX_1 $_bTAKE_1$ $BOOK_b$
'I took the book'.

c. IX_2 $_1CHOOSE_2$ IX_1
'You chose me'.

In backward double agreement verb constructions the agreement pattern is $_{obj}VERB_{suj}$. Once the first agreement slot spells-out agreement with T, in these constructions, it is the object that agrees with the head of TP, not the subject. Assuming the Case-Dependency of Agreement Parameter, the object must receive Case from T. Consequently, the object bears nominative Case. The formalization is given below:

(62) $SUBJECT_{???}$ $_{nominative.DP}VERB_{???}$ $OBJECT_{nom}$

The formalization above gives rise to the following questions:

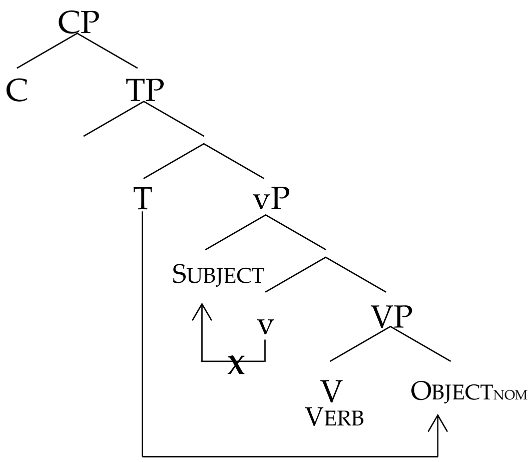
i. Is the subject marked with accusative Case?

ii. If not, what is the Case of the subject?

iii. How does the object receive nominative Case in situ, once there is no indication that it moves to a higher position?

The first question is motivated by comparing regular and backward agreement verb constructions. If, in regular agreement verb sentences, there are two different structural Cases – nominative Case assigned by T and accusative Case assigned by *v* –, we should expect that in backward agreement verbs the arguments are marked with the same structural Cases. However, it is not possible for the subject to receive accusative Case from *v*, because of the syntactic structure of the clause. Considering that objects are merged in the complement position of V and that subjects are merged in the specifier position of *v*P, *v* cannot assigns accusative Case to the subject because there is no c-command relation, which is mandatory to establish Agree. The structure is given below:

(63)



The first conclusion that can be drawn is that the Case received by the subject is not a structural Case. Therefore, the object receives structural nominative Case from T and the subject bears some non-structural Case. This seems to be similar to what happens in Icelandic, in the example given in (17) and repeated below as (64):

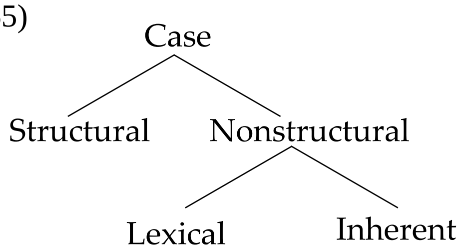
(64)	*Henni*	*leiddust*	*Þeir*.
	she.DAT	be.bored. with-3pS	they.NOM
	'She was bored with them.'		

Notice that the verb agrees with the nominative object, because the subject is marked with dative Case. However, there is no structural reason for the subject to receive dative instead of nominative. The syntactic position of the arguments in the structure would lead the subject to receive nominative and the object to receive accusative Case. Therefore, the Case of the subject is not a typical structural one.

Chomsky (1981, 1986b) claims that there are two types of Case: structural Case and nonstructural Case. Structural and nonstructural Case are assigned differently. The first one is assigned purely in a syntactic way, based on the structural relations between the DPs and the functional heads. The second one is licensed based on specific relations involving certain thematic-roles.

Woolford (2006) splits the non-structural Cases into two different categories: inherent Case and lexical Case:

(65) (Woolford, 2006, p. 111)



The main difference between inherent and lexical Case, is that thematic relations are regular and can be predicted in inherent Case assignment; but are idiosyncratic and cannot be predicted for lexical Case.

If the Case received by the subject of backward agreement verbs is not a structural Case, it must be a kind of nonstructural Case. The next step is to identify if this Case is inherent or lexical.

Woolford (2006, p. 113) also proposes a complementary distribution of lexical and inherent Case:

(66) *Complementary distribution of lexical and inherent Case:*
- Lexical Case may occur on themes/internal arguments, but not on external arguments or on (shifted) DP goal arguments.
- Inherent Case may occur on external arguments and on (shifted) DP goal arguments, but not on themes/internal arguments.

Considering this complementary distribution, I assume that the subject of a backward agreement verb receives an inherent Case; because it is an external argument of *v*P. Additionally, this Case pattern is found in a full set of verbs – the backward agreement verbs. So, there is a certain uniformity and predictability of the Case assignment and also of the agreement patterns in these constructions. Another important observation is that the subjects of backward agreement constructions are always the thematic agent. This fact shows that there is a specific relation between the Case born by the subject and its thematic-role.

Assuming that the subject receives inherent Case, the question is: what Case is this? Again, I adopt Woolford (2006)'s proposal, which claims that only *v* is able to license inherent Case. She makes two predictions: *v* assigns inherent ergative Case to the external agent; and inherent dative Case to (shifted) goal arguments[40]. As already mentioned before, the subject of a backward agreement verb is always theta-marked as agent and it is merged in the specifier position of *v*P. Therefore, subjects of backward agreement verbs receive **inherent ergative Case**.

To sum up, I have proposed that what differentiates regular and backward agreement verb constructions is the Case assignment pattern (Lourenço, 2014b). In regular agreement verb sentences the subject receives nominative Case from T and the object gets accusative

[40] Woolford (2006) adopts a model in which there are two different types of *v* heads, to wit: v_A introduces the external argument (agent) and v_G introduces the goal argument. Therefore, v_A licenses inherent ergative Case and v_G licenses inherent dative Case. This distinction is not relevant for the analysis outlined here.

Case from *v*. Differently, in backward agreement verbs, the subject gets inherent ergative Case from *v* and the object receives nominative Case from T. However, how does the object receive nominative Case in situ, once there is no indication that it moves to higher position?

If the subject receives inherent ergative Case from *v*, the only argument available to receive nominative Case from T is the object. Nevertheless, the object is not visible to T, because *v* functions as a barrier and, if we consider the phase model, the object is within the *v*-VP phase. Yet, the object must receive Case and the nominative Case of T must be assigned to a DP, a Case Filter requirement.

In order to explain how T assigns nominative Case to the in situ object, I will assume a transparency effect, as proposed by Bittner & Hale (1996).

Bittner & Hale (1996) claim that there are two different possibilities for the object to receive nominative Case from T. The first one is for the object to move to Spec,TP, getting out of the *v*-VP phase and getting in the domain of T. They call this type of language raising ergative languages, e.g. Dyirbal:[41]

[41] "Dyirbal (also Djirubal) is an Australian Aboriginal language spoken in northeast Queensland by about 29 speakers of the Dyirbal tribe" (*Wikipedia, The Free Encyclopedia*. "Dyirbal language." accessed November 11, 2018).

(67) *Dyirbal* (Bittner & Hale, 1996, p. 15)

Payi	parrkan	pangkul	yara-ngku	juffka-nyu.
CL(NOM)	wallaby(NOM)	CL(ERG)	man-ERG	spear-NFUT

'The man is spearing the wallaby.'

In (67) the subject 'pangkul yara-ngku - *the man*' receives ergative Case. Then, the object moves to Spec,TP to receive nominative Case from T. A consequence of this movement is the OSV word order.

There is a second type of language, in which the object does not move up to a higher position. Instead, there is a transparency effect obtained by the movement of the intervening category *v*.[42] So, when *v* moves up to T, or even up to C, it is no longer an intervenient barrier between T and the object. The authors call this type of language *transparent ergative languages*, e.g. Samoan[43] (68) and Warlpiri[44] (69).

[42] Actually, Bittner and Hale (1996) propose that the intervenient element between T and the object is V, and that V is moved to T (and in some cases it moves up to C) yielding this transparency effect. However, in the model I am assuming here, Case features are not in V, but in *v*. So we can adapt the proposal, claiming that *v* moves to T and not V.

[43] "Samoan is the language of the Samoan Islands, comprising Samoa and the United States territory of American Samoa" (*Wikipedia, The Free Encyclopedia*. "Samoan language." accessed November 11, 2018).

[44] "The Warlpiri language is spoken by about 3,000 of the Warlpiri people in Australia's Northern Territory." (*Wikipedia, The Free Encyclopedia*. "Warlpiri language." accessed November 11, 2018).

(68) *Samoan* (Bittner & Hale, 1996, p. 21)

Sa sasa e le teine le maile.

PST hit [ERG the girl] [the dog]

'The girl hit the dog.'

(69) *Warlpiri* (Bittner & Hale, 1996, p. 23)

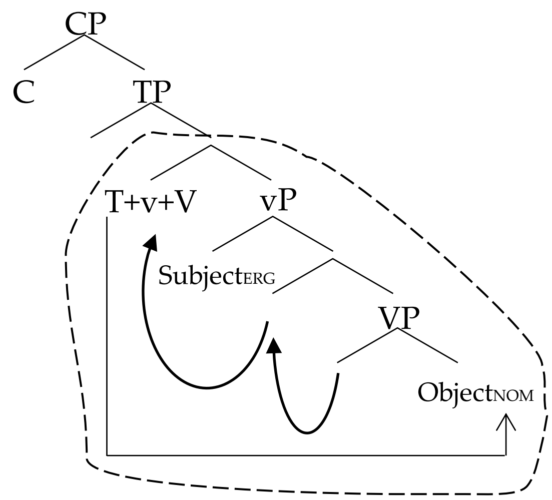
Nyuntulu-rlu ka-npa-ju ngaju nya-nyi.

you-ERG PRS-2SG-1SG me(NOM) see-NPST

'You see me.'

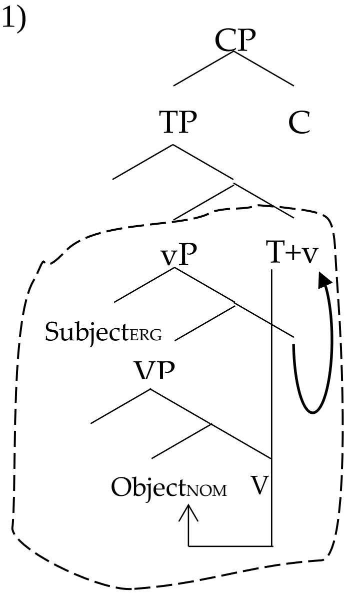
Note that, in Samoan (68), the subject receives ergative Case, but the object does not move to Spec,TP to receive nominative Case. Instead, V moves to *v*, then *v*+V moves to T. As a result, the object is now visible to T and can receive nominative Case. The derivation is given below. The dashed lines indicate the new domain of T after the movement.

(70)



In Warlpiri (69), a final head language, the object does not move to Spec,TP either. However, in this language there is no V to v movement. In this sense, only *v* moves to T[45], yielding the same transparecy effect and allowing the object to receive nominative Case in situ. The syntactic tree is provided in (71).

(71)



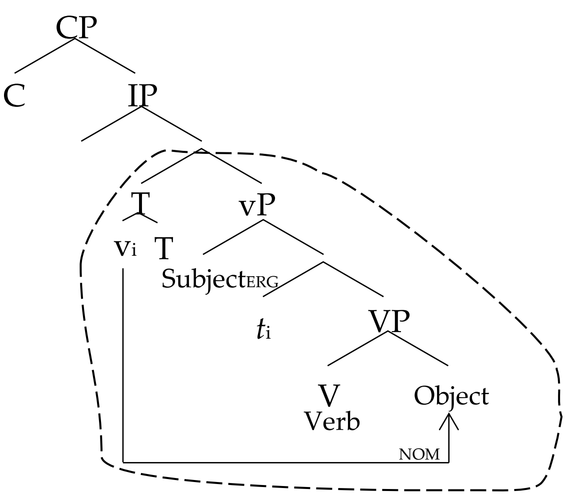
Comparing raising and transparent ergative languages with Brazilian Sign Language, we can conclude that Libras is much more

[45] This is another adaptation of Bittner and Hale (1996). In the original proposal what happens is a coindexation between V and T. But as I adopted the idea that the Case features are in *v* not in V, *v* can move to T and V can stay in situ.

similar to transparent ergative languages, once there is no object raising, based on the order of the constituents that is consistently SVO. Thus, the proposal is that in Libras only *v* moves to T. V stays in situ as already predicted by Quadros (1999).

Following the phase model as proposed by Chomsky (2000, 2001, 2008), CP and *v*P are phases. However, when v moves to T, it extends the limits of the phase (on Phase Extension, see Den Dikken (2007))[46] and, consequently, the objects becomes visible to receive nominative Case from T. The complete derivation is given in (72):

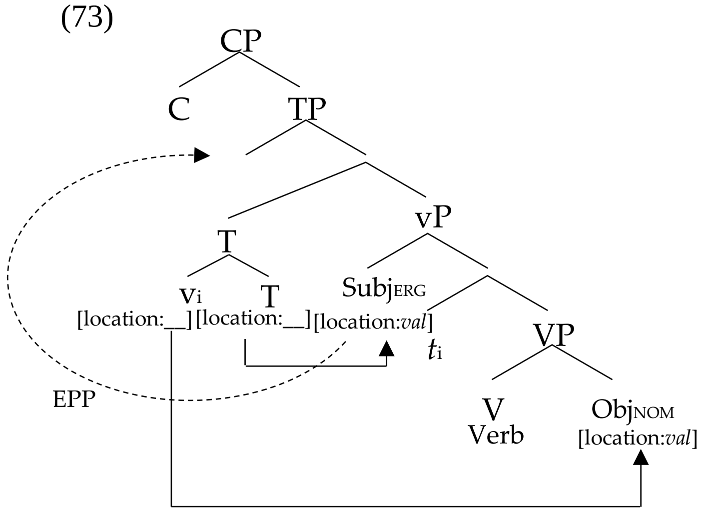
(72)



[46] "syntactic movement of the *head* H of a phase α up to the head X of the node β dominating α extends the phase up from α to β; α loses its phasehood in the process, and any constituent on the edge of α ends up in the domain of the derived phase β as a result of Phase Extension" (Den Dikken, 2007, p. 1).

Similarly, in backward agreement verbs, there are two unvalued [location:__] features that must Agree with two nominals, one merged on T and the other one merged on *v*. An important observation, though, must be pointed out: when *v* moves to T, it carries its [location:__] feature along. So, this complex head *v*+T has two different [location:__] features to be valued. Again, following the Case-Dependency of Agreement Parameter, the [location:__] in T can only Agree with the DP which Case was assigned by T; and in backward agreement verbs, the object is the nominal that receives nominative from T. In the same way, [location:__] in *v* can only Agree with the DP that received its Case from *v*. Note that *v* does not assign any structural Case in backward agreement verb constructions. However, *v* licenses inherent ergative Case on the subject. Therefore, [location:__] in *v* Agrees with the ergative subject. The syntactic derivation proposed here is given below (73):

(73)



When looking at the complex head *v*+T, one may conclude that agreement with *v*, more specifically agreement with the ergative subject, would appear in the first agreement slot of the verb, once it seems to precede T. However, the morphological manifestation of agreement on the verb is the result of linearization processes. When morphology is applied, the first agreement slot will spell-out the valued [location:*val*] feature on T and the second agreement slot will spell-out the [location:*val*] feature on *v*.

Again, affix hopping will take place, and then the agreement markers will be pronounced on the verb.

To sum up the derivation of double agreement verbs, the idea here is that regular agreement verbs show a nominative agreement pattern, in which the subject receives structural nominative Case and agrees with the [location:___] probe on T; whereas the object receives structural accusative Case and agrees with the [location:___] probe on *v*. On the other hand, backward agreement verbs have an ergative agreement pattern[47]. The subject bears non-structural, inherent ergative Case and agrees with the [location:___] probe on *v*. The object receives structural nominative Case from T, because of a transparency effect (phase extension), and agrees with the [location:___] probe on T.

Table 8. Case and agreement alignment in double agreement verbs.

Type of agreement	Subject	Object	Agreement pattern
Regular agreement verbs	Nominative	Accusative	$_{\text{subject.NOM}}$VERB$_{\text{object.ACC}}$
Backward agreement verbs	Ergative	Nominative	$_{\text{object.NOM}}$VERB$_{\text{subject.ERG}}$

[47] For a similar proposal on backward agreement verbs as ergative-like constructions, see Pfau et al. (2011, 2018).

Let us now turn our attention to another type of double agreement constructions: the ones with ditransitive verbs.

5.5 Ditransitive verbs

In previous works, I have identified that ditransitive constructions in Libras are restricted to verbs of transfer (Lourenço, 2016a; Lourenço, Silva, & Costa, 2013). Additionally, the object is usually a *goal* and the verb agrees with the subject and the goal object, but not with the theme. The following examples illustrate this kind of construction:

(74) IX_1 $_1\text{GIVE}_a$ [IX_a STUDENT] [BOOK].
I gave the book to the student.

(75) IX_a $_a\text{THROW}_1$ [IX_1] [PROBLEM].
Lit. '(S)He throw me the problem' / '(S)He passed the buck to me.

(76) MARY_a $_a\text{TEACH}_b$ [IX_b SON] [MATH].
Mary teaches Math to her son.

Verbs of creation are not allowed in ditransitive constructions. Instead, you must have a bi-clausal structure, usually with the verb GIVE or some handling verb.

(77) *IX$_1$ COOK [PASTA] [IX$_a$ SON].
I cooked some pasta to my son.

(78) IX$_1$ COOK [PASTA] $_1$GIVE$_a$ [IX$_a$ SON].
I cooked some pasta and gave it to my son.

(79) *MARY$_a$ WRITE [LETTER] [IX$_b$ PROFESSOR].
Mary wrote a letter to her professor.

(80) MARY$_a$ WRITE [LETTER] $_a$HAND-PAPER$_b$ [IX$_b$ PROFESSOR].
Mary wrote a letter and handed it to her professor.

Another type construction that has been considered ditransitive in Libras (Quadros & Quer, 2008) are the ones that introduce an object$_{source}$, like STEAL and TAKE. Curiously, both of these verbs are backward verbs.

(81) IX_1 ${}_a\text{STEAL}_1$ $[\text{IX}_a]$ $[\text{PEN}_a]$.
I stole the pen from her / I stole her pen.

(82) MARY_a ${}_b\text{TAKE}_a$ $[\text{IX}_b$ $\text{MOM}]$ $[\text{BOOK}_b]$.
Mary took the book from her mother / Mary took her mother's book.

However, these constructions are not true ditransitives. In fact, in their argument structure, there is only one object that has a possession structure (possessor-possessed). First, notice that both possessor and possessed elements share the same location. A second piece of evidence comes from topicalization of the object. When it happens, both the possessor and the possessed must be topicalized:

(83) a. IX_1 ${}_a\text{STEAL}_1$ $[\text{IX}_a$ $\text{PEN}_a]$.
$\rule{3cm}{0.4pt}_{er}$
b. $[\text{IX}_a$ $\text{PEN}_a]$ IX_1 ${}_a\text{STEAL}_1$.[48]

(84) a. MARY_a ${}_1\text{TAKE}_a$ $[\text{IX}_a$ MOM $\text{BOOK}_a]$.
$\rule{5cm}{0.4pt}_{er}$
b. $[\text{IX}_b$ MOM $\text{BOOK}_b]$ MARY_a ${}_1\text{TAKE}_a$.

[48] Topicalization in Libras is marked with eyebrow raising ($\rule{1cm}{0.4pt}_{er}$). This marker scopes only over the topicalized element, with clear onset and offset (Figueiredo & Lourenço, *submitted*; Quadros, 1999; Quadros & Karnopp, 2004).

This cannot happen with true ditransitive constructions, in which only one object can be topicalized, see examples (85) and (86). If both objects are topicalized, the result is a multiple topic structure, with clear phonological boundaries between them – brief interruption of the nonmanual marker and a break between the topic phrases – as shown in examples (87) to (89) .

(85) $\overline{[\text{IX}_a\ \text{STUDENT}]}^{er}$ IX_1 $_1\text{GIVE}_a$ _________ [BOOK].

(86) $\overline{[\text{BOOK}]}^{er}$ IX_1 $_1\text{GIVE}_a$ $[\text{IX}_a\ \text{STUDENT}]$ _________.

(87) $\overline{{}^*[\text{IX}_a\ \text{STUDENT}\ \text{BOOK}]}^{er}$ IX_1 $_1\text{GIVE}_a$ _________ _________.

(88) $\overline{[\text{IX}_a\ \text{STUDENT}]}^{er}$ $\overline{[\text{BOOK}]}^{er}$ IX_1 $_1\text{GIVE}_a$ _________ _________.

(89) $\overline{[\text{BOOK}]}^{er}$ $\overline{[\text{IX}_a\ \text{STUDENT}]}^{er}$ IX_1 $_1\text{GIVE}_a$ _________ _________.

Therefore, constructions that introduce $\text{object}_{\text{source}}$ are not ditransitives. Neither are verbs of creation with benefactive objects.

True ditransitives in Libras have transfer semantics and introduce an $object_{goal}$ and an $object_{theme}$.

Another important aspect to be discussed is the different word order possibilities. As shown in examples (74)-(76), the basic word order is S-V-O_{goal}-O_{theme}. Nevertheless, different orders are allowed, but with restrictions.

The order S-V-O_{theme}-O_{goal} usually carries a contrastive reading, which may indicate some focalization operation. This is consistent with the idea that focus constructions occupy the sentence final position in Libras (Quadros, 1999). Interestingly, the indexical sign (IX) of the O_{goal} has a repeated movement, which contributes to the contrastive reading.

(90) IX_1 $_1GIVE_a$ [BOOK] [IX_a++ STUDENT].
I gave the book to this student (not that one).

(91) IX_a $_aLEND_1$ [PEN] [IX_1++].
She lent ME the pen (not anyone else).

Another possible order is S-O_{theme}-V-O_{goal}. This order is predicted, because agreement verbs allow for object shift (Lourenço, 2017; Quadros, 1999). Therefore, the following examples are possible:

(92) IX_1 [GIFT] $_1GIVE_2$ [(IX_2)].
I gave you the gift.

(93) IX_a [PEN BLUE] $_aLEND_1$ [(IX_1)].
She lent me the blue pen.

It is important to point out that object shift is Libras seems to be associated to some definiteness effect, which is a quite common requirement for object shift in spoken languages too (cf. Diesing, 1996). The following pair of examples illustrate this semantic distinction:

(94) PETER FIX CAR.

(95) PETER CAR FIX.

The sentence in (94) is ambiguous. One possible interpretation is that Peter fixed a definite car. The other one, which seems to be the preferred reading according to our Deaf consultants, is that Peter is an auto mechanic whose job is to fix cars. However, in (95), the ambiguity vanishes. The only possible interpretation is that Peter fixed a definite car. This confirms that object shift entails some definiteness effect.[49] Therefore, the object$_{theme}$ in (92) and (93) has a definite reading.

Although the object$_{theme}$ can be raised, raising the object$_{goal}$ results in ungrammaticality:

(96) *IX$_1$ [IX$_a$ STUDENT] $_1$GIVE$_a$ [BOOK].

(97) *IX$_a$ MARY [IX$_1$] $_a$LEND$_1$ [PEN].

To sum up, the main characteristics of ditransitive constructions in Libras are listed below:

[49] This is a very seminal observation that certainly needs more testing in Libras. I will leave this to future work.

i. transfer semantic reading;
ii. object$_{goal}$ and object$_{theme}$ are introduced;
iii. S-V-O$_{goal}$-O$_{theme}$ is the basic word order;
iv. S-V-O$_{theme}$-O$_{goal}$ is a focalized construction;
v. Object shift of a [+definite] O$_{theme}$ is allowed;
vi. Object shift of the O$_{goal}$ is ungrammatical.

Based on these descriptive facts, I will outline a basic syntactic derivation for ditransitives in Libras.[50]

First, it is important to notice that Libras ditransitives constitute a closed class, in Malchukov et al. (2010)'s terms.[51] That means that there is no canonical syntactic or morphological operation that productively generates ditransitive constructions in the language, e.g. dative case

[50] Because of space and time considerations, I will not review previous studies of ditransitives in signed languages. However, I recommend the reader to consult some researches on ASL (Bahan, 1996; Neidle et al., 2000; Padden, 1988), on LGP (Choupina, Brito, & Bettencourt, 2016), on LIS (Bertone, 2006; Brunelli, 2006), on HKSL (Sze, 2003), on SZJ (Pavlič, 2016) and on RSL (Kimmelman, 2018).
[51] "It is striking that when a language has a closed class of ditransitive verbs, the same lexemes tend to recur in this class in language after language, most frequently verbs like 'give', 'show', 'teach', sometimes also 'tell', 'send', and 'ask'. Other verbs are less likely to do so, and if they do participate in the ditransitive construction, the same would be true of more canonical ditransitives, mentioned above" (Malchukov et al., 2010, p. 50).

marking or applicative morphology. This explains why there are not many true ditransitive verbs in Libras.

Secondly, it is important to identify which type of argument alignment is observed in these constructions. Languages can differ on how they mark the arguments of ditransitive verbs. The first type of alignment identified by Malchukov, Haspelmath & Comrie (2010) is the indirective alignment. Languages that have this type of alignment mark the indirect object, or the recipient-like object differently in the structure. These languages may use dative case, e.g. German, or even an adposition, e.g. Brazilian Portuguese.

(98) German – object marked with dative Case.

Ich	gab	[dem	Kind]	den	Apfel
1SG.NOM	gave	[the.DAT	child]	the.ACC	apple

'I gave the child the apple.'

(Malchukov et al., 2010, p. 3)

(99) Brazilian Portuguese – object marked with a preposition.

João	deu	o	livro	[para	Maria].
João	gave	the	book	[to	MARIA]

The second type of alignment is called secundative alignment. In these languages, the theme-like object is marked differently, not the recipient-like one. In West Greenlandic, an example of such language, the theme object is marked with Instrumental Case.

(100) West Greenlandic
(Uuma) Niisi [aningaasa-nik] tuni-vaa
(that.ERG) Nisi money-INSTR.PL give-IND.3SG>3SG
'He gave Nisi Money.'
(Malchukov et al., 2010, p. 4)

Finally, the third alignment is the one in which none of the objects is marked differently – therefore, this is a neutral alignment. These ditransitive constructions are usually called *double object constructions* and English has this kind of structure.

(101) John gave [Mary] [the book].

(102) Bob showed [Sam] [his new house].

Clearly, Libras shows a neutral alignment in ditransitive constructions, once there is no morphological marking that differentiates one object from the other. One may say that the theme object is not localized, whereas the goal object is. This is not exactly true. You can have a non-localized goal object as in (103):

(103) IX1 1GIVEneutral [MOTHER] [DRESS RED].
I gave mom a red dress.

Assuming that this neutral alignment indicates that ditransitives in Libras are double object constructions, I will adopt applicative projections in my analysis (McGinnis, 2001; Pylkkänen, 2000, 2008).

Pylkkänen (2000, 2008) proposes that, in double object constructions, an Applicative Phrase (ApplP) is projected and this functional head introduces the recipient/goal object. She also claims that there are two different types of applicative heads: "high applicatives. which denote a relation between an event and an individual, and low applicatives, which denote a relation between two individuals" (Pylkkänen, 2000, p. 208). Additionally, low applicatives imply a transfer of possession (Pylkkänen, 2008, pp. 8, 18).

(104) *High applicative* – Luganda

Mukasa	ya-tambu-**le**-dde	Katonga.
Mukasa	3SG.PAST-walk-**APPL**-PAST	Katonga

'Mukasa walked for Katonga.'

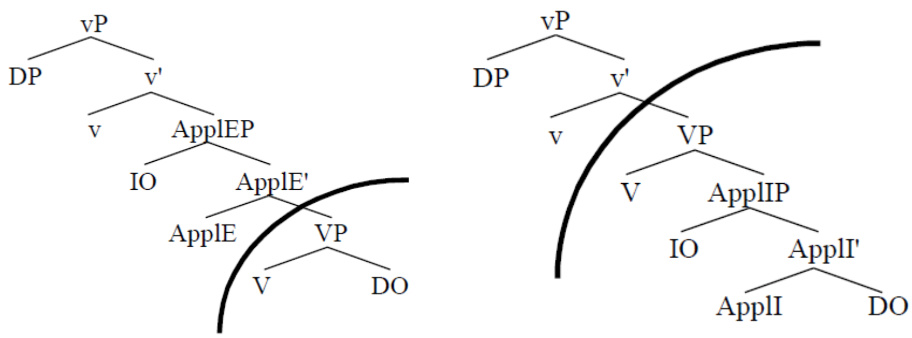
(Pylkkänen, 2008, p. 20)

(105) *Low applicative* – English

John gave Mary the book.

Based on the semantic differences between high and low applicatives, McGinnis (2001) call them E(vent)-applicatives, which projects an ApplEP, and I(ndividual)-applicatives, projecting an ApplIP, respectively. The differences between E-applicatives and I-applicatives are not only semantic but also structural. They are merged in different syntactic positions. Moreover, McGinnis claims that only the head of ApplE is a phasal head.

(106) *E-applicatives:* *I-applicatives:*

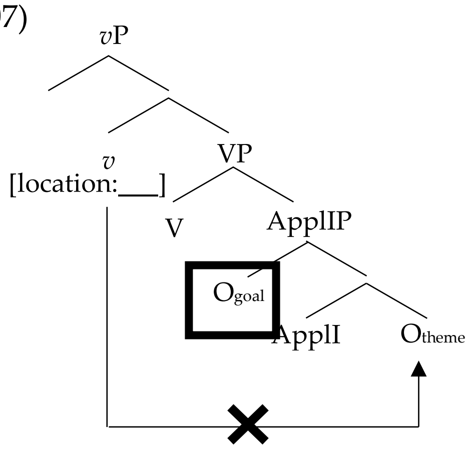


(McGinnis, 2001, p. 6)

Assuming ApplI to be a phase comes with some corollaries to the syntactic structure and possible operations. McGinnis discusses some properties that are different between E- and I-applicatives, such as: A-movement, object agreement, phonological phrasing, quantifier scope and Wh-movement. The most relevant property for the discussion outlined here is clearly object agreement.

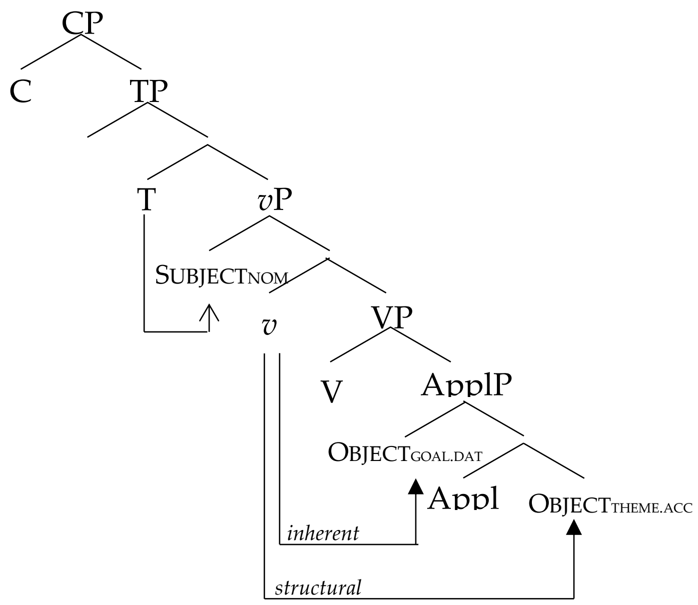
In I-applicative constructions, the verb can only agree with the higher object, the object$_{goal}$ in Libras. This is so, because both objects are within the same phase and, therefore, in the same search domain of the [location:___] probe on *v*. Because of locality constraints, the object$_{goal}$ intervenes, blocking agreement with the lower object$_{theme}$.

(107)

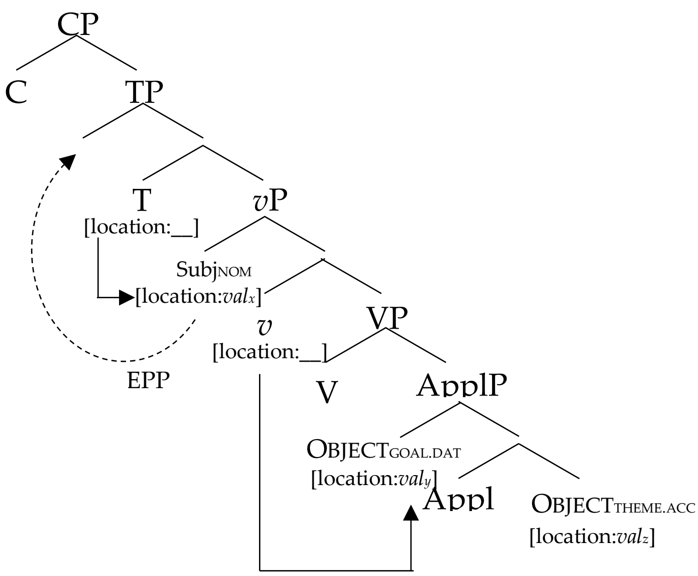


Let us now turn our attention to the Case assignment pattern in these constructions, considering the Case-agreement relation I have claimed to exist in Libras. Assuming the inherent Case theory (Woolford, 2006) discussed in the previous section, it is plausible to assume that the object$_{goal}$ receives inherent dative Case from *v*, whereas the object$_{theme}$ bears structural accusative Case also assigned by *v*. Another possibility would be to assume that *v* assigns multiple accusative Cases, similar to what happens in Russian. Inherent dative Case seems to be a better option, especially because of the thematic role *goal* that matches Woolford's system. Still, both derivations would maintain the fact the close relation between Case and agreement, once in both scenarios Case is assigned/licensed by *v*.

(108)


CP
C
TP
T
vP
SUBJECTNOM
v
VP
V
ApplP
OBJECTGOAL.DAT
Appl
OBJECTTHEME.ACC
inherent
structural

(109)


CP
C
TP
T
[location:__]
vP
SubjNOM
[location:valx]
EPP
v
[location:__]
VP
V
ApplP
OBJECTGOAL.DAT
[location:valy]
Appl
OBJECTTHEME.ACC
[location:valz]

One issue I will leave open for further investigation is the restriction on object raising (only the $object_{theme}$ can be shifted). However, assuming that the $object_{goal}$ receives non-structural inherent Case and the $object_{theme}$'s Case is assigned structurally may shed some light on this restriction.

5.6 Non-agreeing (body-anchored) verbs

Non-agreeing verbs are the ones that are already fully specified for Point of Articulation features and that are body-anchored (see *Chapter 4*:). A tricky conclusion would be to assume that (some) phonological information is relevant for syntax computation. This idea, however, is very deviant, considering a phonology-free syntax that assumes that "certain specific types of syntactic information are indeed available to phonology, but no phonological information is available to syntax" (Pullum & Zwicky, 1988, p. 255).

The claim here is not that body-anchoring information is blocking agreement in syntax, but that body-anchored verbs are already lexically valued for the [location] feature (as argued in Section

5.3). Consequently, they are already merged in the derivation bearing the feature [location:*val*].

The fact that some features may be either lexically valued or structurally valued is common in natural languages. One example is Case, which can be structurally determined or lexically specified (lexical case). Another comparison that can be drawn, and that happens in the verb domain, is that some verbs are already lexically specified for tense, for aspect or even for reflexive. These are called *tantum* forms:

(110) **Tense**: some verbs may be already lexically specified for a specific tense, e.g. *coepisse* 'began' in Latin is inherently past in meaning (a past-tense *tantum* verb) (Pesetsky & Torrego, 2007, p. 264).

(111) **Aspect**: a verb may only exist in the imperfective aspect (*imperfectivum tantum*) or in the perfective aspect (*perfectivum tantum*), *potřebovat* 'need' and *onemocnět* 'fall ill', respectively, in Czech (Tahal, 2011, p. 5) (p. 5) .

(112) **Reflexive**: a verb may be inherently reflexive (*reflexiva tantum*), e.g. *představovat si* 'imagine' in Czech (Tahal,

2011, p. 7) and *suicidar-(se)* ‘commit suicide’ in Brazilian Portuguese.

These verbs must carry specific features to prevent any syntactic operation that would be in disagreement with their lexical values. This is the idea put forth by Pesetsky and Torrego:

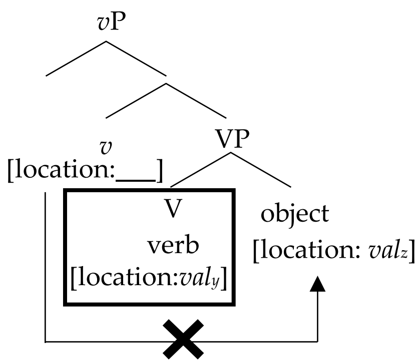
> Certain features on lexical items appear to come from the lexicon unvalued, and receive their value from a valued instance of the same feature, present on another lexical item. […] More generally, the existence of *tantum* forms for a particular feature F within a particular syntactic category X can be taken as a sign that F is a valued feature for words of category X (Pesetsky & Torrego, 2007, p. 264).

The idea here is that body-anchored verbs are *tantum* forms that are lexically specified for location.

One may argue that *tantum* forms are usually restricted because of some semantic property (e.g. you cannot ‘commit suicide to another person’). At first sight, the restriction for location in body-anchored verbs seems to be phonological in nature. However, some insights from the body-as-subject analysis (Meir et al., 2007, 2008) would provide an interesting semantic framework to be explored, based on the claim that "the signer's body is not merely a formal location for the articulation of signs, but may, in principle, be associated with a particular meaning or a particular function" (Meir et al., 2008). The fact that mental activity verbs are signed on/near the temple or the forehead, for instance, is not just a phonological information, but an important iconic/semantic mapping that cannot be broken by changing the location of the verb.

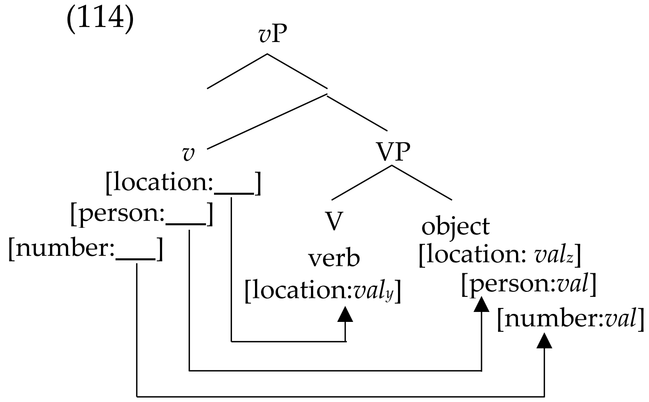
Once the verb is inserted in the derivation with the feature [location:*val*], there is a change in some of the Agree relations. When the [location:___] feature on *v* probes down its searching domain for a [location:*val*] feature, the closest one is no longer the valued feature of the object, but the one merged with the (*tantum*, body-anchored) verb. This feature on V intervenes, not allowing the traditional object agree(ment) process.

(113)



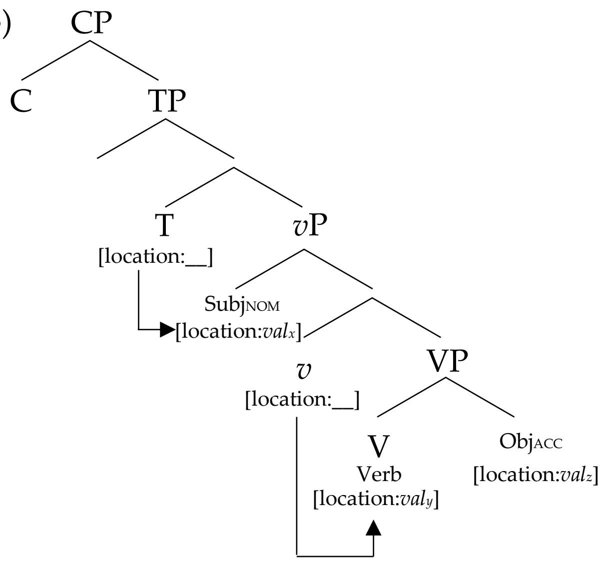
Before moving forward in the derivation, it is crucial to remember that each unvalued feature acts like a probe, and not the whole functional head (Pesetsky & Torrego, 2007). Therefore, the probing operation of each unvalued feature is independent, in such a way that [person] and [number] feature sharing still happens between *v* and the object. Only the [location] value of the object is not available to *v*.

(114)



Now let us see what happens to the [location:___] probe merged on T. This unvalued feature probes down the structure searching for a [location:*val*] feature and it finds the subject DP. Agree takes place and the value of the feature is shared.

(115)



However, there is a problem in this derivation. The affix hopping operation wil not converge, because the location value of the probe on T cannot be pronounced on the verb, which is already fully specified for location. Threfore, this value must be deleted somehow or, at least, it need to be left unpronounced.

An interesting parallel is found in languages that exhibit agreement asymmetries, such as some dialects of Italian and also Arabic. In these languages, agreement on the verb depends on the syntactic position of the subject in the clause. If the subject sits preverbally, the verb displays full subject agreement. On the other hand, if the subject is in a post-verbal position, agreement is partial or even has a neutral unmarked form (Miyagawa, 2010, pp. 3–4). The following examples are from Fiorentino Italian:

(116)	E’	vegnú	qualche	putela.
	is	come	some	girls
	‘Some girls have come.’			

(117)	*L’è	vegnuda	qualche	putela.
	are	come	some	girls
	‘Some girls have come.’			

(118)	La	Maria	la	parla.
	the	Maria	she	speaks
	‘Maria speaks.’			

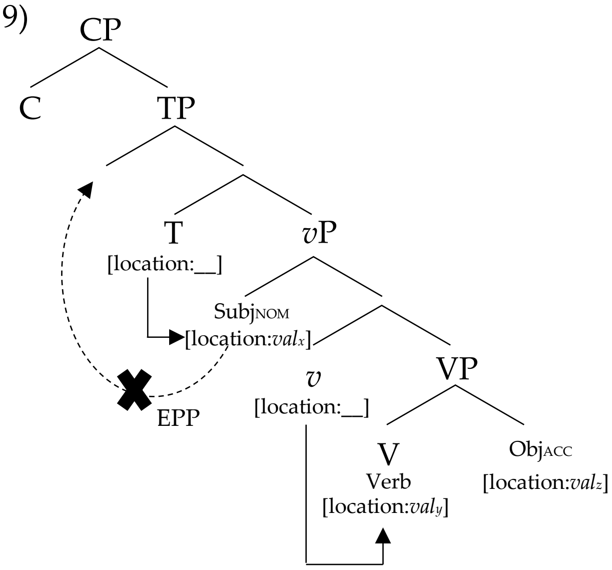
(Brandi & Cordin, 1989 *apud* Miyagawa, 2010, p. 3)

In the example (116), there is no agreement with the post-verbal subject. If agreement is pronounced, the sentence becomes ungrammatical (117). Differently, agreement is obligatory with pre-verbal subjects (118).

Based on this type of asymmetry, Miyagawa adopts an agreement approach to EPP, in such a way that "agreement triggers movement" and "no agreement [or partial agreement] emerges if movement does not take place" (Miyagawa, 2010, p. 4).[52]

Based on this agreement approach to EPP, we can postulate that there is no EPP movement in non-agreeing verbs, which leaves the agreement morphology on T unpronounced.

(119)



[52] The agreement approach to EPP is also found elsewhere (Chomsky, 2000, 2005, 2007, 2008; Kuroda, 1988; Miyagawa, 2005; Pesetsky & Torrego, 2001).

One piece of evidence of no EPP movement in these constructions is the ungrammaticality of the pre-verbal negative sign NO, in sentences with non-agreeing verbs. Pre-verbal negation is possible though, when the verb has agreement:

(120) $\overline{}^{neg}$ over NO DESIRE CAR

(120) *JOHN$_a$ $\overline{\text{NO DESIRE CAR}}^{neg}$.
'John does not want the car'.

(121) JOHN$_a$ $\overline{\text{NO }_a\text{GIVE}_1\text{ CAR}}^{neg}$.
'John did not give me the car'.

Pre-verbal negation is only possible in (121) because the subject moves up to Spec,TP, crossing the NegP projection and satisfying the EPP feature of T. When there is no EPP movement, in the case of non-agreeing verbs, the order SNOVO does not emerge.

Some facts about negation in Libras are important to make clear how the interaction between negation and agreement works in the language.

First, Libras is a nonmanual dominant language (Arrotéia, 2005), assuming Zeshan's typology (Zeshan, 2004, 2006). The manual sign NO is optional, and the main negative marker is the obligatory nonmanual negation – compare examples (122) through (124). Additionally, the nonmanual negation spreads over the clause – compare (122) and (125).

                ______________neg
(122) IX$_1$ BUY HOUSE NO

                __________neg
(123) IX$_1$ BUY HOUSE

(124) *IX$_1$ BUY HOUSE NO

                                        ___neg
(125) ?IX$_1$ BUY HOUSE NO

Second, Libras is a Strict Negative Concord language (Arrotéia, 2005), following Giannakidou's and Zeijlstra's works (Giannakidou, 2000; Zeijlstra, 2004, 2008). This means that "N-words are not allowed to occur by themselves, but have to be accompanied by a single negative marker" (Zeijlstra, 2004, p. 64). In Libras, when there are two different negative markers in the sentence, (e.g. the manual and the nonmanual negative markers or the nonmanual negative marker and an N-word) the presence of both does not make the sentence affirmative[53]. Additionally, N-words (NOTHING, NO-ONE, etc.) cannot occur without the nonmanual negative marker.

$\phantom{(126)\ \mathrm{IX_1}}\ \overline{}^{\,neg}$
(126) IX$_1$ BUY HOUSE NO

$\phantom{(127)\ \mathrm{IX_1}}\ \overline{}^{\,neg}$
(127) IX$_1$ BUY NOTHING

$\phantom{(128)\ \mathrm{NO\text{-}ONE}}\ \overline{}^{\,neg}$
(128) NO-ONE BUY NOTHING

(129) *NO-ONE BUY NOTHING

[53] In English, which is a double negation language and not a negative concord one, the semantics of two negative elements combine, resulting in an affirmative sentence (except in certain dialects).

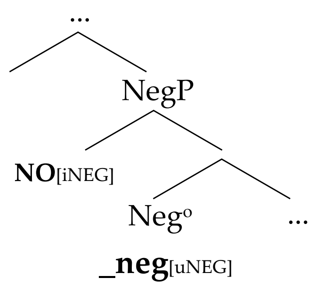
Ex.: I did not see nothing = I saw something.

Finally, I have adopted some analysis for negation in German Sign Language – DGS (Pfau, 2015; Pfau & Quer, 2007) to explain sentential negation in Libras (Lourenço, 2015).

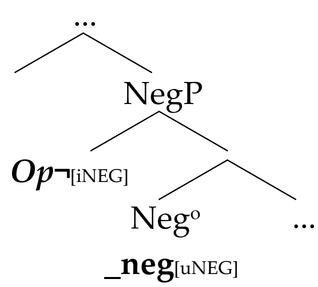
In Libras, like in DGS, there is split negation: there is an optional negative item (sign NO) which sits on Spec,NegP and an obligatory negative head (the nonmanual marker) which carries the feature [+affix].

Once Libras is a Strict Negative Concord Language, the negative nonmanual marker carries an uninterpretable negative feature [*u*NEG] and the NO sign carries a [*i*NEG] (130). When the NO sign is absent, the nonmanual marker is licensed by a covert negative operator *Op*¬ which c-commands the highest instance of [*u*NEG] (131). This is what has been proposed for DGS (Pfau, 2015; Pfau & Quer, 2007).

(130) [$_{TP}$ SUBJECT [$_{NegP}$ **NO**$_{[iNEG]}$ [$_{Neg°}$ **_neg**$_{[uNEG]}$ [$_{vP}$ ...]]]]



(131) [$_{TP}$ SUBJECT [$_{NegP}$ ***Op¬***$_{[iNEG]}$ [$_{Neg°}$ **_neg**$_{[uNEG]}$ [$_{vP}$ ...]]]]

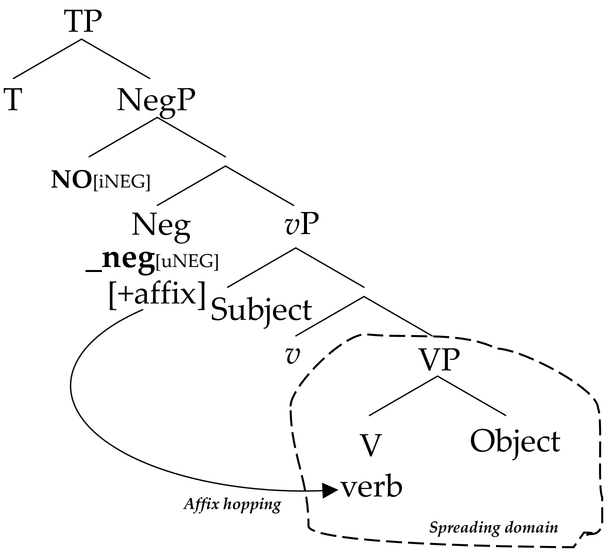


Two more implementations are needed for Libras. First, the nonmanual marker that sits on the head of NegP is [+affix] and it needs to attach to a [-affix] item[54]. However, as argued before, the verb in Libras does not move up to higher projections, always staying in situ.

[54] The same Stranded Affix Filter requirement, discussed in Section 5.4.

Therefore, an affix hopping operation must apply, in order to attach the negative nonmanual marker to the verb. When attached, the negative marker can spread throughout its c-command domain.

(132)



Finally, when the NegP structure is sent to spell-out, linearization takes place and, then, two options emerge: the pronunciation can be Spec,NP+NegP' or NegP'+Spec,NP.[55] If the first option is chosen, then the order will be [NO V O]; if the second option

[55] "There is no clear evidence that order plays a role at LF [Logical Form] or the computation from N [Numeration] to LF. Let us assume not. It must be then that ordering is part of the phonological component" (Chomsky, 1995a, p. 79).

is linearized, then a [V O NO] structure will emerge. Leaving the ordering of the elements as an operation that takes place in the phonological component will save us from postulating additional syntactic operations, like some of the remnant operations proposed by Quadros (1999). This also explains the optionality shown in example (35), repeated below as (133).

(133) a) JOHN$_a$ $\overline{\text{NO } {}_a\text{GIVE}_1 \text{ CAR}}^{neg}$.
'John did not give me the car'.

b) JOHN$_a$ $\overline{{}_a\text{GIVE}_1 \text{ CAR NO}}^{neg}$.

As proposed before, in agreement verb constructions, the subject moves up to Spec,TP, because of EPP. Consequently, both orders SNOVO and SVONO are possible. On the other hand, when the verb is a non-agreeing one, there is no EPP movement and the order SNOVO is ruled out and only the SVONO emerges.

(134) *JOHN$_a$ NO DESIRE CAR. [neg: NO DESIRE CAR]
'John does not want the car'.

(135) JOHN$_a$ DESIRE CAR NO. [neg: DESIRE CAR NO]
'John does not want the car'.

However, one could predict that the order NOSVO would be grammatical in non-agreeing verb constructions. This predictions does not hold:

(136) *NO JOHN$_a$ DESIRE CAR. [neg: DESIRE CAR]

A possible explanation for that could be found in Pfau's proposal that the negative sign NO contains its own lexical nonmanual marker. In the case of DGS, the nonmanual marker is the headshake:

> The reader will notice that NOT is also accompanied by a headshake. We assume, however, that this headshake is lexically specified, that is, it is part of the phonological description of the negative adverbial […]. Phonetically, the headshakes on the verb and on the negative adverbial will be realized as one continuous headshake (Pfau, 2015).

If we assume that the sign NO in Libras also contains a lexically specified nonmanual marker, headshake + protuberant lips (Arrotéia, 2005), the blocking of the order NOSVO is not syntactic per se, but phonologically driven. The ungrammatical example (136) should be rewritten as follows:

(137) $\overline{\text{*NO}}^{\text{neg}}$ JOHN$_a$ $\overline{\text{DESIRE CAR.}}^{\text{neg}}$

As you can see, the problem with this order is the non-contiguity of the nonmanual markers. This would explain why the language only allows for negation to be pronounced on the final sentence position in non-agreeing verb constructions:

(138) JOHN$_a$ $\overline{\text{DESIRE CAR}}^{neg}$ $\overline{\text{NO}}^{neg}$.

By explaining the negation asymmetry between agreement verbs and non-agreeing verbs, I finish my syntactic analysis of the different agreement patterns in Libras.

However, one last topic must be covered: the element that has been called "agreement auxiliary" (Quadros, 1999; Quadros & Quer, 2008).

5.7 On the so-called agreement auxiliary in Libras

Many languages have auxiliaries. These elements often express tense, aspect, modality, voice, etc. However, it is important to notice that auxiliaries are functional items that only convey some kind of grammatical information. Additionally, in a sentence with an auxiliary, there is also the main verb, which is the one that projects the argument structure and that assigns theta-roles to its arguments.

Auxiliaries are also found in some sign languages. According to Sapountzaki (2012, p. 209), the most commonly found auxiliary in signed languages is the indexical auxiliary.[56] This element is derived from pointing and is illustrated in the following figure:

Figure 35. Indexical auxiliary.

Libras has an element that has been analyzed as an indexical auxiliary (AUX). AUX is purely a morphological realization of agreement in Libras (Quadros, 1999; Quadros & Quer, 2008), and it

[56] Steinbach & Pfau (2007) claim that there are three different types of auxiliaries in sign languages: the indexical auxiliary, which is going to be discussed here; the non-indexical auxiliaries derived from verbs; and the non-indexical auxiliaries derived from nouns. For a more detailed discussion on these types of auxiliaries, see Steinbach and Pfau (2007) and Sapountzaki (2012).

does not bear any other grammatical information, such as tense, aspect, modality, or voice.

Moreover, when AUX is expressed in a sentence, there is a change in the basic word order. The following examples show AUX in a sentence with a plain verb:

(139) JOHN_a LIKE MARY_b.

(140) JOHN_a MARY_b $_a\text{AUX}_b$ LIKE.

Notice that in (139) the sentence has a non-agreeing verb and, therefore, the basic word order is SVO. However, in (140) when AUX is uttered, the sentence has a different word order, namely SOAUXV.

Another curious fact about AUX is that it also occurs with agreement verbs and its path is always from subject to object, regardless if the agreement verb is regular or backward (Lourenço, 2014b, pp. 122–124):

(141) a. JOHN$_a$ $_a$HELP$_b$ MARY$_b$.

b. JOHN$_a$ MARY$_b$ $_a$AUX$_b$ HELP$_b$.

c. *JOHN$_a$ MARY$_b$ $_a$AUX$_b$ $_a$HELP.

d. */?JOHN$_a$ MARY$_b$ $_a$AUX$_b$ $_a$HELP$_b$.

e. *JOHN$_a$ MARY$_b$ $_a$AUX$_b$ HELP.[57]

(142) a. JOHN$_a$ $_b$INVITE$_a$ MARY$_b$.

b. JOHN$_a$ MARY$_b$ $_a$AUX$_b$ $_b$INVITE.

c. *JOHN$_a$ MARY$_b$ $_a$AUX$_b$ INVITE$_a$.

d. */?JOHN$_a$ MARY$_b$ $_a$AUX$_b$ $_b$INVITE$_a$.

e. *JOHN$_a$ MARY$_b$ $_a$AUX$_b$ INVITE.

[57] The judgment provided in this example differs from the one given by Quadros and Quer (2008). According to them, a sentence with an agreeing verb can occur with AUX when there is no morphological agreement on the verb. However, they only considered path as the agreement marker. Although you can have a sentence like the one presented in (141) without path, some displacement of the verb to the location of the object will emerge. Considering co-localization as the true agreement marker, a sentence without any kind of location matching is considered ungrammatical by our consultants. This restriction becomes even clearer in a context of a 1st person object:

*JOHN$_a$ IX$_1$ $_a$AUX$_1$ HELP.

The sentences in (141) have a regular agreement verb and as (141) shows, this kind of verb can occur with AUX in a sentence. However, note that the verb only agrees with the object of the sentence. If the verb shows no agreement or if it agrees only with the subject, the sentence is ungrammatical - (141) and (141). Full agreement on the main verb (141) is also ungrammatical, or, at least, very pragmatically marked. Some signers may consider this construction grammatical in a very emphatic context.

The same distribution is attested in sentences with a backward agreement verb, as the examples in (142) show. However, it is important to point out that the agreement is always with the object and, in a backward agreement context, it occurs in the first slot of the verb (see example 142b). Therefore, it is curious that AUX has the same path (from subject to object) in both regular and backward agreement verb sentences, but the main verb retains its original agreement pattern.

Based on the syntactic behavior of AUX, I have proposed that this element is not a real auxiliary (Lourenço, 2014b). Instead, I have claimed that AUX is actually a topic marker that indicates that both the subject and the object were moved to a topic position.

The first evidence given to support the topic analysis is the nonmanual markers that are obligatory in sentences with AUX. AUX constructions are always marked with eye gaze (eg), eyebrow raising (er) and also a pause after each argument and after AUX (143). These nonmanual markers typically indicate a topic construction (Quadros, 1999, 2004). Additionally, these nonmanual markers do not spread over the main verb.

	eg/er	eg/er	eg/er	
(143)	JOHN_a	MARY_b	$_a\text{AUX}_b$	LIKE.

Additional evidence that AUX occurs in a topic environment comes from the contexts in which it is used. Although AUX seems to indicate an agreement relation, it is restricted to very specific pragmatic contexts. Therefore, in unmarked pragmatic situations, sentences are not expressed with AUX.[58] One of the situations when AUX occurs is when the signer wants to emphasize which argument is

[58] Experimental data supports the analysis that AUX in Libras is pragmatically marked. In out of the blue contexts, sentences with AUX show lower levels of acceptability by (near-)native signers (Souza, 2016; Souza, Rodrigues, & Quer, 2018). This is expected, if we consider that topic constructions require specific discourse structures.

the subject/agent and which is the object/patient of the sentence/event. AUX is also often used in adversative coordination constructions and is commonly followed by a VP-ellipsis:

(144) JOHN$_a$ LOVE MARY$_b$ [BUT <$_b$AUX$_a$>$_{top}$ (LOVE) NOT]
'John likes Mary, but she does not like him back.'

AUX constructlions can also be compared to sentences with object topicalization. When objects are topicalized in Libras, they are usually followed by a post-nominal pointing. This pointing is an indexical element and it occurs both with agreement and non-agreeing verb constructions. Some examples are provided below:

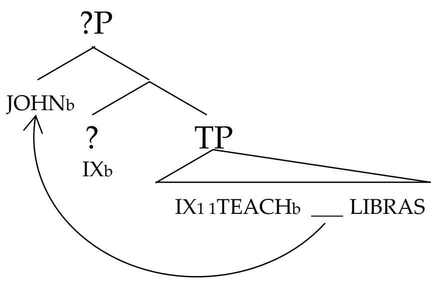
(145) <JOHN$_b$ IX$_b$>$_{top}$ IX$_1$ $_1$TEACH$_b$ LIBRAS.
'John$_k$, I teach t$_k$ Libras.'

(146) <JOHN$_b$ IX$_b$>$_{top}$ IX$_1$ $_1$LIKE$_b$ IX$_b$.[59]
'John$_k$, I like him$_k$.'

[59] In this sentence, there is a pronominal pointing in the object position because non-agreement verbs do not license null categories in Libras (Quadros, 1995).

This post-nominal pointing can be analyzed as a topic marker that indicates that the object of the sentence has been topicalized.[60] Following this assumption, Libras has both the nonmanual marking and also a manual post-nominal pointing that occurs when the object of the sentence is moved to a topic position. The syntactic structure of (145) is given below:

(147)



Comparing this post-nominal marker and the AUX element, we can see that they are very similar in function and also in their morphological form. Both are indexical pointing signs, as ***Figure 36*** illustrates:

60 Lourenço (2014b) shows some evidence that this pointing in topicalized constructions is different from the post-nominal pointing discussed by Bahan, Kegl, MacLaughlin, & Neidle (1995) and MacLaughlin (1997).

Figure 36. The post-nominal pointing IX$_x$ (left) and AUX (right).

Additionally, IX$_x$ and AUX are in complementary distribution. When you have only the object topicalized, IX$_x$ must occur. When both the subject and the object are moved to a topic position AUX must occur. This distribution is given in (148):

(148) a. <JOHN **IX**$_b$>$_{top}$ MARY HELP$_b$ ALREADY.

b. <MARY$_a$>$_{top}$ <JOHN$_b$>$_{top}$ <$_a$**AUX**$_b$>$_{top}$ HELP$_b$ ALREADY.

c. *<MARY$_a$ IX$_a$>$_{top}$ <JOHN$_b$ IX$_b$>$_{top}$ HELP$_b$ ALREADY.

d. *<JOHN $_a$AUX$_b$>$_{top}$ MARY HELP$_b$ ALREADY.

e. *<MARY$_a$ IX$_a$>$_{top}$ <JOHN$_b$ IX$_b$>$_{top}$ <$_a$AUX$_b$> HELP$_b$ ALREADY.

Therefore, I have proposed that the post-nominal pointing and AUX are actually the same syntactic category: both elements are topic markers. Based on this assumption, AUX should be glossed as $_x$IX$_y$. This transcription transparently shows that this element is an indexical and that it is marked for two different location specifications.

Analyzing $_x$IX$_y$ as a topic marker also explains the change of the word order. Thus, the SO$_x$IX$_y$V order is the result of the fronting of the subject and the object to a topic position, and these arguments are followed by the topic marker. The verb stays in a lower position in the tree. But where does the topic marker sit?

Following Miyagawa (2010), Lourenço (2014b) claims that the topic features are generated in CP. Therefore, C could be the site of the topic markers. However, the fact that $_x$IX$_y$ can occur in a Wh-construction (149) indicates that this topic position is an intermediary position between CP and TP (150).

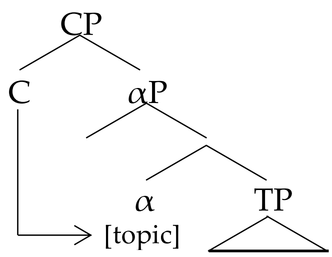
(149) $\overline{\text{(WHAT) } pro_a \; pro_b \; {}_a\text{IX}_b \text{ GIVE}_b \text{ WHAT?}}^{\text{interrogative}}$

(WHAT) *pro*$_a$ *pro*$_b$ $_a$IX$_b$ GIVE$_b$ WHAT?
'*What* pro$_a$ *gave to* pro$_b$*?'*

(150) [$_{CP}$ (WHAT) +Q [$_{?P}$ *pro*$_a$ *pro*$_b$ $_a$IX$_b$ [$_{IP}$ [$_{vP}$ t$_a$ [$_{VP}$ GIVE$_b$ WHAT]]]]]

Still following Miyagawa (2010), I have called this intermediary position that receives the topic features from C αP:

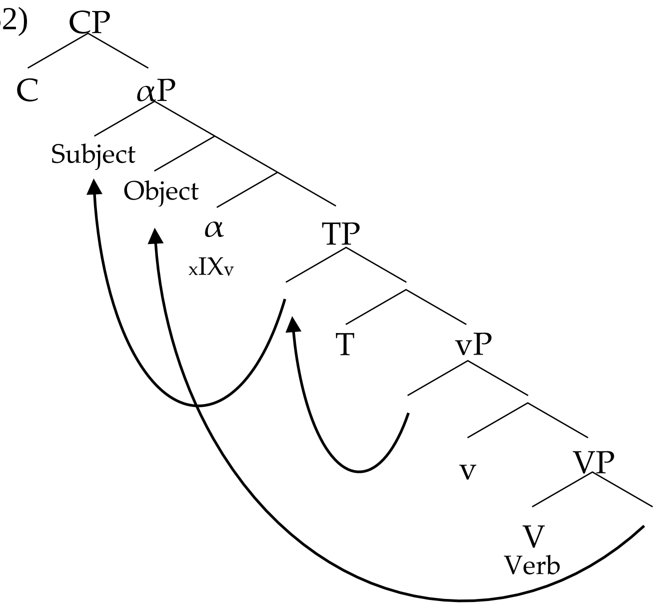
(151)



After the topic features are inherited by α, both the subject and the object are moved into the αP projection as specifiers. The fact that both arguments are moved into the same projection explains why you cannot have two topic markers in the sentence, as already shown in (148). The complete syntactic derivation of a topic marker construction is provided in (152)[61]:

[61] Before moving to Spec,αP, the subject of an agreement verb will move to Spec,TP to check EPP. The verb, in Libras, stays in situ (Quadros, 1999; Lourenço, 2014b).

(152)



Once the topic marker $_{x}IX_{y}$ is the realization of topic features, it is easy to explain why its path is always from the subject to the object, even when the sentence has a backward agreement verb. Verb agreement, as I have consistently claimed in this dissertation, is triggered by the [location] probes in the structure. On the other hand, topic markers are the spell-out of topic features on the head of αP, so there is no direct relation between verb agreement and the topic marker[62].

[62] A very interesting alternative analysis is to assume that the topic marker $_{x}IX_{y}$ is [+verbal], in such a way that it has its own agree(ment) relations with the raised arguments. This would result in a biclausal analysis of this type of construction in Libras.

5.8 Summary and some topics for future work

Throughout the different syntactic analyses provided in this Chapter, I have offered a minimal derivation of agreement in Libras, assuming:

i. a minimalist syntactic spine (C-T-*v*-V);

ii. the minimal operations MERGE and AGREE;

iii. the feature [location] and the distinction between valued versus unvalued feature.

In a nutshell, the proposal is that agreement verbs enter in the derivation with an unvalued [location:___] feature and they receive their value by agreeing with different arguments, during the syntactic computation. The difference between double and single agreement verbs rests in how many unvalued [location:___] features the verb has in its lexical specification.

On the other hand, non-agreeing verbs, which are body-anchored verbs, have a valued [location:*val*] feature as part of their lexical entry. The presence of a lexically specified value blocks verb agreement and also impacts on the syntactic derivations.

The reader might be wondering at this point how this model works for other constructions that I have not analyzed here: spatial verbs, single agreement verbs, and neutral agreement constructions.

Spatial verbs are tricky because they rely on the very debatable distinction between arguments and adjuncts. For instance, see the following example:

(153) JOHN$_a$ $_a$ARRIVE$_b$ HOUSE$_b$.
'John arrived at home.'

If the DP house is analyzed as a true argument of the verb ARRIVE, then this verb behaves exactly as a regular double agreement verb. If HOUSE is treated as a locative adjunct, then a different syntactic derivation must be outlined. I clearly would advocate in favor of the first analysis,[63] but because of time considerations (dissertations have deadlines!), I leave this topic open for future investigations.

[63] This is similar to the position that Kimmelman adopts for RSL: "spatial arguments of verbs of movement or location (location, goal, and source) are considered arguments" (Kimmelman, 2018, p. 5 of 39).

Finally, I had to skip the discussion on single agreement verbs (154) and neutral agreement constructions (155), because the grammaticality judgements were not consistent among the Deaf consultants. It was hard to reach a certain level of consensus on their syntactic behavior, specially on word order and distribution of negation. Therefore, a more experimental approach needs to be adopted in order to obtain clearer results.

(154) MARY$_a$ ABANDON$_b$ CHILD$_b$

(155) IX$_1$ HELP$_{neutral}$ MOTHER NO.

My tentative analysis based on the data I have would consist of claiming that single agreement verbs behave similarly to double agreement verbs in terms of object agreement (takes [location] values from its object, allows for object shift, etc.) and also similar to non-agreeing verbs when it comes to the subject (no [location] sharing with the subject and no EPP movement).

In the case of neutral agreement, it seems to behave exactly like regular agreement, showing the same syntactic structure and agreeing operation. Therefore, I would claim that in neutral agreement constructions, all the agree operations take place and the arguments bear valued [location:*val*] features. The difference would be the value of the feature itself: the *val* is 'neutral'. However, as pointed out by Pesetsky & Torrego (2007), syntactic computation is blind to the actual value of a given feature. Syntax only deals with the value vs. unvalued distinction. The actual content of the value is relevant only when sent to the interfaces.

Again, because I could not get clear judgments on these two constructions, I also have to leave them open for future work.

Chapter 6:

Event properties and the layering of visual information in the verb structure

In Chapter 4, I have argued that co-localization is the true agreement marker in Libras and that path feature specifications are not related to agreement, but, instead, to the event properties of the verb. This disentanglement is based on the claim that path features conveys some semantic notions, such as the temporal unfolding of the event, and is related to some aspectual properties, such as activities, achievements, and accomplishments (Wilbur, 2003b, 2008, 2009, 2010b, 2010a).

In order to sustain my claim that path/movement is not agreement, this chapter aims at presenting a preliminary analysis of telicity in Libras verbs, based on the Event Visibility Hypothesis and to discuss the layering of visual information in the verb internal structure.

6.1 The Event Visibility Hypothesis

Event structure can be understood as the (semantic) properties of events that are relevant for their linguistic representation (Rappaport-Hovav, Doron, & Sichel, 2010, p. 2).[64] The most salient property, and the one that has received the most attention, is the various temporal dimensions involved in events. For instance, the internal temporal properties of an event have been discussed in terms of features such as eventivity, durativity, and telicity (Dowty, 1979; Vendler, 1957, 1967).

Telicity, the feature important for our discussion,

[64] "Originally, this term [event structure] referred only to one type of approach to the meaning of the VP, related to the seminal work of Davidson (1967). Approaches of this type all involve semantic decomposition of eventualities, in particular with respect to the roles that different participants may have in it, and represent the eventuality itself as yet another argument of the VP predicate" (Arsenijević, 2006, p. 2).

> involves associating an endpoint, or TELOS, to an event. Some verbs lexically entail a telos for the event they describe. Yet endpoints to events can be derived through an interaction between the referential properties of certain kinds of arguments and the lexical semantics of the verb. […] Telicity can also be introduced by elements not selected by the verb, including result phrases and cognate objects. (Rappaport-Hovav et al., 2010, pp. 2–3).

This main distinction between telic and atelic events[65] is illustrated in the following examples (Vendler, 1957):

(156)	John runs.	(atelic)
(157)	John builds a house.	(telic)
(158)	John died.	(telic)

Notice that the predicate in (156) is not associated to any endpoint. This type of sentence is atelic and is usually claimed to

[65] The focus here relies only on "events". Therefore, states (e.g. *John loves Mary*) will not be considered in this discussion. In Vendler's words, states "cannot be qualified as actions at all" and "involve time instants in an indefinite and nonunique sense" (Vendler, 1967 [1957], p. 24-25).

denote a *process* (Dowty, 1979; Vendler, 1957). On the other hand, (157) and (158) are telic events, once they are associated to a logical endpoint – they culminate in a change. The difference between them rests in the fact that the change in (157) is gradual, whereas in (158) is considered to be instantaneous. According to Vendler (1957, 1967), these verbs belong to different aspectual classes, to wit: *activities* (156), *accomplishments* (157) and *achievements* (158).

In Pustejovsky's model (1991, 1995, 2000), three basic event types are distinguished: States, Processes (*activities*) and Transitions (*achievements* and *accomplishments*). The difference between states and processes is a matter of dynamicity. (S)tates are static, while (P)rocesses are dynamic. Transitions, on the other hand, are the combination of those subevents, in such a way that achievements are composed by an initial state and a final state ($\neg S \rightarrow S$) and accomplishments are composed by an initial process that results in a final state ($P \rightarrow S$).[66,67] Once transitions (both accomplishments and achievements) contain a final state, they are telic events.

[66] Pustejovsky argues that a transition is "an event identifying a semantic expression, which is evaluated relative to its opposition" (Pustejovsky, 1991, p. 56). In other words, there is a "transition from one state to its opposition" (p. 57).

[67] Still on the distinction between accomplishments and achievements: "when a verb makes reference both to a predicate opposition and the activity bringing about this change, then the resulting aspectual type is an accomplishment. When the verb

As Rappaport Hovav, Doron & Sichel (2010, p. 3) point out, "languages differ in terms of how telicity is lexically encoded, and in the morphosyntactic means available for constructing telicity". However, sign languages seem to exhibit a similar type of "mapping of semantic components and phonological forms [that] represents a systematic recruitment of characteristics of the physical world for conceptual, hence morphological, semantic, and syntactic purposes"(Wilbur, 2008, p. 218).[68] Rooted in this semantics-phonology interface is the Event Visibility Hypothesis (Wilbur, 2008, p. 229):

(159) *Event Visibility Hypothesis (EVH)*:
In the predicate system, the semantics of event structure is visible in the phonological form of the predicate sign.

The main idea of the EVH is that some semantic primitives are morphologically encoded in sign languages, in such a way that there are specific morphemes that reflect properties of the event structure of

makes no explicit reference to the activity being performed, the resulting aspectual type is an achievement" (Pustejovsky, 1991, p. 59).

[68] Wilbur actually argues that this semantics-phonology interface is universal across sign languages.

the predicate. More specifically, Wilbur proposes six different morphemes:

Table 9. Morphemes proposed in the EVH.
Adapted from (Wilbur, 2008, p. 220).

Morpheme	Function	Phonological form
EndState	Marker of telic events	Rapid deceleration to a stop
InitialState	Marker of initial state	Rapid acceleration from a stop
Extent	Duration of events	Path, [tracing]
Path	Distance of spatial events	Path, [tracing]
Extra	Adverbial modifier	[arc]
USET[69]	Adverbial temporal modifier	Trilled movement [TM]

A first observation that has to be made is that these morphemes are combined in the Prosodic Feature structure of the verb, considering Brentari's Prosodic Model (1998):

[69] Unchanging State in Elapsing Time.

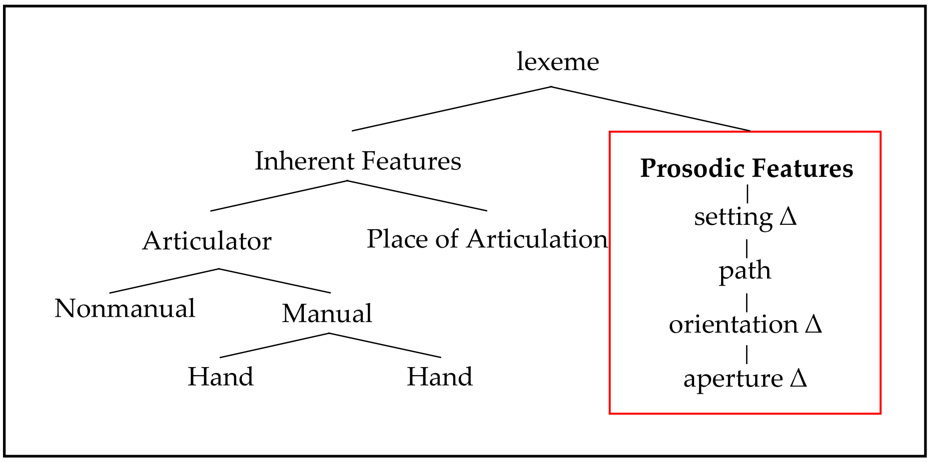


Figure 37. The Prosodic Feature structure. (Brentari, 1998, p. 94, adapted).

This fact alone contributes to my claim that the Prosodic Features of the verb, that is the movement of the sign, is related to the event properties of the predicate and not to agreement. Although the type of path feature of the verb does not mark agreement, it will impact on how many agreement slots a given verb has, as argued in Section 4.5. I will go back to this point in Section 6.4.

In order to test the EVH in Libras, I elected the morpheme {EndState}, which is a marker of telic events. My goal here is not to provide a full picture of event structure in Libras. Instead, I just want to offer additional evidence in favor of the disentanglement of the functions of location and movement in the verb structure.

Wilbur defines {EndState} as a rapid deceleration of the movement to a stop. There are four types of phonological movements that can be combined with {EndState}: handshape change, orientation change and setting change. The path feature [direction][70] can also combine with {EndState}.

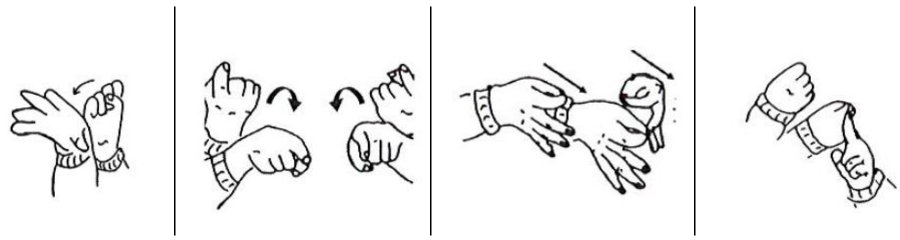


Figure 38. ASL signs denoting telic events: SEND (handshape change), HAPPEN (orientation change), POSTPONE (setting change) and HIT ([direction >|]). From Wilbur (2008, p. 232).

All the verbs above are marked with a rapid deceleration. Once the {EndState} morpheme indicates a geometric point in space, this point can be associated to a point already assigned to an argument, by

[70] "[direction]: a phonologically specified straight path executed at a 90º angle to (notated [>|]) or from (notated [|>]) a point in a plane of articulation, either from such a point or to such a point" Brentari (1998, p. 136).

localization. This association is exactly the process of co-localization presented in Chapter 4.

On the other hand, verbs that do not contain {EndState} denote atelic events and usually have the path feature [tracing]:[71]

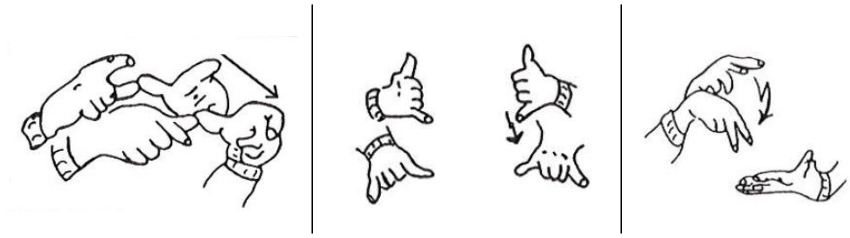


Figure 39. ASL signs denoting atelic events: RUN, PLAY and READ. From Wilbur (2008, p. 232).

In sum, the EVH postulates a quite robust mapping of semantic properties onto the morphophonology of the predicate sign, by assuming the existence of a set of morphemes that explicitly convey event related meanings. Additionally, an interesting prediction of this hypothesis is that this semantic mapping is possibly universal across different sign languages. Based on this universality claim, we tested one of the proposed morphemes ({EndState}) in Libras.

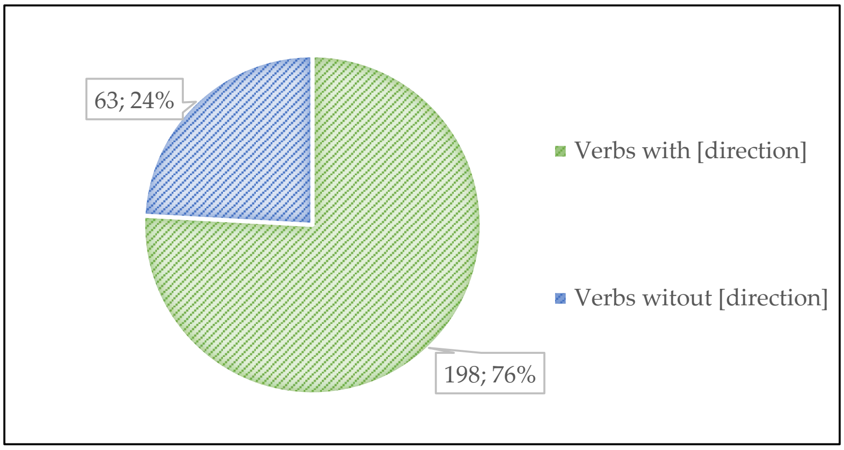
[71] "[tracing]: a line with an arc, straight, or circle shape articulated with respect to a single point within a plane" Brentari (1998, p. 136).

6.2 The marking of telicity in Libras

In order to test the presence of EndState as a telic marker in Libras, we identified 260 telic verbs from our 583 verbs. Verbs were classified in terms of their event properties (states, processes or transitions) and their path feature specifications ([direction] vs. [tracing]) and if they have change (handshape, orientation and setting).

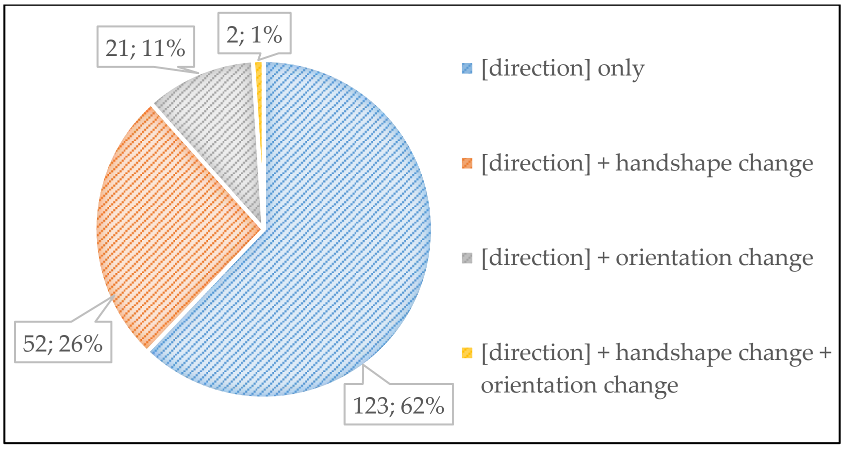
This analysis brings interesting observations about the different types of movement that can be combined with the morpheme {EndState}. The first one is that {EndState} is most productively combined with [direction] – 198 of the 260 telic verbs had [direction]. For the full list of verbs, see *Appendix 5*.

Graphic 6. Telic verbs with and without [direction].



However, in many cases, [direction] co-occurs with other types of movement, such as handshape change and/or orientation change (see ***Graphic 7*** and ***Figure 40***).

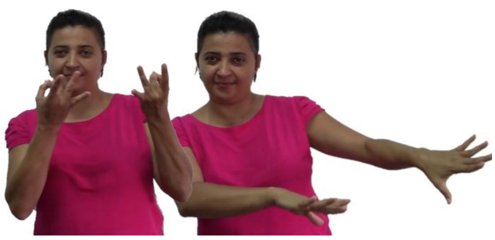
Graphic 7. Telic verbs with [direction] combined with other types of movement.



GIVE
[direction] only

OFFEND
[direction] + handshape change

SEND-EMAIL
[direction] + orientation change

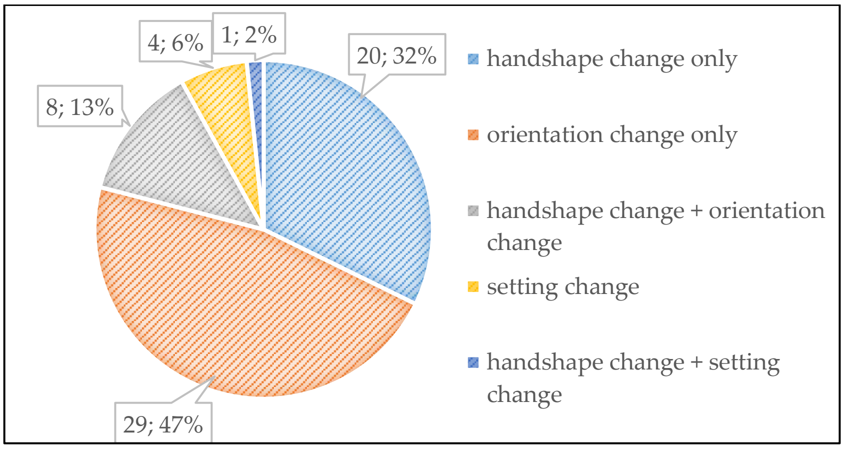


REJECT
[direction] + handshape change + orientation change

Figure 40. Telic verbs with [direction] combined with other types of movement.

All the remaining verbs that do not show [direction] do have one of the other proposed types of movement. Some of them only have a handshape change; others have only orientation change; a few have the combination of orientation and handshape change; 4 verbs in our data have setting change; and only 1 verb has both handshape and setting change (see ***Graphic 8*** and ***Figure 41***).

Graphic 8. Telic verbs without [direction].



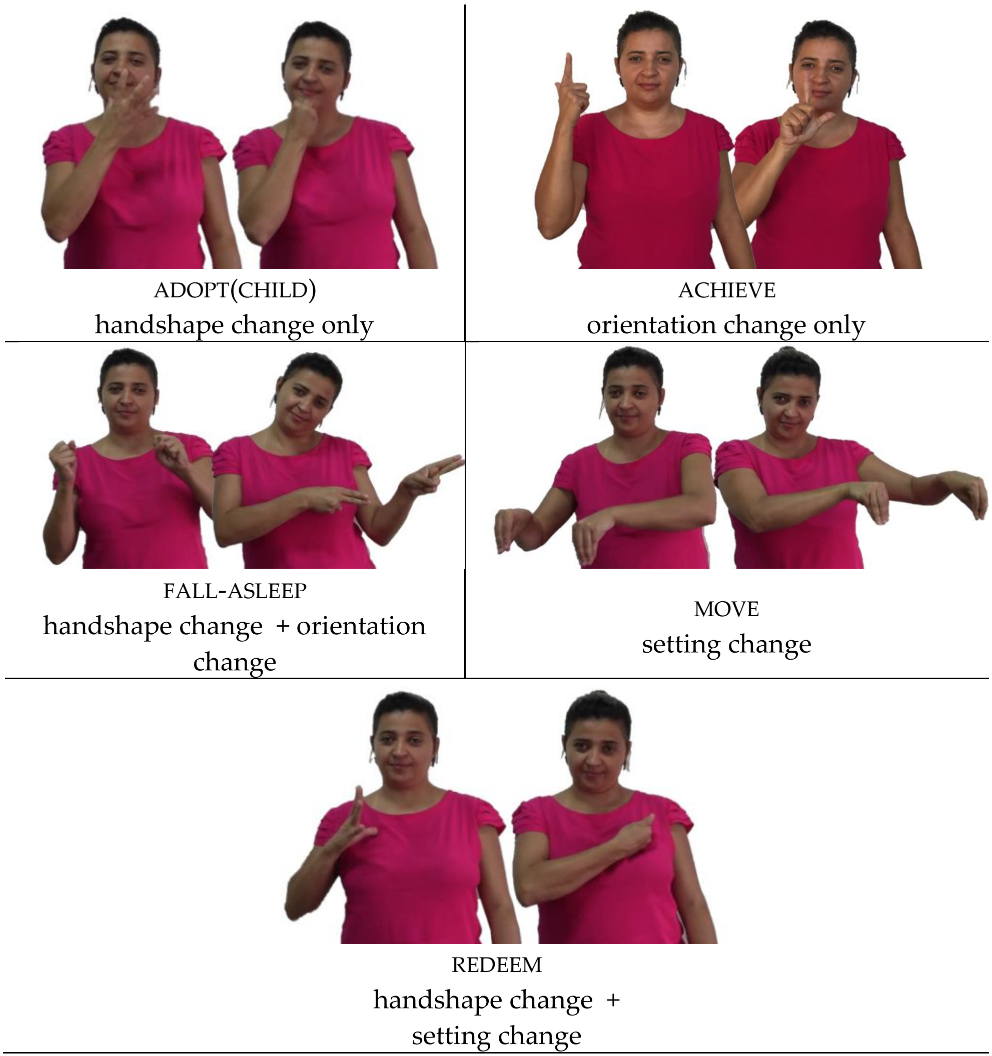


Figure 41. Telic verbs without [direction].

The results indicate that {EndState} really is a marker of telicity in Libras and that it does combine with the types of movement predicted by Wilbur (2008). This is the first time EVH is tested in

Libras, and we only worked with one of the proposed morphemes. However, the data is pretty consistent, reinforcing the claim that the semantics-phonology mapping is very similar across sign languages (Wilbur, 2008, 2010b).

6.3 Testing the EVH with nonsigners

By postulating that some semantic notions are actually visible in the (morpho)phonological structure of the predicate in sign languages, an interesting research question is posed: is this visibility only available to signers or can it also be perceived by nonsigners?

Strickland et al. argue that "sign languages encode telicity in a seemingly universal way and moreover that even nonsigners lacking any prior experience with sign language understand these encodings" (Strickland et al., 2015, p. 1 of 6). They ran a set of experiments that showed that nonsigners can correctly discriminate telic from atelic signs. They used data from LIS, NGT, TİD and even some pseudosigns. In all of the six experiments, hearing nonsigners provided more telic responses for telic signs than for atelic ones. These results indicate that {EndState} serves as a salient gestural boundary, salient enough that the participants "were sensitive to these properties of the stimuli in intuiting whether a given sign was telic or atelic" (Strickland et al., 2015, p. 4 of 6). In order to test if the results found by Strickland et al. (2015) also hold for Libras verbs, we decided to replicate experiments 1, 2 and 3 of their study.

In Experiment 1, a deaf signer produced 18 verbs in Libras. 9 of these verbs were telic (with {EndState}) and 9 were atelic (no {EndState} and with [tracing] or [repeat]). Additionally, these verbs came from three different conceptual domains: psych verbs, physical events, and social exchanges (see ***Table 10*** and ***Appendix 6***).

Table 10. Stimuli for Experiment 1-3.

Conceptual domain	Telic	Atelic
Psych verbs	*DECIDE*	*REMEMBER*
	TRAUMATIZE	*DREAM*
	FORGET	*PONDER*
Physical events	*ARRIVE*	*WORK*
	LEAVE	*PLAY*
	SUBSTITUTE	*STUDY*
Social exchanges	*SELL*	*TALK*
	BUY	*INTERACT*
	COMMAND	*DISCUSS*

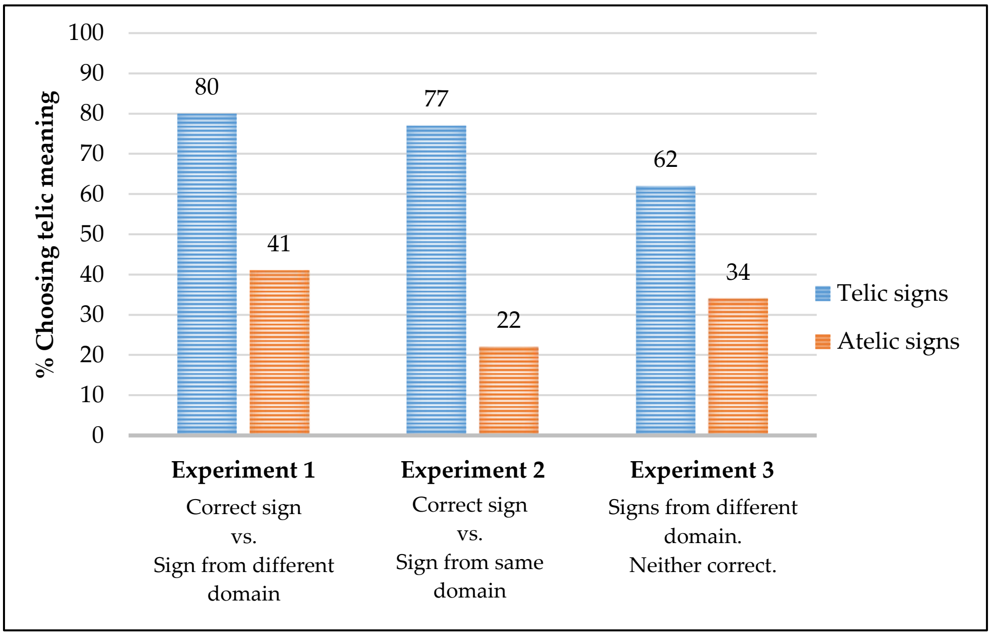
12 hearing nonsigner participants[72] watched these signs presented randomly on a Google Docs form. Each participant watched the 18 signs as many times as they wanted and were asked to choose the correct meaning of the sign among two possible choices. One of the choices was the correct meaning of the sign and the other one had a different telicity and was from a different conceptual domain. For example, when the participants watched the sign BUY (telic), they had to choose between the Portuguese words for "BUY" (right choice, telic) and "DREAM" (atelic and from a different domain).

Given that the main goal of this study is to investigate if {EndState} is salient enough to be perceived by nonsigners, the most relevant data is not if they chose the right meaning for the sign. Instead, it is more relevant to see if the participants chose the telic word in Portuguese only for telic signs. Coincidently, in Experiment 1, the telic word is the correct meaning of the telic verbs.

A Wilcoxon Signed-Rank Test[73] showed that participants provided more telic responses for telic verbs than for atelic ones (80% vs. 41%, significant at $p \leq 0.01$). Results are given in ***Graphic 9***.

[72] The participants reported to have no knowledge of any sign language and no connection with deaf people.
[73] We used the same non-parametric statistical hypothesis test used by Strickland et al. (2015).

Graphic 9. Amount of telic choices for each verb condition.



As Strickland et al. (2015) points out, it is already surprising how successful nonsigners are in a task of picking the correct meaning of unfamiliar signs. However, this could be an effect of the conceptual domain, instead of the presence (or absence) of telicity. This brings us to Experiment 2.

In Experiment 2, the same set of stimuli was used and the same experimental design was adopted. Each participant (a new set of participants, *n*=12) watched the 18 signs as many times as they wanted and were asked to choose the correct meaning of the sign between two possible choices. One of the choices was still the correct meaning of the sign, and the other one had a different telicity but this time it was from the same conceptual domain. For example, when the participants watched the sign ARRIVE (telic), they had to choose between the Portuguese words for "ARRIVE" (right choice, telic) and "PLAY" (atelic, same conceptual domain).

Again, the Wilcoxon Signed-Rank Test showed that participants provided more telic responses for telic verbs than for atelic ones (77% vs. 22%, significant at $p \leq 0.01$) (***Graphic 9***).

However, "it is still possible that, given the fact that one of the meaning choices was actually correct, some form of imitation relating the meaning to the sign guided participants toward the correct meaning" (Strickland et al., 2015, p. 3 of 6). Experiment 3 was designed to get rid of this problem.

In Experiment 3 a new set of participants (*n*=12) watched the same set of stimuli, in the very same experimental design from Experiments 1 and 2. This time, none of the choices was the correct meaning of the sign. Despite both choices being from the same conceptual domain, this domain was different from the correct meaning of the sign. Additionally, one choice was telic and one was atelic. For example, when the participants watched the sign COMMAND (telic), they had to choose between the Portuguese words for "FORGET" (telic, matching for telicity) and "PONDER" (atelic, non-matching for telicity).

Yet again, the Wilcoxon Signed-Rank Test showed that participants provided more telic responses for telic verbs than for atelic ones (62% vs. 34%, significant at $p \leq 0.01$) (***Graphic 9***).[74]

Experiments 1, 2 and 3 confirm the following hypotheses: i) there is a clear mapping between meaning (semantics, telicity) and form (morphophonology, {EndState}); and ii) this mapping is salient enough to be perceived by nonsigners. Furthermore, we could successfully replicate the findings by Strickland et al. (2015).

Finally, this study also adds to my claim that the Prosodic Feature specifications of a given verb conveys some certain semantic meanings (e.g. event properties), instead of marking agreement in sign languages.

[74] In Strickland et al.'s study, the results of Experiment 3 were just marginally significant ($p=0.058$). Our results, on the other hand, were still significant at $p \leq 0.01$.

6.4 The interaction between the Prosodic Features and agreement

Despite the claim that path specifications are not agreement markers, there is an interesting relation between the Prosodic Features and agreement in Libras. If we consider that Prosodic Features are a combination of geometric points and lines[75] (see Wilbur, 2008, 2009, 2010b, 2013) and that agreement is the sharing of a point between elements (co-localization), there is a clear connection between the Prosodic Features of a given verb and its ability to carry agreement.

For instance, if {EndState} is defined as a rapid deceleration of the movement to a stop, this stop is actually a point (*p*). This point can, a priori, be co-indexed with a point already mapped onto an individual ($p \rightarrow x$). If the point of a given timing-unit is successfully co-indexed with an antecedent point, the result is co-localization, hence agreement. However, if this point is lexically mapped onto a specific location (e.g. on a body part, body-anchoring), co-localization is not allowed. Again, we have a phonological constraint blocking co-localization, as argued in Section 4.4.

[75] Points, lines and planes. However, planes are not relevant for the discussion presented here.

Notice that what predicts agreement is not the presence of a specific type of path feature, but the lexical value of the *point*. A verb can have [direction] and be a single agreement verb or even a non-agreeing verb. On the other hand, a verb can have no [direction] at all, and still show agreement. It all depends on if the *point* is lexically given (e.g. body-anchoring) or not.

Although the Prosodic Features (movement) do not mark agreement, they will predict how many *points* will be available in the verb structure. If these points are unvalued (not lexically specified), then they are available for agreement (see Table 10). So the relation is:

path features → # of points → if *p* is unvalued → agreement (co-localization)

Table 11. Prosodic Features and agreement.

Schematic representation of PF	Prosodic Feature specification	agreement slots (unvalued *p*)	Type of agreement	Example
body-----------p_x	[direction >|]	1	Single regular	•COMMAND$_x$
p_x-----------body	[|>direction]	1	Single backward	$_x$ASSIMILTE•
p_x-----------p_y	[|>direction>|]	2	Double (backward or regular)	$_x$HELP$_y$ $_y$INVITE$_x$
	setting change	2	Double regular	$_x$MOVE$_y$
body-----------body	[|>direction>|]	0	No agreement	•RECOGNIZE-SELF•
(-----------)p_x	[tracing]	1	Single	WORK$_x$
	handshape change	1	Single	SUBTRACT$_x$
	orientation change	1	Single	TRANSLATE$_x$
(-----------)$_{body}$	[tracing]	0	No agreement	LIKE•
	handshape change	0	No agreement	ADOPT(CHILD)•
	orientation change	0	No agreement	CHANGE-MIND•

Figure 42. Signs from Table 11.

In this Dissertation, I have argued that agreement in Libras, and possibly in other sign languages as well, is not marked by the path movement of the verb, as has currently been described in the literature. Instead, a verb shows agreement with its argument(s) when the location of the verb is changed in order to match the location of the argument(s), the process I called co-localization. Additionally, I have benefitted from the Event Visibility Hypothesis to identify what type of morphological function the path movement has in the verb structure. Path movement and the whole Prosodic Feature Structure are associated to event properties of the predicate.

Extricating location and movement leads to a more fine grained specialization of the verb structure and the different morphological processes. In the following section, I want to pursue this line of reasoning even further, claiming that there is a layering of visual information within the verb internal structure, in such a way that each node of the phonological specification of the verb will be the target of a specific morphological operation.

6.5 Layering of visual information within the verb structure

Before discussing the internal structure of the verb and the morphological operations, let me present a definition of layering:

> Layering is the linguistic organizational mechanism by which multiple pieces of information can be sent simultaneously; it requires that the articulation of each piece cannot interfere with the others. Thus, layering is a conspiracy of form (articulation) and meaning to allow more than one linguistically meaningful unit of information (morpheme) to be efficiently transferred simultaneously (Wilbur, 2003a, p. 334).

First of all, it is important to mention that both simultaneity and layering of information are not design features found exclusively in signed languages. Spoken languages also has simultaneous transmission of linguistic information. "Some examples are simultaneous pitch patterns for intonation; lexical tone; ablauts (e.g., German plural); vowel harmony (Turkish, Finnish); and nasalization over large domains". When it comes to layering, one example found in spoken languages "is the use of tone in tone languages, wherein consonantal and vocalic segments are sequentially articulated while tone contours are simultaneously produced with them" (Wilbur, 2003a, pp. 333–334).

Despite the fact that spoken and sign languages equally display simultaneous and also linear organization mechanisms, spoken languages rely heavily on sequentiality and linearity. On the other hand, "signed languages display a marked preference for co-occurring layered (as opposed to linear) organization" (Wilbur, Klima, & Bellugi, 1983, p. 314).

In sign languages, layering is found in both manual and nonmanual components. In terms of manual layering, the classical examples come from the fact that sign languages largely exploit the possibility of using two hands independently and, therefore, different pieces of information can be transmitted by each hand (Battison, 1978). Layering is also found in classifiers constructions and even verb agreement has been claimed to be a kind of layering in sign languages (Wilbur 2003a, pp. 334-336).

Layering is also a design feature of the non-manual marking systems attested in sign languages. The most basic layering of non-manual information is seen when you have the separation of grammatical and affective non-manual expressions (Wilbur, 2000).

Moreover, grammatical non-manual markings are usually coordinated with syntactic constituents, e.g. the spreading of the negative headshake (Veinberg & Wilbur, 1990) or are limited to a specific phrase when providing adjectival or adverbial information (Liddell, 1978, 1980). An illustration of layering in sign languages is give in *Figure 43.*

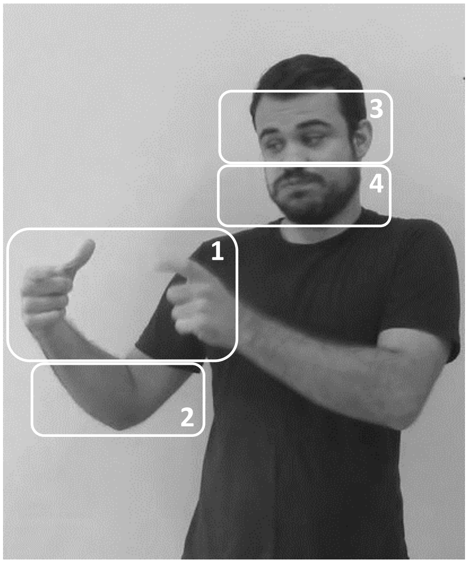


Figure 43. Layering of four main sources of visual information. (1) Manual information; (2) Spatial information; (3) Upper-face marking; (4) Lower-face marking.

The idea here is to expand the concept of layering to the verb structure and, therefore, to the verbal morphology. Instead of assuming that morphological operations can change the whole structure of the verb, we claim that there a is layering of visual information in the verb structure:

(160) *Layering of visual information in the verb structure*:
Different morphological operations will target specific nodes of the phonological structure of the verb.

Assuming this internal layering of the verbal complex, at least five different types of morphological process can be identified, each one associated to a specific node of the phonological structure, as shown in ***Figure 44***:

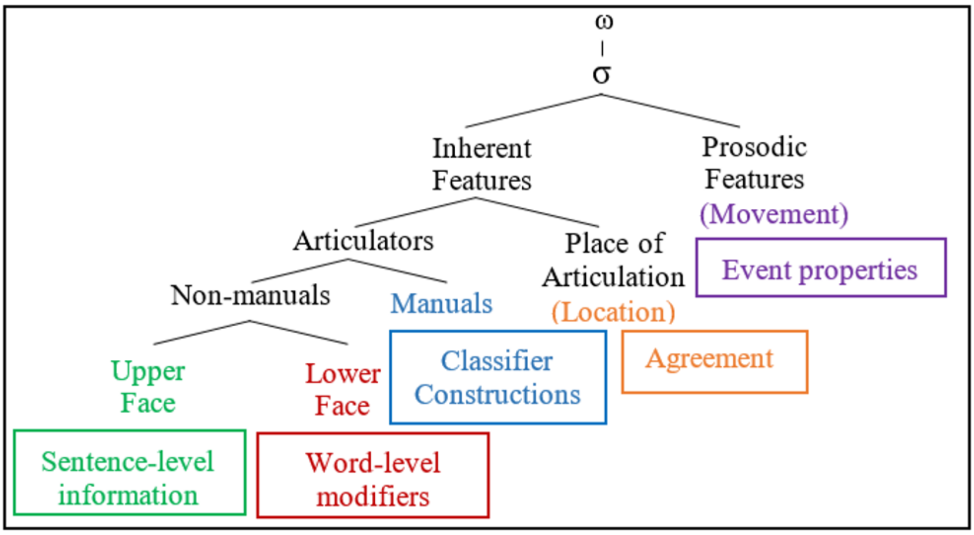


Figure 44. Layering of visual information in the internal structure of the verb.

6.5.1 Articulators: Non-manuals

Starting with the non-manual domain, there is an interesting specialization of upper and lower-face. Lower-face articulators (cheeks, mouth and chin) usually are related to word-level modification, adverbial in the case of verbs (Liddell, 1978, 1980; Wilbur, 2003a); and upper-face articulators (forehead, eyes and brows) are associated with specific syntactic structures (Aarons, 1994; Bahan, 1996; Baker-Shenk, 1983; Liddell, 1986; Wilbur, 1994, 1995 inter alia).[76]

In Libras, this specialization of upper and lower face seems to be true, as well. One example of non-manual marker on the upper face is eyebrow-raising (er). Eyebrow-raising occurs in different syntactic structures, such as topicalization, polar questions, relative clauses and conditionals (Figueiredo & Lourenço, *submitted*; Lourenço, 2018; Quadros, 1999; Quadros & Karnopp, 2004). Additionally, the eyebrow-raising marker spreads over a specific syntactic domain. An example of conditional in Libras is given in (161) and in ***Figure* 45**. Notice that the nonmanual marker spreads over the whole condition, but not over the 'result' clause.

(161) $\overline{\text{IF IX}_1\ \text{<TAKE-ON-BACK>}}^{er}$ IX2 WILL STING1.
'If I take you on my back, you will sting me.'

[76] For a very promising syntactic analysis that proposes some sort of layered mapping of the left periphery onto different parts of the face and the body of the signer, within a cartographic framework, see Bross & Hole (2017).

Figure 45. Conditional with eyebrow-raising in Libras.

On the other hand, the lower face markers function as word-level modifiers; in the case of verbs, adverb-like modifiers. Although there is no such detailed descriptions of lower-face marking in Libras, as there is for ASL (C. Baker & Cokely, 1980; Davies, 1985; Liddell, 1978, 1980; Valli & Lucas, 1992), one example of verb modification by the lower face is the intensity marker by puffed cheeks plus blowing with the mouth (Araujo, 2013; Felipe, 2013; Pêgo, 2013; Xavier, 2017). An example of the verb TAKE-LONG is provided in ***Figure 46***.

Figure 46. Verb TAKE-LONG intensified.
Source: <https://www.youtube.com/watch?v=d_HepT8fZQY>

6.5.2 Articulators: Manual

The manual node consists of the inherent handshape features of the dominant hand and the non-dominant hand (H1 and H2, respectively). Modifications of the manual tier constitute the core morphological process that creates classifier constructions. Classifiers "are morphemes that appear in morphologically complex verbal forms, which are formed of a verbal root (represented by the movement of the sign) and the classifier itself (the handshape)" (Benedicto & Brentari, 2004, p. 748).[77] If we take this definition of classifier, we can already see that classifier constructions are the result of a morphological process that changes the Manual features of the verb structure.[78] Indeed, this is exactly what Benedicto & Brentari claim (Benedicto & Brentari, 2004, sec. 6). They even propose a morphological template for each type of classifier, as shown in ***Figure 47***.

[77] Different proposals have been suggested that identify different handshapes associated to specific types of classifiers (Engberg-Pedersen, 1993; Supalla, 1982, 1986). There is even a correlation between handshape type and argument structure in classifier constructions (Benedicto & Brentari, 2004).

[78] It is important to notice that the difference between a classifier verb and a non-classifier verb is not actually the content, the type or the hierarchy of the features under the Manual node. The difference relies on the fact that in classifier constructions the handshape is actually morphological, whereas in non-classifier verbs it is just phonological in nature (Benedicto & Brentari, 2004, p. 789).

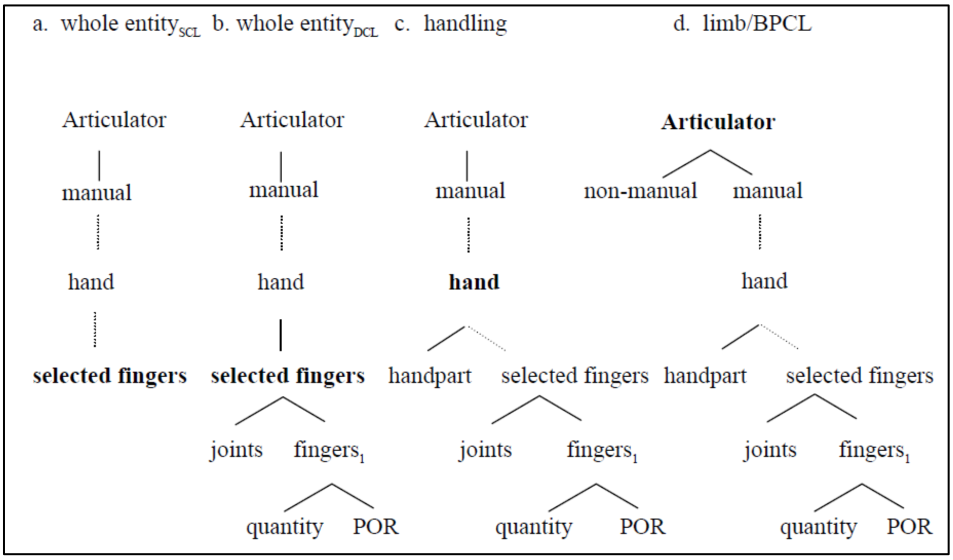


Figure 47. Morphological template for different types of classifiers (Benedicto & Brentari, 2004, p. 790).

Studies on Libras classifiers also attest specific handshapes associated to classifier constructions (Bernardino, 2012; Felipe, 2002; Ferreira-Brito, 1995). Examples of classifiers (<LINE-OF-PEOPLE-WALKING>cl and <CUT-WITH-SCISSORS>cl) are provided in ***Figure 48***.

Figure 48. On the left, <LINE-OF-PEOPLE-WALKING>cl and, on the right, <CUT-WITH-SCISSORS>cl. Images extracted from Bernardino (2012, p. 266) and Ferreira & Naves (2014, p. 380), respectively.

6.5.3 Place of Articulation and Prosodic Features

I have argued in favor of disentangling the functions of location and movement in the verb structure. Place of Articulation (Location) specifications in the verb can mark agreement in Libras. The main claim is that location matching is the true agreement marker in the language, and possibly in other sign languages, as well (see Chapter 4). Movement modifications are associated to the event structure of the predicate, such as aspectual information (Wilbur, 2003b, 2008, 2009, 2010b, 2010a).

Considering all the argumentation built in Chapter 4 and in the previous sections of this chapter, I will not revisit that discussion here. However, I want to provide one more interesting piece of evidence in favor of the location-as-agreement analysis, by looking at innovative agreement forms found in Libras. I will analyze two examples here: the new agreement form of the verb EXPLAIN and the change of location of some dicendi verbs (verbs of utterance).

The verb EXPLAIN is traditionally analyzed as a plain (non-agreeing) verb, assuming the traditional classification. However I showed that this verb can indeed show agreement by co-localization (***Figure 49***). However, this verb can only agree with one agreement slot. So, in a transitive sentence, it will agree with the location of the syntactic object (162).

(162) IX_1 EXPLAIN_b IX_b ALREADY.
‘I already explained (something) to her”.

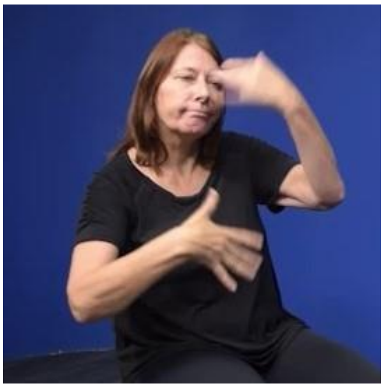


Figure 49. The verb EXPLAIN co-localized, extracted from the Libras Corpus (Quadros et al., n.d.).

However, this verb seems to be changing its agreement pattern. It seems to be grammaticalizing a second agreement slot (*Figure 51*). Additionally, it can only show this new agreement configuration with a first person object (163).

Figure 50. The verb $_{a}$EXPLAIN$_{1}$ in Libras, extracted from the Libras Corpus (Quadros et al., n.d.).

(163) a. IX$_2$ $_2$EXPLAIN$_1$

b. *IX$_1$ $_1$EXPLAIN$_2$

c. IX$_a$ $_a$EXPLAIN$_1$

d. *IX$_1$ $_1$EXPLAIN$_a$

e. *IX$_a$ $_a$EXPLAIN$_b$

Interesting enough, the verb still has a straight line movement, but it is changing the identity requirement of its Point of Articulation specifications in the two timing-units. Instead of having the same location specification for the x-slots, the verb now is showing the possibility of agreeing with two different points (*p*) in space.

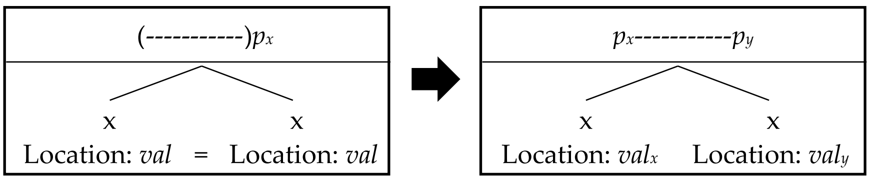


Figure 51. Grammaticalization scheme of the verb EXPLAIN in Libras.

The second innovative agreement form I want to mention is the change of location from mouth to palm of some verbs of utterance in Libras. Verbs like SAY, SCREAM and GIVE-OPINION are body-anchored verbs, and, therefore, do not show agreement. However, Libras has found a way to show agreement by signing these verbs anchored on the palm (***Figure 52***). Once their location is now the second hand (H_2), these verbs can be co-localized, showing agreement with its argument.

Figure 52. Innovative forms of utterance verbs in Libras.

Again, notice that there is no change in the movement of the verb. The verb only detaches from the body (mouth) and anchors on the palm of the H_2. By doing that, the verb is now free to show agreement.

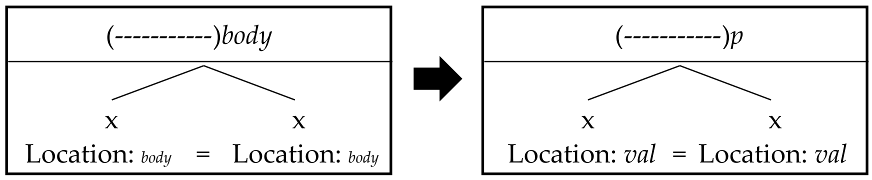


Figure 53. Grammaticalization scheme of some innovative forms of utteratnce verbs in Libras.

These innovative forms constitute an interesting research topic that may elucidate some aspects of the agreement marking mechanism in Libras. Moreover, they seem to corroborate my analysis, by showing that when a verb changes its agreement pattern, it does not change its path specification. Instead, it gains the ability to incorporate location specifications from an argument. To put it differently, the verb gains the ability to be co-localized.

6.6 Summary

In this chapter, I discussed the role of the Prosodic Features in the verb structure. The main claim here is that movement is related to the event properties of the predicate and not to agreement. In order to sustain this idea, I benefited from the Event Visibility Hypothesis and I analyzed the marking of telicity in Libras by the morpheme {EndState}.

{EndState} was shown to behave exactly as expected, marking telicity in telic events and combining with specific types of movement ([direction], change of handshape, change of orientation and change of setting). Additionally, the morphological marking of event boundaries is so visible that even nonsigners are able to infer telicity from signs they do not know.

I also argued that although path movement is not the marker of agreement in Libras, there is a relation between path features in agreement. In fact, the type of path will indicate if the verb has two different slots for place of articulation features in each timing unit (2 x-slots) or if the verb only has one slot for place of articulation specification.

Finally, I expanded the concepted of layering as discussed by Wilbur (2000, 2003a) to the internal structure of the verb, by claiming that different morphological operations will target specific nodes of the phonological structure of the verb.

Chapter 7:

Final Remarks

In contrast to previous discussions on agreement, this dissertation argued that matching of location is the single morphological exponent of verb agreement in Brazilian Sign Language (Libras). Therefore, I reject the analysis of path/directionality as agreement markers (Meir 2002; Lillo-Martin and Meier 2011; inter alia) and propose that the sole manifestation of agreement in Libras – and possibly other sign languages – is not directionality, nor facing. It is, instead, the sharing of Point of Articulation features (location) between controller and target/verb – a process I called co-localization.

Additionally, I showed that agreement is actually more pervasive and productive than has been argued (e.g. Mathur and

Rathmann 2012), thus challenging one argument against calling it agreement. I argued that “plain” verbs are actually capable of showing agreement, as long as there is no phonological restriction and, therefore, agreement is not restricted to a subset of verbs.

The path movement in agreeing verbs is actually related to event properties of the predicate, as consistently argued by the Event Visibility Hypothesis. I also provided a unified minimalist derivation for agreement in Libras, by adopting a minimal syntactic spine and the two basic operations MERGE and AGREE.

The data supporting most of my claims came from analysis of syntactic behavior of 583 Libras verbs from a Libras-Portuguese dictionary (Capovilla et al. 2017) and evaluated by Deaf informants. Information on transitivity, agreement pattern, phonological shape and event structure was collected for each of those verbs. This quantitative analysis corroborated the claim that agreement is not as restricted as we thought, and that it is indeed the rule, not the exception in the language.

Changing the analysis of how agreement is morphophonologically spelled-out has implications for ongoing debates on how different agreement patterns can be derived and generated (whether thematically/semantically or syntactically); and what agreement-classes found in sign languages are (e.g. whether spatial verbs and person agreement verbs constitute different agreement-classes). It also resolves the discussion on candidacy for agreement (the features that predict the realization of agreement) and eliminates the relevance of the distinction between directionality and facing for agreement analysis.

Finally, I claimed that different morphological operations target specific nodes of the phonological structure of the sign, providing a fine grained layering of visual information in ther inernal structure of the verb.

I hope this dissertation will contribute to the current discussion of agreement in signed languages and also to a better description of sign language verbs. Moreover, I strongly believe that sign languages are a very promising source for linguistic investigations that can help to elucidate bigger and more general questions about the Human Language Faculty.

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Appendix 1

Methodology for the quantitative analyses

The quantitative analyses of verb agreement and event properties presented in this dissertation were based on the classification of 583 Libras verbs. These verbs were extracted from *Dicionário da Língua de Sinais do Brasil: A Libras em suas mãos* (Capovilla et al., 2017).

The classification of the verbs was done in collaboration with 11 deaf people from different geographic regions of Brazil. 2 of them, who are Libras professors and have some training in linguistics, were regular consultants and classified most of the verbs analyzed here. The other 9 deaf informants provided some occasional assistance, because some of the verbs found in the dictionary were from a specific geographic region and were not known by the 2 main informants.

The signs were classified using a Microsoft Excel spreadsheet, with controlled vocabulary cells. The criteria used is shown in the following table:

1. Type of agreement marking
a. Subject agreement? Yes/No b. Object agreement? Yes/No c. Locative agreement? Yes/No d. Locative agreement on first slot (beginning point)? Yes/No e. Locative agreement on second slot (end point)? Yes/No
2. Agreement class (following the traditional Paddenian classification):
a. Regular double agreement verb b. Regular single agreement verb c. Backward agreement verb d. Double spatial agreement verb e. Single spatial agreement verb f. Plain verb g. Handling verb
3. On "plain" verbs:
a. Can be co-localized? Yes/No
4. Body-anchoring:
a. Fully body-anchored b. Body-anchored at the beginning point c. Body-anchored at the endpoint
5. Path features (Brentari, 1998, p. 137):
a. [tracing] b. [direction]
6. Event structure :
a. Process b. Transition c. State
7. Transitivity:
a. Transitive b. Intransitive i. Unergative ii. Unnacusative c. Ditransitive d. Impersonal e. Reciprocal

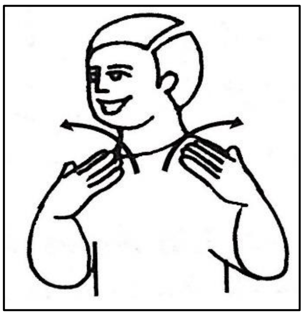
A snapshot of the spreadsheet is provided below:

PT_GLOSSES	EN_GLOSSES	AGR_S	AGR_O	AGR_L	xAGR_L	AGR_L	AGR_MIX	PLAIN
ASFIXIAR1	ASPHYXIATE1	No	No	No	No	No	No	No
ASFIXIAR2	ASPHYXIATE2	No	No	No	No	No	No	No
ASSALTAR	ASSAULT	Yes	Yes	No	No	No	No	No
ASSINAR	SIGN	No	No	No	No	No	No	Yes
ASSISTIR	WATCH	No	No	No	No	No	No	No
ASSISTIR2	WATCH2	No	No	No	No	No	No	No
ASSISTIR3	WATCH3	No	No	No	No	No	No	No
ASSUSTAR	GET_SCARED	No	No	No	No	No	No	No
ATACAR	ATTACK	Yes	Yes	No	No	No	No	Yes
ATIRAR	SHOOT	Yes	Yes	No	No	No	No	No
ATRAPALHAR	DISTURB	No	Yes	Yes	No	No	No	No
AUMENTAR1	RAISE1	No	No	No	No	No	No	Yes
AUMENTAR2	RAISE2	No	No	No	No	No	No	Yes
AUMENTAR3	RAISE3	No	No	No	No	No	No	Yes
AVALIAR	EVALUATE	Yes	Yes	No	No	No	No	No
BABAR	SLOBBER	No	No	No	No	No	No	No
BALANCAR	SWING_PLAYGROUN	No	No	No	No	No	No	Yes
BALANCAR2	SWING_NET	No	No	No	No	No	No	Yes
BALBUCIAR	BABBLE	No	No	No	No	No	No	No
BALBUCIAR_SINAIS	BABBLE_SIGN	No	No	No	No	No	No	No
BANHAR	BATH	No	No	No	No	No	No	No
BATER	PUNCH	Yes	Yes	No	No	No	No	No
BATER_PORTA	KNOCK_DOOR	No	No	No	No	No	No	Yes
BATIZAR	BAPTIZE	No	No	No	No	No	No	No
BATIZAR	BAPTIZE	No	No	No	No	No	No	Yes
BATUCAR	DRUM	No	No	No	No	No	No	Yes
BEBER1	DRINK	No	No	No	No	No	No	No
BEBER2	DRINK2	No	No	No	No	No	No	No
BEBER3	DRINK3	No	No	No	No	No	No	No
BEIJAR1	KISS1	No	No	No	No	No	No	No
BEIJAR2	KISS2	No	Yes	No	No	No	No	No
BEIJAR_BOCA1	KISS_MOUTH1	Yes	Yes	No	No	No	No	No

BODY	xBODY	BODY	VERB_CATEGOR	TRANSITIV	TRACIN	DIRECTI	TM	EVENT
Yes	No	No	Plain	Unaccusative	No	No	No	Process
Yes	No	No	Plain	Unaccusative	No	No	No	Process
No	No	No	Handling	Transitive	No	Yes	No	Transition
No	No	No	Handling	Transitive	No	Yes	No	Transition
Yes	No	No	Plain	Transitive	Yes	No	No	Process
Yes	No	No	Plain	Transitive	Yes	No	No	Process
Yes	No	No	Plain	Transitive	Yes	No	No	Process
Yes	No	No	Plain	Unaccusative	No	Yes	No	Transition
No	No	No	Double agreement	Transitive	No	Yes	No	Transition
No	No	No	Handling	Transitive	No	Yes	No	Transition
No	No	No	Plain	Transitive	Yes	No	No	Process
No	No	No	Plain	Unaccusative	Yes	No	No	Process
No	No	No	Plain	Unaccusative	Yes	No	No	Process
No	No	No	Plain	Unaccusative	Yes	No	No	Process
No	No	No	Double agreement	Transitive	Yes	No	No	Process
Yes	No	No	Plain	unergative	Yes	No	No	Process
No	No	No	Handling	unergative	Yes	No	No	Process
No	No	No	Handling	unergative	Yes	No	No	Process
Yes	No	No	Plain	unergative	Yes	No	No	Process
Yes	No	No	Plain	unergative	Yes	No	No	Process
Yes	No	No	Plain	unergative	Yes	No	No	Process
No	No	No	Double agreement	Transitive	No	Yes	No	Transition
No	No	No	Plain	Transitive	No	Yes	No	Transition
Yes	No	No	Plain	Unaccusative	No	No	No	Transition
No	No	No	Plain	Unaccusative	No	Yes	No	Transition
No	No	No	Handling	Transitive	No	Yes	No	Transition
No	No	Yes	Plain	Transitive	No	Yes	No	Transition
Yes	No	No	Plain	Transitive	Yes	No	No	Process
No	No	Yes	Plain	Transitive	No	Yes	No	Transition
Yes	No	No	Plain	Transitive	No	Yes	No	Transition
No	No	No	Single agreement	Transitive	No	Yes	No	Transition
No	No	No	Double agreement	Reciprocal	No	Yes	No	Transition

In order to avoid over generation of verbs, some items were excluded based on the following criteria:

i) *Deadjectival verbs:* some clearly deadjectival verbs were not considered here, because we are not even so sure that they are real verbs in Libras. Additionally, they have exactly the same form of their adjectival counterpart:

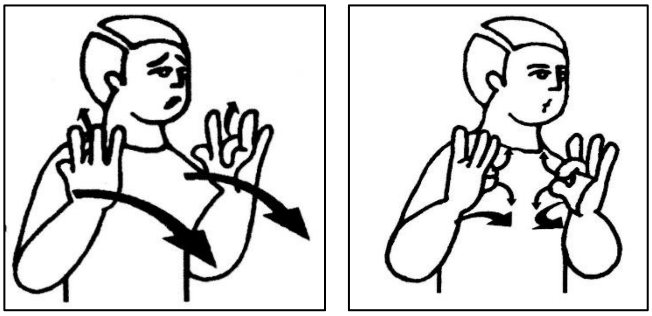


The "verb" BE-HAPPY (ALEGRAR), which is the same sign for HAPPY (ALEGRIA). (Capovilla et al., 2017, p. 145).

ii) *Different entries for the same sign (synonyms in Portuguese)*: once Capovilla et al. (2017) is a Portuguese-based dictionary, there are many repeated signs under different entries that represent synonyms in Portuguese. These repeated signs were excluded, being annotated only once:

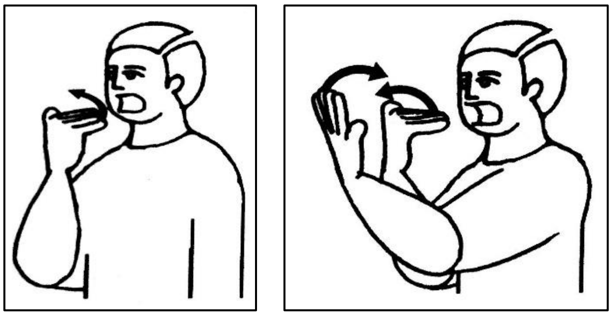
The same sign found under two different entries LIKE (GOSTAR) and AGRADAR (APPRECIATE). (Capovilla et al., 2017, p. 129).

iii) *(Possible) handshape allophonic signs:* some signs that have different entries in the dictionary are just variants (handshape allophonic signs). So, in order to avoid reduplicated signs, we considered only one entry:

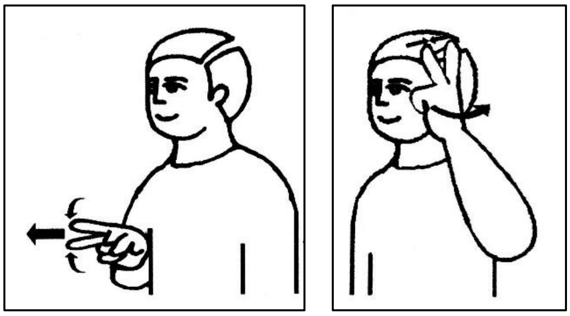


Two different entries for the sign ABANDON (ABANDONAR), but the only difference between is the handshape, which, by the away, are phonetically similar and form a suspicious pair. (Capovilla et al., 2017, p. 53).

iv) *Morphologically derived signs:* some signs are just derived forms from the same basic verb. Derived verbs (even some inflected verbs) were excluded:

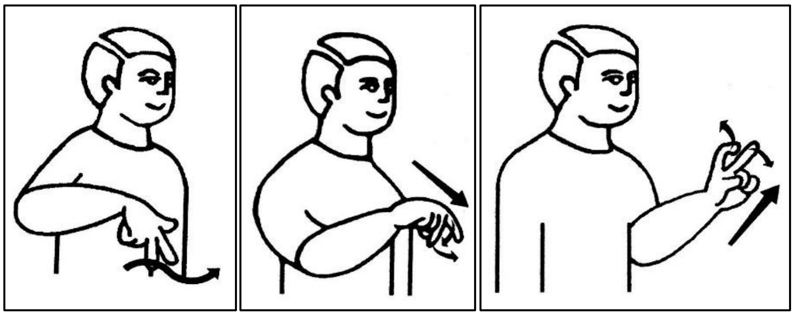


EAT (COMER) and GOBBLE (DEVORAR). (Capovilla et al., 2017, pp. 717, 945).



CUT (CORTAR) and CUT-HAIR (CORTAR-CABELO). (Capovilla et al., 2017, p. 808).

v) *Classifier constructions (except for handling verbs)*: once classifier constructions are polymorphemic items and that are some analysis that already treat them to be agreeing forms, they were removed from this study. The only exception were handling verbs.



WALK (ANDAR), GO-DOWN (DESCER) and GO-UP (SUBIR). (Capovilla et al., 2017, p. 195; 910; 2626).

vi) *None of the consultants knows the sign*: when a verb was unknown to all of the consultants, it was excluded and not annotated.

Appendix 2

List of verbs – agreement classes

Plain verbs			
ABAIXAR	*LOWER*	ACONTECER1	*HAPPEN1*
ABAIXAR_ORELHAS	*EARS_DOWN*	ACONTECER2	*HAPPEN2*
ABAIXAR_RABO	*TAILS_DOWN*	ACORDAR1	*WAKE-UP1*
ABANAR	*FAN_SELF*	ACORDAR2	*ACORDAR2*
ABISMAR	*SHOCK*	ACOSTUMAR1	*BE_HABITUATE1*
ABORTAR	*MISCARRY*	ACOSTUMAR2	*GET_HABITUATE2*
ABOTOAR	*BUTTON*	ACREDITAR	*BELIEVE*
ABRAÇAR	*HUG*	ADAPTAR	*ADAPT*
ABREVIAR	*ABREVIATE*	ADICIONAR	*ADD*
ABSORVER2	*SUCK_UP*	ADMINISTRAR	*MANAGE*
ABSORVER3	*EXTRACT*	ADMIRAR	*ADMIRE*
ABSTER2	*ABSTAIN2*	ADMITIR	*CONFESS*
ACABAR_NAMORO	*BREAK_UP*	ADOECER	*GET_SICK*
ACABAR1	*FINISH1*	ADORAR	*ADORE*
ACABAR2	*FINISH2*	ADORMECER1	*FALL_ASLEEP1*
ACABAR3	*FINISH3*	ADORMECER2	*FALL_ASLEEP2*
ACABAR4	*FINISH4*	ADOTAR	*ADOPT*
ACALENTAR	*LULL_TO_SLEEP*	ADULAR	*FLATTER*
ACALMAR_SE	*CALM_DOWN2*	AGENDAR	*SCHEDULE*
ACARICIAR	*CARESS*	ALISAR	*SMOOTH*
ACEITAR	*ACCEPT*	ALTERNAR1	*ALTERNATE1*
ACELERAR	*SPEED_UP*	ALUGAR	*RENT*
ACENAR	*BECKON*	AMAMENTAR	*BREASTFEED*
ACENDER_LUZ	*TURN_ON_LIGHT*	AMANHECER	*DAWN*
ACHAR	*SUPPOSE*	AMAR1	*LOVE1*
ACHATAR	*COMPRESS*	AMAR2	*LOVE2*
ACLAMAR	*APPLAUD*	AMASSAR	*CRUMPLE*
ACLAMAR	*APPLAUD*	AMPUTAR	*AMPUTATE*

ANDAR_BICICLETA	*RIDE_BIKE*	BEBER3	*DRINK3*
ANTECIPAR1	*ANTECIPATE1*	BEIJAR1	*KISS1*
ANTECIPAR2	*ANTECIPATE2*	BOCEJAR	*YAWN*
ANUNCIAR	*ANNOUNCE*	BORBULHAR	*BUBBLE UP*
APAGAR_LUZ	*TURN_OFF_LIGHT*	BRINCAR	*PLAY*
APAGAR1	*ERASE*	CALAR_BOCA	*SHUT_UP*
APAGAR2	*TURN_OFF*	CANCELAR	*CANCEL*
APALPAR2	*PALP2*	CANCELAR2	*CANCEL2*
APARECER_TV	*APPEAR_TV*	CANTAR	*SING*
APRENDER	*LEARN*	CANTAR2	*SING2*
APROVAR	*BE_APPROVED*	CARIMBAR	*STAMP*
APROVEITAR	*ENJOY*	CASAR	*MARRY*
APROXIMAR	*COME_CLOSE*	CASAR2	*MARRY*
ARGUMENTAR	*ARGUE*	CHECAR	*CHECK*
ARRANCAR_DENTE	*LOOSE_TOOTH*	CHEIRAR2	*SMEEL2*
ARREPENDER	*REGRET*	CHORAR	*CRY*
ARROTAR	*BURP*	CHORAR2	*CRY2*
ASFIXIAR1	*ASPHYXIATE1*	CHORAR3	*CRY3*
ASFIXIAR2	*ASPHYXIATE2*	CHOVER	*RAIN*
ASSISTIR	*WATCH*	COBRIR_SE	*COVER_BLANKET*
ASSISTIR2	*WATCH2*	COLAR	*GLUE*
ASSISTIR3	*WATCH3*	COMBINAR1	*MAKE_AGREEMENT*
ASSUSTAR	*GET_SCARED*	COMEÇAR	*START*
ATRAPALHAR	*DISTURB*	COMEÇAR2	*START2*
AUMENTAR1	*RAISE1*	COMER	*EAT*
AUMENTAR2	*RAISE2*	COMER	*EAT*
AUMENTAR3	*RAISE3*	COMPLEMENTAR	*ADD*
BABAR	*SLOBBER*	COMPREENDER	*COMPREHEND*
BALBUCIAR	*BABBLE*	COMUNGAR	*TAKE_COMMUNIO N*
BALBUCIAR_SINAIS	*BABBLE_SIGN*	CONFESSAR	*CONFESS*
BANHAR	*BATH*	CONFIAR	*TRUST*
BATER_PORTA	*KNOCK_DOOR*	CONGRATULAR	*CONGRATULATE*
BATIZAR	*BAPTIZE*	CONHECER	*BE_FAMILIAR_WITH*
BATIZAR	*BAPTIZE*	CONSEGUIR	*CONQUER*
BEBER1	*DRINK*	CONSTRUIR	*BUILD*
BEBER2	*DRINK2*	CONTAR	*TELL*

CONTRUIR2	*BUILD2*	ENGOLIR2	*SWALLOW2*
CONVERSAR	*TALK*	ENSURDECER	*DEAFEN*
CORRER	*RUN*	ENTENDER	*UNDERSTAND*
COSTURAR	*SEW*	ENTREVISTAR	*INTERVIEW*
COSTURAR2	*SEW_MACHINE*	ESCAPAR	*ESCAPE*
CRESCER	*GROW_UP*	ESCAPAR2	*ESCAPE2*
CRIAR	*CREATE*	ESCONDER	*HIDE*
CURAR	*HEAL*	ESCOVAR	*BRUSH*
DANCAR	*DANCE*	ESFOLAR	*BRUISE*
DANCAR2	*DANCE2*	ESFORÇAR	*MAKE_EFFORT*
DECAIR	*DECAY*	ESMOLAR	*BEG*
DECIDIR	*DECIDE*	ESPALHAR	*SPREAD_NEWS*
DECORAR	*MEMORIZE*	ESPERAR	*WAIT*
DECRESCER	*DIMINISH*	ESPERAR	*WAIT*
DEFECAR	*DEFECATE*	ESPIAR	*SPY*
DEFINHAR	*WITHER*	ESPIAR2	*SPY2*
DERRETER	*MELT_AWAY*	ESPIRRAR	*SNEEZE*
DESABAFAR	*RELIEVE_FROM*	ESPIRRAR2	*SNEEZE2*
DESABROCHAR	*BLOSSOM*	ESQUECER	*FORGET*
DESCANSAR	*REST*	ESTUDAR	*STUDY*
DESCONFIAR	*SUSPECT*	EVITAR	*AVOID*
DESCONTAR	*DEDUCT*	EXCITAR	*AROUSE*
DESCULPAR	*APOLOGIZE*	EXPLICAR	*EXPLAIN*
DESEJAR	*DESIRE*	EXPLODIR	*EXPLODE*
DESENVOLVER	*DEVELOP*	FALAR1	*SPEAK3*
DESTRUIR	*DESTROY*	FALTAR	*LACK*
DISCURSAR	*GIVE_SPEECH*	FAREJAR	*SNUFF*
DIVIDIR	*SHARE*	FAXINAR	*CLEAN_HOUSE*
DIVORCIAR	*DIVORCE*	FAZER	*DO*
DOER	*HURT*	FILMAR	*FILM*
DORMIR1	*SLEEP1*	FINGIR	*FAKE*
DORMIR2	*SLEEP2*	FOFOCAR1	*GOSSIP1*
EJACULAR	*EJACULATE*	FOFOCAR2	*GOSSIP2*
ENFORCAR	*STRANGLE*	FORMAR-SE	*GRADUATE*
ENGOLIR	*SWALLOW*	FOTOGRAFAR	*PHOTOGRAPH*

FOTOGRAFAR2	*PHOTOGRAPH2*
FRITAR	*FRY*
FUMAR	*SMOKE*
FUMAR_MACONHA	*SMOKE_WEED*
GABAR-SE	*BRAG*
GALOPAR	*RIDE_HORSE*
GASTAR	*SPEND_MONEY*
GASTAR	*SPEND*
GIRAR	*SPIN*
GOSTAR	*LIKE*
GOZAR	*HAVE_ORGASM*
GOZAR2	*HAVE_ORGASM2*
GRAVAR	*RECORD*
GRITAR	*SCREAM*
IDEIA	*HAVE_IDEA*
IMPRIMIR	*PRINT*
INCHAR	*SWELL*
INJETAR_SERINGA	*INJECT_SYRINGE*
INTERPRETAR	*INTERPRET*
JEJUAR	*ABSTAIN_FOOD*
JURAR	*VOW*
JURAR2	*VOW2*
LAVAR_MAOS	*WASH_HANDS*
LAVAR_PRATO	*WASH_DISHES*
LAVAR_ROUPA	*WASH_CLOTHES*
LEMBRAR	*REMEMBER*
LER	*READ*
LEVAR2	*TAKE_AWAY*
LIBERAR	*SET_FREE*
LIMPAR	*CLEAN*
LIXAR	*RUB_SANDPAPER*
LUSTRAR	*POLISH*
LUSTRAR2	*POLISH_2*
MARCHAR	*MARCH*
MASSAGEAR	*MASSAGE*
MASSAGEAR2	*MASSAGE2*
MASTIGAR	*CHEW*
MASTURBAR_FEMININO	*MASTURBATE_FEMALE*
MASTURBAR_MASCULINO	*MASTURBATE_MALE*
MASTURBAR_MASCULINO2	*MASTURBATE_MALE2*
MEDIR	*MEASURE*
MEDITAR	*MEDITATE*
MELHORAR	*IMPROVE*
MENSTRUAR	*MENSTRUATE*
MENSTRUAR2	*MENSTRUATE2*
MENSTRUAR3	*MENSTRUATE3*
MENTIR	*LIE*
MISTURAR	*MIX*
MORRER	*DIE*
MUDAR_OPINIAO	*CHANGE_MIND*
MULTAR	*FINE*
NADAR	*SWIM*
NAMORAR	*DATE*
NÃO_PODER	*CAN_NOT*
NÃO_TER	*HAVE_NOT*
NÃO_VER	*SEE_NOT*
NASCER	*BE_BORN*
NEVAR	*SNOW*
OBRIGAR	*FORCE*
ODIAR1	*HATE1*
OUVIR	*HEAR*
PALPITAR	*BEAT_HEART*
PALPITAR2	*BEAT_HEART2*
PAPEAR	*CHATTER*
PAQUERAR2	*FLIRT2*
PARAR	*STOP*
PARAR2	*STOP2*
PARECER	*SEEM*
PASSEAR	*GO_FOR_WALK*
PECAR	*SIN*
PENSAR	*THINK*
PERCEBER2	*PERCEIVE2*

PERDER	LOSE
PESCAR	FISH
PESQUISAR	RESEARCH
PETISCAR	NIBBLE
PISCAR	BLINK
PLANEJAR	PLAN
PODER	CAN
PRECIPITAR-SE	HASTEN
PRECISAR	NEED
PREJUDICAR	HARM
PREOCUPAR-SE	WORRY
PROIBIR	PROHIBIT
PROMETER	PROMISE
PROSPERAR	PROSPERATE
PROVAR	PROVE
PUXAR_SACO	CAJOLE
QUEBRAR	BREAK
QUERER	WANT
RACIOCINAR	REASON
RECLAMAR	COMPLAIN
RECUAR	RETREAT
REFORMAR	REFORM
REGER	CONDUCT_MAESTRO
RESUMIR	SUMMARIZE
REZAR	PRAY
RIR	LAUGH
RONCAR	SNORE
ROUBAR	STEAL
SABER	KNOW
SAIR	LEAVE
SAIR2	LEAVE2
SALVAR	SAVE
SALVAR2	REDEEM
SECAR	DRY
SENTAR-SE	SIT

SENTIR	FEEL1
SENTIR2	FELL2
SERRAR	SAW
SERVIR	SERVE
SINALIZAR	SIGN
SOFRER	SUFFER
SOLETRAR_DATILOLOGIA	FINGER-SPELL
SOMAR	SUM
SONHAR	DREAM
SONHAR2	DREAM2
SORTEAR	RAFFLE
SUAR	SWEAT
SUAR2	SWEAT2
SUBTRATIR	SUBTRACT
SUMIR	VANISH
SUMIR	DISAPPEAR
SUPORTAR1	BEAR1
SUPORTAR2	BEAR2
SURGIR	APPEAR
SUSSURAR	WHISPER
TECLAR	TYPE
TELEGRAFAR	TELEGRAPH
TEMER	BE_AFRAID
TEMER2	BE_AFRAID2
TENTAR	TRY
TER	HAVE
TOLERAR	TOLERATE
TOMAR_BANHO	TAKE_SHOWER
TORCER	CHEER
TOSSIR	COUGH
TRABALHAR	WORK
TRADUZIR	TRANSLATE
TRAIR	BETRAY
TRANCAR	LOCK
TREINAR	PRACTICE

TREMER	*SHAKE*	VIAJAR2	*TRAVEL2*
TREMER2	*SHAKE2*	VIVER	*LIVE*
TROCAR	*CHANGE*	VOAR	*FLY*
USAR	*USE*	VOMITAR	*VOMIT*
VACINAR	*VACCINATE*	VOTAR	*VOTE*
VENCER	*WIN*	XEROCAR	*MAKE_COPY*
VESTIR-SE	*WEAR*		

Regular double agreement verbs

ABANDONAR1	*GIVE_UP1*	INFLUENCIAR3	*INFLUENCE3*
ABANDONAR2	*GIVE_UP2*	JOGAR	*THROW*
ABENCOAR	*BLESS*	LEVAR	*LEAD*
ABUSAR	*ABUSE*	MATAR	*KILL*
ACAREAR	*CONFRONT_FACE_TO_FACE*	MATAR_ARMA	*KILL_GUN*
ACOMPANHAR	*GO_ALONG*	MOSTRAR	*SHOW*
ACONSELHAR	*ADVISE*	OFENDER	*OFFEND*
AVISAR	*TELL*	PERGUNTAR	*ASK*
AGARRAR1	*GRASP*	PROCURAR2	*REACH_SOMEONE*
AJUDAR1	*HELP1*	PROVOCAR	*IRRITATE*
AJUDAR2	*HELP2*	REJEITAR	*REJECT*
AMAR3	*LOVE3*	RESPONDER	*ANSWER*
AMEAÇAR2	*THREATEN2*	SEGUIR	*FOLLOW*
APELAR	*APPEAL*	SERVIR2	*SERVE2*
APONTAR1	*POINT1*	SUBSTITUIR	*SUBSTITUTE*
APRESENTAR	*INTRODUCE*	TOCAR	*TOUCH*
ARRANHAR	*BRUISE*	TRANSFERIR	*TRANFER*
ATACAR	*ATTACK*	VER	*SEE*
AVALIAR	*EVALUATE*	VISITAR2	*VISIT2*
BATER	*PUNCH*	ZOMBAR	*MOCK*
DAR	*GIVE*	VENDER	*SELL*
DAR2	*GIVE2*		
ENVIAR_E-MAIL	*SEND_E-MAIL*		
EMPRESTAR	*LEND*		
EMPRESTAR2	*LEND2*		

Regular single agreement verbs

ABOCANHAR	*BITE_OFF*	ESBOFETEAR	*SLAP_FACE*
ABSTER	*ABSTAIN*	ESTUPRAR	*RAPE*
ACOTOVELAR	*ELBOW*	EXPULSAR	*EXPEL*
ACUSAR	*ACCUSE*	FALAR1	*SPEAK1*
ADVERTIR	*WARN*	FALAR2	*SPEAK4*
AFASTAR2	*SEPARATE2*	FILIAR-SE	*JOIN_ORGANIZATION*
AGARRAR2	*CATCH*	IMPOR	*IMPOSE*
AGRADECER	*THANK*	INCENTIVAR	*ENCOURAGE*
AMEAÇAR1	*THREATEN1*	INFLUENCIAR	*INFLUENCE*
ANALISAR	*ANALISE*	INFLUENCIAR2	*INFLUENCE2*
APALPAR	*PALP*	INSULTAR	*INSULT*
APOIAR	*SUPPORT*	INTERESSAR-SE	*TAKE_INTEREST*
APONTAR2	*POINT2*	LAMBER	*LICK*
BEIJAR2	*KISS2*	MANDAR	*COMMAND*
CHUTAR	*KICK*	MEXER	*MEDDLE*
COMPRAR	*BUY*	MOSTRAR2	*SHOW2*
CONCENTRAR	*(GET)_CONCENTRATE*	OBEDECER	*OBEY*
CONQUISTAR	*OBTAIN*	OBRIGAR2	*FORCE2*
COROAR	*CROWN*	OPINAR	*GIVE_OPINION*
CUIDAR	*LOOK_AFTER*	PAGAR	*PAY*
CUMPRIMENTAR	*GREET*	PAGAR2	*PAY2*
DEFENDER	*DEFEND*	PAQUERAR	*FLIRT*
DELATAR	*DENOUNCE*	PEDIR2	*ASK2*
DEMITIR	*FIRE*	PRENDER	*ARREST*
DESCOBRIR	*FIND_OUT*	SUBORNAR	*BRIBE*
DESPREZAR	*DESPISE*	TELEFONAR	*CALL_PHONE*
DETESTAR	*HATE*	TEMER3	*BE_AFRAID3*
ELOGIAR	*PRAISE*	VIGIAR	*GUARD*
ENGANAR	*DECEIVE*	VISITAR	*VISIT*
ENSINAR	*TEACH*	CUSPIR	*SPIT*

Backward agreement verbs

ABSORVER	*ASSIMILATE*	MEMORIZAR	*MEMORIZE2*
ABSORVER_MENTE	*ASSIMILATE*	PEDIR	*ASK*
PEGAR	*CATCH*	PEGAR	*TAKE_GRASP*
CHAMAR	*CALL*	PERCEBER	*PERCEIVE*
CHEIRAR	*SMELL*	PUXAR	*PULL*
CONVIDAR	*INVITE*	RECEBER	*RECEIVE*
COPIAR	*COPY*	RESPIRAR	*BREATH*
COPIAR2	*COPY2*	ROUBAR2	*STEAL2*
ESCOLHER	*CHOOSE*	TRAUMATIZAR	*TRAUMATIZE*

Double spatial

ADIAR	*POSTPONE*	MUDAR	*MOVE*
IR	*GO*	VIAJAR	*TRAVEL*
IR2	*GO2*	VOLTAR	*RETURN*

Single spatial

ABARROTAR	*ABOUND*	DERRAMAR	*SPILL*
ABRIGAR	*ACCOMMODATE*	ENTERRAR	*BURY*
ADMISSÃO	*ADMITTANCE*	ENTRAR	*GO_IN*
ADORNAR	*ADORN*	FICAR	*STAY*
AFIXAR	*FIX*	FINCAR	*THRUST_IN*
ESPALHAR	*SPREAD*	GUARDAR	*STORE*
AMONTOAR	*PILE*	PENDURAR	*HANG*
BOIAR	*FLOAT*	PLANTAR	*PLANT_SEED*
CARREGAR	*CARRY*	PLANTAR2	*PLANT_SEED2*
CHEGAR	*ARRIVE*	PROCURAR	*LOOK_FOR*
CHEGAR2	*CHEGAR2*		
COLOCAR	*PUT*		

Reciprocals

ACASALAR	*COUPLE*	DIALOGAR	*DIALOGUE*
COMBINAR 2	*MATCH*	DISCUTIR	*DISCUSS*
ALTERNAR2	*ALTERNATE2*	ENFRENTAR	*CONFRONT*
APOSTAR1	*BET1*	FOFOCAR3	*GOSSIP3*
BEIJAR_BOCA1	*KISS_MOUTH1*	GUERREAR	*WAR*
BEIJAR_BOCA2	*KISS_MOUTH2*	JUNTAR_MORAR	*SHACK_UP*
BEIJAR_BOCA3	*KISS_MOUTH3*	LUTAR	*FIGHT*
BRIGAR	*FIGHT*	NEGOCIAR	*NEGOCIATE*
BRINDAR	*MAKE_TOAST*	TROCAR2	*CHANGE2*
COMUNICAR	*COMMUNICATE*	AFASTAR1	*SEPARATE1*
CONVERSAR_ORAL	*TALK_SPOKEN*	CONTACTAR	*GET_IN_TOUCH*
CONVERSAR_SINAIS	*TALK_SIGN*	CUMPRIMENTAR2	*GREET2*
CORRESPONDER	*CORRESPOND_COMMUNICATION*	ENCONTRAR	*MEET*

Handling

ABASTECER-VEÍCULO	*FUEL_UP*	ATIRAR	*SHOOT*
ABRIR_ALGO	*OPEN_SOMETHING*	BALANCAR	*SWING_PLAYGROUND*
ACELERAR_CARRO	*SPEED_UP_CAR*	BALANCAR2	*SWING_NET*
ACENDER_FOSFORO	*TURN_ON_MATCH*	BATUCAR	*DRUM*
AÇOITAR	*WHIP*	BICAR	*PECK*
ACRESCENTAR_COLHER	*ADD_WITH_SPOON*	BUZINAR	*HONK*
AFERIR_PRESSÃO	*ASSESS_BLOOD_PRESSURE*	CACAREJAR	*CACKLE*
AFIAR	*SHARPEN*	CAÇAR	*HUNT*
AGASALHAR	*DRESS_WARM*	CALÇAR	*SHOE*
SOCAR	*PUNCH*	CEIFAR	*HARVEST*
AMARRAR	*TIE*	CHEIRAR_COCAINA	*INHALE_COCAINE*
PARAFUSAR	*FASTEN_WITH_SCREW*	CONSERTAR	*FIX*
APITAR	*WHISTLE*	CORTAR	*CUT*
ARAR	*PLOW_THE_SOIL*	CORTAR2	*CUT2*
ASSALTAR	*ASSAULT*	COZINHAR	*COOK*
ASSINAR	*SIGN*	DEPILAR	*DEPILATE*

DESCASCAR	*PEEL*	FREAR	*BRAKE*
DESENHAR	*DRAW*	LAÇAR	*LASSO*
DIGITAR	*TYPE*	MARTELAR	*HAMMER*
DIRIGIR	*DRIVE*	PENEIRAR	*SIFT*
DIRIGIR_ATE	*DRIVE_TO*	PENTEAR	*COMB_HEAR*
EMPINAS_PIPA	*FLY_KITE*	PERFURMAR-SE	*PERFUME_SELF_FLASK*
ENFORCAR	*HANG*	PINTAR	*PAINT*
ESCOVAR_DENTE	*BRUSH_TEETH*	PULAR_CORDA	*SKIP_ROPE*
ESCREVER	*WRITE*	REMAR	*ROW*
ESCULPIR	*ENGRAVE*		

Appendix 3

List of verbs – plain verbs and co-localization

Plain verbs that can be co-localized			
ALTERNAR1	*ALTERNATE1*	ACARICIAR	*CARESS*
DERRETER	*MELT_AWAY*	ACEITAR	*ACCEPT*
DESABROCHAR	*BLOSSOM*	ACELERAR	*SPEED_UP*
ESCONDER	*HIDE*	ACENAR	*BECKON*
ESCOVAR	*BRUSH*	ACENDER_LUZ	*TURN_ON_LIGHT*
FORMAR-SE	*GRADUATE*	ACHATAR	*COMPRESS*
FOTOGRAFAR	*PHOTOGRAPH*	ACLAMAR	*APPLAUD*
FOTOGRAFAR2	*PHOTOGRAPH2*	ACLAMAR	*APPLAUD*
INCHAR	*SWELL*	ACONTECER1	*HAPPEN1*
LEVAR2	*TAKE_AWAY*	ACONTECER2	*HAPPEN2*
MASSAGEAR	*MASSAGE*	COMBINAR1	*MAKE_AGREEMENT*
MISTURAR	*MIX*	ACOSTUMAR2	*GET_HABITUATE2*
PESQUISAR	*RESEARCH*	ACREDITAR	*BELIEVE*
PETISCAR	*NIBBLE*	ADAPTAR	*ADAPT*
FAXINAR	*CLEAN_HOUSE*	ADICIONAR	*ADD*
ABAIXAR	*LOWER*	ADMITIR	*CONFESS*
ABAIXAR_RABO	*TAILS_DOWN*	ADOECER	*GET_SICK*
ABREVIAR	*ABREVIATE*	ADULAR	*FLATTER*
ABSORVER2	*SUCK_UP*	AGENDAR	*SCHEDULE*
ABSORVER3	*EXTRACT*	ESPERAR	*WAIT*
ACABAR1	*FINISH1*	SUPORTAR1	*BEAR1*
ACABAR2	*FINISH2*	SUPORTAR2	*BEAR2*
ACABAR3	*FINISH3*	ALISAR	*TRETCH_OUT*
ACABAR4	*FINISH4*	ALUGAR	*RENT*
ACABAR_NAMORO	*BREAK_UP*	AMANHECER	*DAWN*

AMASSAR	*CRUMPLE*	CONTRUIR2	*BUILD2*
AMPUTAR	*AMPUTATE*	CONVERSAR	*TALK*
ANDAR_BICICLETA	*RIDE_BIKE*	COSTURAR	*SEW*
ANTECIPAR1	*ANTECIPATE1*	COSTURAR2	*SEW_MACHINE*
ANTECIPAR2	*ANTECIPATE2*	CRESCER	*GROW_UP*
ANUNCIAR	*ANNOUNCE*	CRIAR	*CREATE*
APAGAR1	*ERASE*	CURAR	*HEAL*
APAGAR2	*TURN_OFF*	DANCAR2	*DANCE2*
APAGAR_LUZ	*TURN_OFF_LIGHT*	DECAIR	*DECAY*
APROVAR	*BE_APPROVED*	DECRESCER	*DIMINISH*
APROVEITAR	*ENJOY*	DEFINHAR	*WITHER*
APROXIMAR	*COME_CLOSE*	SUMIR	*VANISH*
ARGUMENTAR	*ARGUE*	DESCONTAR	*DEDUCT*
ATRAPALHAR	*DISTURB*	DESENVOLVER	*DEVELOP*
AUMENTAR1	*RAISE1*	DESTRUIR	*DESTROY*
AUMENTAR2	*RAISE2*	DIVIDIR	*SHARE*
AUMENTAR3	*RAISE3*	DIVORCIAR	*DIVORCE*
BATER_PORTA	*KNOCK_DOOR*	DOER	*HURT*
BATIZAR	*BAPTIZE*	EJACULAR	*EJACULATE*
BORBULHAR	*BUBBLE UP*	ESCAPAR	*ESCAPE*
BRINCAR	*PLAY*	ESCAPAR2	*ESCAPE2*
CANCELAR	*CANCEL*	ESPERAR	*WAIT*
CANCELAR2	*CANCEL2*	ESTUDAR	*STUDY*
CARIMBAR	*STAMP*	EXPLICAR	*EXPLAIN*
CASAR	*MARRY*	EXPLODIR	*EXPLODE*
CASAR2	*MARRY*	FALTAR	*LACK*
CHECAR	*CHECK*	FAZER	*DO*
CHOVER	*RAIN*	FINGIR	*FAKE*
COLAR	*GLUE*	FRITAR	*FRY*
COMEÇAR	*START*	GALOPAR	*RIDE_HORSE*
COMEÇAR2	*START2*	GASTAR	*SPEND*
ADMINISTRAR	*MANAGE*	GIRAR	*SPIN*
COMPLEMENTAR	*ADD*	GRAVAR	*RECORD*
CONFIAR	*TRUST*	IMPRIMIR	*PRINT*
CONGRATULAR	*CONGRATULATE*	INTERPRETAR	*INTERPRET*
CONSTRUIR	*BUILD*	LAVAR_MAOS	*WASH_HANDS*

LAVAR_PRATO	*WASH_DISHES*	REFORMAR	*REFORM*
LAVAR_ROUPA	*WASH_CLOTHES*	REGER	*CONDUCT_MAESTRO*
LER	*READ*	REZAR	*PRAY*
LIBERAR	*SET_FREE*	RIR	*LAUGH*
LIMPAR	*CLEAN*	ROUBAR	*STEAL*
LIXAR	*RUB_SANDPAPER*	SAIR	*LEAVE*
LUSTRAR	*POLISH*	SAIR2	*LEAVE2*
LUSTRAR2	*POLISH_2*	SECAR	*DRY*
MASSAGEAR2	*MASSAGE2*	SENTAR-SE	*SIT*
MASTIGAR	*CHEW*	SERRAR	*SAW*
MASTURBAR_FEMININO	*MASTURBATE_FEMALE*	SINALIZAR	*SIGN*
MASTURBAR_MASCULINO	*MASTURBATE_MALE*	RESUMIR	*SUMMARIZE*
MASTURBAR_MASCULINO2	*MASTURBATE_MALE2*	SOLETRAR_DATILOLOGIA	*FINGER-SPELL*
MEDIR	*MEASURE*	SOMAR	*SUM*
MELHORAR	*IMPROVE*	SORTEAR	*RAFFLE*
MULTAR	*FINE*	SUBTRATIR	*SUBTRACT*
NAMORAR	*DATE*	SUMIR	*DISAPPEAR*
NÃO_TER	*HAVE_NOT*	SURGIR	*APPEAR*
NEVAR	*SNOW*	TECLAR	*TYPE*
OBRIGAR	*FORCE*	TELEGRAFAR	*TELEGRAPH*
PALPITAR2	*BEAT_HEART2*	TOLERAR	*TOLERATE*
PARAR	*STOP*	TRABALHAR	*WORK*
PARAR2	*STOP2*	TRADUZIR	*TRANSLATE*
PERDER	*LOSE*	TRANCAR	*LOCK*
PESCAR	*FISH*	TREINAR	*PRACTICE*
PLANEJAR	*PLAN*	TROCAR	*CHANGE*
PODER	*CAN*	USAR	*USE*
PRECISAR	*NEED*	VENCER	*WIN*
PREJUDICAR	*HARM*	VIAJAR2	*TRAVEL2*
PROIBIR	*PROHIBIT*	VIVER	*LIVE*
PROSPERAR	*PROSPERATE*	VOTAR	*VOTE*
PUXAR_SACO	*CAJOLE*	XEROCAR	*MAKE_COPY*
QUEBRAR	*BREAK*	MARCHAR	*MARCH*
QUERER	*WANT*	NADAR	*SWIM*
RACIOCINAR	*REASON*	TREMER	*SHAKE*

Plain verbs that cannot be co-localized

ABAIXAR_ORELHAS	*EARS_DOWN*	BALBUCIAR_SINAIS	*BABBLE_SIGN*
ABANAR	*FAN_SELF*	BANHAR	*BATH*
ABISMAR	*SHOCK*	BATIZAR	*BAPTIZE*
ABORTAR	*MISCARRY*	BEBER1	*DRINK*
ABOTOAR	*BUTTON*	BEBER2	*DRINK2*
ABRAÇAR	*HUG*	BEBER3	*DRINK3*
ABSTER2	*ABSTAIN2*	BEIJAR1	*KISS1*
ACALENTAR	*LULL_TO_SLEEP*	BOCEJAR	*YAWN*
ACALMAR_SE	*CALM_DOWN2*	CALAR_BOCA	*SHUT_UP*
ACHAR	*SUPPOSE*	CANTAR	*SING*
ACORDAR1	*WAKE-UP1*	CANTAR2	*SING2*
ACORDAR2	*ACORDAR2*	CHEIRAR2	*SMEEL2*
ACOSTUMAR1	*BE_HABITUATE1*	CHORAR	*CRY*
ADMIRAR	*ADMIRE*	CHORAR2	*CRY2*
ADORAR	*ADORE*	CHORAR3	*CRY3*
ADORMECER1	*FALL_ASLEEP1*	COBRIR_SE	*COVER_BLANKET*
ADORMECER2	*FALL_ASLEEP2*	COMER	*EAT*
ADOTAR	*ADOPT*	COMER	*EAT*
AMAMENTAR	*BREASTFEED*	COMPREENDER	*COMPREHEND*
AMAR1	*LOVE1*	COMUNGAR	*TAKE_COMMUNION*
AMAR2	*LOVE2*	CONFESSAR	*CONFESS*
APALPAR2	*PALP2*	CONHECER	*BE_FAMILIAR_WITH*
APARECER_TV	*APPEAR_TV*	CONSEGUIR	*CONQUER*
APRENDER	*LEARN*	CONTAR	*TELL*
ARRANCAR_DENTE	*LOOSE_TOOTH*	CORRER	*RUN*
ARREPENDER	*REGRET*	DANCAR	*DANCE*
ARROTAR	*BURP*	DECIDIR	*DECIDE*
ASFIXIAR1	*ASPHYXIATE1*	DECORAR	*MEMORIZE*
ASFIXIAR2	*ASPHYXIATE2*	DEFECAR	*DEFECATE*
ASSISTIR	*WATCH*	DESABAFAR	*RELIEVE_FROM*
ASSISTIR2	*WATCH2*	DESCANSAR	*REST*
ASSISTIR3	*WATCH3*	DESCONFIAR	*SUSPECT*
ASSUSTAR	*GET_SCARED*	DESCULPAR	*APOLOGIZE*
BABAR	*SLOBBER*	DESEJAR	*DESIRE*
BALBUCIAR	*BABBLE*	DISCURSAR	*GIVE_SPEECH*

DORMIR1	*SLEEP1*	JURAR	*VOW*
DORMIR2	*SLEEP2*	JURAR2	*VOW2*
ENFORCAR	*STRANGLE*	LEMBRAR	*REMEMBER*
ENGOLIR	*SWALLOW*	MEDITAR	*MEDITATE*
ENGOLIR2	*SWALLOW2*	MENSTRUAR	*MENSTRUATE*
ENSURDECER	*DEAFEN*	MENSTRUAR2	*MENSTRUATE2*
ENTENDER	*UNDERSTAND*	MENSTRUAR3	*MENSTRUATE3*
ENTREVISTAR	*INTERVIEW*	MENTIR	*LIE*
ESFOLAR	*BRUISE*	MORRER	*DIE*
ESFORÇAR	*MAKE_EFFORT*	MUDAR_OPINIAO	*CHANGE_MIND*
ESMOLAR	*BEG*	NÃO_PODER	*CAN_NOT*
ESPALHAR	*SPREAD_NEWS*	NÃO_VER	*SEE_NOT*
ESPIAR	*SPY*	NASCER	*BE_BORN*
ESPIAR2	*SPY2*	ODIAR1	*HATE1*
ESPIRRAR	*SNEEZE*	OUVIR	*HEAR*
ESPIRRAR2	*SNEEZE2*	PALPITAR	*BEAT_HEART*
ESQUECER	*FORGET*	PAPEAR	*CHATTER*
EVITAR	*AVOID*	PAQUERAR2	*FLIRT2*
EXCITAR	*AROUSE*	PARECER	*SEEM*
FALAR1	*SPEAK3*	PASSEAR	*GO_FOR_WALK*
FAREJAR	*SNUFF*	PECAR	*SIN*
FILMAR	*FILM*	PENSAR	*THINK*
FOFOCAR1	*GOSSIP1*	PERCEBER2	*PERCEIVE2*
FOFOCAR2	*GOSSIP2*	PISCAR	*BLINK*
FUMAR	*SMOKE*	PRECIPITAR-SE	*HASTEN*
FUMAR_MACONHA	*SMOKE_WEED*	PREOCUPAR-SE	*WORRY*
GABAR-SE	*BRAG*	PROMETER	*PROMISE*
GASTAR	*SPEND_MONEY*	PROVAR	*PROVE*
GOSTAR	*LIKE*	RECLAMAR	*COMPLAIN*
GOZAR	*HAVE_ORGASM*	RECUAR	*RETREAT*
GOZAR2	*HAVE_ORGASM2*	RONCAR	*SNORE*
GRITAR	*SCREAM*	SABER	*KNOW*
IDEIA	*HAVE_IDEA*	SALVAR	*SAVE*
INJETAR_SERINGA	*INJECT_SYRINGE*	SALVAR2	*REDEEM*
JEJUAR	*ABSTAIN_FOOD*	SENTIR	*FEEL1*

SENTIR2	*FELL2*	TER	*HAVE*
SERVIR	*SERVE*	TOMAR_BANHO	*TAKE_SHOWER*
SOFRER	*SUFFER*	TORCER	*CHEER*
SONHAR	*DREAM*	TOSSIR	*COUGH*
SONHAR2	*DREAM2*	TRAIR	*BETRAY*
SUAR	*SWEAT*	TREMER2	*SHAKE2*
SUAR2	*SWEAT2*	VACINAR	*VACCINATE*
SUSSURAR	*WHISPER*	VESTIR-SE	*WEAR*
TEMER	*BE_AFRAID*	VOAR	*FLY*
TEMER2	*BE_AFRAID2*	VOMITAR	*VOMIT*
TENTAR	*TRY*		

Appendix 4

List of verbs – Non-agreeing verbs and body-anchoring

Non-agreeing verbs articulated on *head*

ABAIXAR_ORELHAS	*EARS_DOWN*	BEBER2	*DRINK2*
ABANAR	*FAN_SELF*	BEBER3	*DRINK3*
ABISMAR	*SHOCK*	BEIJAR1	*KISS1*
ACHAR	*SUPPOSE*	BOCEJAR	*YAWN*
ACORDAR1	*WAKE-UP1*	CALAR_BOCA	*SHUT_UP*
ACORDAR2	*ACORDAR2*	CANTAR	*SING*
ADMIRAR	*ADMIRE*	CANTAR2	*SING2*
ADORMECER1	*FALL_ASLEEP1*	CHEIRAR2	*SMEEL2*
ADORMECER2	*FALL_ASLEEP2*	CHORAR	*CRY*
ADOTAR	*ADOPT*	CHORAR2	*CRY2*
APARECER_TV	*APPEAR_TV*	CHORAR3	*CRY3*
APRENDER	*LEARN*	COMER	*EAT*
ARRANCAR_DENTE	*LOOSE_TOOTH*	COMER	*EAT*
ARREPENDER	*REGRET*	COMPREENDER	*COMPREHEND*
ARROTAR	*BURP*	COMUNGAR	*TAKE_COMMUNION*
ASFIXIAR1	*ASPHYXIATE1*	CONFESSAR	*CONFESS*
ASFIXIAR2	*ASPHYXIATE2*	CONHECER	*BE_FAMILIAR_WITH*
ASSISTIR	*WATCH*	CONSEGUIR	*CONQUER*
ASSISTIR2	*WATCH2*	CONTAR	*TELL*
ASSISTIR3	*WATCH3*	DECIDIR	*DECIDE*
BABAR	*SLOBBER*	DECORAR	*MEMORIZE*
BALBUCIAR	*BABBLE*	DESABAFAR	*RELIEVE_FROM*
BALBUCIAR_SINAIS	*BABBLE_SIGN*	DESCONFIAR	*SUSPECT*
BATIZAR	*BAPTIZE*	DESCULPAR	*APOLOGIZE*
BEBER1	*DRINK*	DISCURSAR	*GIVE_SPEECH*

DORMIR1	*SLEEP1*	MUDAR_OPINIAO	*CHANGE_MIND*
DORMIR2	*SLEEP2*	NÃO_VER	*SEE_NOT*
ENSURDECER	*DEAFEN*	OUVIR	*HEAR*
ENTENDER	*UNDERSTAND*	PAQUERAR2	*FLIRT2*
ENTREVISTAR	*INTERVIEW*	PARECER	*SEEM*
ESPALHAR	*SPREAD_NEWS*	PENSAR	*THINK*
ESPIAR	*SPY*	PERCEBER2	*PERCEIVE2*
ESPIAR2	*SPY2*	PISCAR	*BLINK*
ESPIRRAR	*SNEEZE*	PRECIPITAR-SE	*HASTEN*
ESPIRRAR2	*SNEEZE2*	PREOCUPAR-SE	*WORRY*
ESQUECER	*FORGET*	PROMETER	*PROMISE*
EVITAR	*AVOID*	PROVAR	*PROVE*
FALAR1	*SPEAK3*	RECLAMAR	*COMPLAIN*
FAREJAR	*SNUFF*	RONCAR	*SNORE*
FILMAR	*FILM*	SABER	*KNOW*
FOFOCAR1	*GOSSIP1*	SALVAR	*SAVE*
FOFOCAR2	*GOSSIP2*	SONHAR	*DREAM*
FUMAR	*SMOKE*	SONHAR2	*DREAM2*
FUMAR_MACONHA	*SMOKE_WEED*	SUAR	*SWEAT*
GRITAR	*SCREAM*	SUAR2	*SWEAT2*
IDEIA	*HAVE_IDEA*	SUSSURAR	*WHISPER*
JEJUAR	*ABSTAIN_FOOD*	TEMER2	*BE_AFRAID2*
JURAR	*VOW*	TENTAR	*TRY*
JURAR2	*VOW2*	TORCER	*CHEER*
LEMBRAR	*REMEMBER*	TOSSIR	*COUGH*
MENSTRUAR2	*MENSTRUATE2*	TRAIR	*BETRAY*
MENSTRUAR3	*MENSTRUATE3*	VOMITAR	*VOMIT*
MENTIR	*LIE*		

Non-agreeing verbs articulated on *body*

ABORTAR	*MISCARRY*	ACALMAR_SE	*CALM_DOWN2*
ABOTOAR	*BUTTON*	ADORAR	*ADORE*
ABRAÇAR	*HUG*	AMAMENTAR	*BREASTFEED*
ABSTER2	*ABSTAIN2*	AMAR1	*LOVE1*
ACALENTAR	*LULL_TO_SLEEP*	AMAR2	*LOVE2*

APALPAR2	*PALP2*	NÃO_PODER	*CAN_NOT*
ASSUSTAR	*GET_SCARED*	NASCER	*BE_BORN*
BANHAR	*BATH*	ODIAR1	*HATE1*
COBRIR_SE	*COVER_BLANKET*	PALPITAR	*BEAT_HEART*
DANCAR	*DANCE*	PAPEAR	*CHATTER*
DEFECAR	*DEFECATE*	PASSEAR	*GO_FOR_WALK*
DESCANSAR	*REST*	PECAR	*SIN*
DESEJAR	*DESIRE*	RECUAR	*RETREAT*
ENFORCAR	*STRANGLE*	SALVAR2	*REDEEM*
ENGOLIR	*SWALLOW*	SENTIR	*FEEL1*
ENGOLIR2	*SWALLOW2*	SENTIR2	*FELL2*
EXCITAR	*AROUSE*	SERVIR	*SERVE*
GABAR-SE	*BRAG*	SOFRER	*SUFFER*
GASTAR	*SPEND_MONEY*	TEMER	*BE_AFRAID*
GOSTAR	*LIKE*	TER	*HAVE*
GOZAR	*HAVE_ORGASM*	TOMAR_BANHO	*TAKE_SHOWER*
GOZAR2	*HAVE_ORGASM2*	TREMER2	*SHAKE2*
MENSTRUAR	*MENSTRUATE*	VESTIR-SE	*WEAR*
MORRER	*DIE*	VOAR	*FLY*

Non-agreeing verbs articulated on *arm*

ACOSTUMAR1	*BE_HABITUATE1*	INJETAR_SERINGA	*INJECT_SYRINGE*
ESFOLAR	*BRUISE*	VACINAR	*VACCINATE*

Appendix 5

List of verbs – Telic verbs

Telic verbs with [direction] only			
ABARROTAR	*ABOUND*	APRESENTAR	*INTRODUCE*
ABISMAR	*SHOCK*	APROVAR	*BE_APPROVED*
ABREVIAR	*ABREVIATE*	ARRANCAR_DENTE	*EXTRACT_TOOTH*
ABSTER	*REFRAIN_FROM*	ASSALTAR	*ASSAULT*
ACABAR1	*FINISH1*	ASSUSTAR	*GET_SCARED*
ACABAR2	*FINISH2*	ATIRAR	*SHOOT*
ACABAR3	*FINISH3*	BATER	*PUNCH*
ACELERAR_CARRO	*SPEED_UP_CAR*	BATIZAR2	*BAPTIZE2*
ACENDER_FOSFORO	*TURN_ON_MATCH*	BEBER1	*DRINK*
AÇOITAR	*WHIP*	BEBER3	*DRINK3*
ACONSELHAR	*ADVISE*	BEIJAR1	*KISS1*
AVISAR	*TELL*	BEIJAR2	*KISS2*
ACONTECER1	*HAPPEN1*	BEIJAR_BOCA1	*KISS_MOUTH1*
ACORDAR2	*ACORDAR2*	BRINDAR	*MAKE_TOAST*
COMBINAR1	*MAKE_AGREEMENT*	BUZINAR	*HONK*
ACUSAR	*ACCUSE*	CARIMBAR	*STAMP*
ADAPTAR	*ADAPT*	CASAR	*MARRY*
ADICIONAR	*ADD*	CASAR2	*MARRY*
ADOECER	*GET_SICK*	CEIFAR	*HARVEST*
AFASTAR1	*SEPARATE1*	CHEGAR	*ARRIVE*
SOCAR	*PUNCH*	CHEGAR2	*CHEGAR2*
AJUDAR1	*HELP1*	CHUTAR	*KICK*
AJUDAR2	*HELP2*	COBRIR_SE	*COVER_BLANKET*
AMARRAR	*TIE*	COMEÇAR	*START*
AMPUTAR	*AMPUTATE*	COMPRAR	*BUY*
ANTECIPAR1	*ANTECIPATE1*	COMUNGAR	*TAKE_COMMUNION*
APARECER_TV	*APPEAR_ON_TV*	CONCENTRAR	*(GET)_CONCENTRATE*
APONTAR1	*POINT1*	CONVIDAR	*INVITE*
APONTAR2	*POINT2*	CORTAR2	*CUT2*

DAR	*GIVE*	MANDAR	*COMMAND*
DECAIR	*DECAY*	MATAR	*KILL*
DECORAR	*MEMORIZE*	MEMORIZAR	*MEMORIZE2*
DECRESCER	*DIMINISH*	MOSTRAR	*SHOW*
DELATAR	*DENOUNCE*	MOSTRAR2	*SHOW2*
DESCOBRIR	*FIND_OUT*	OBRIGAR2	*FORCE2*
DESCONTAR	*DEDUCT*	OPINAR	*GIVE_OPINION*
DIRIGIR_ATE	*DRIVE_TO*	PAGAR	*PAY*
DIVIDIR	*SPLIT*	PAGAR2	*PAY2*
ELOGIAR	*GIVE_PRAISE*	PARAR	*STOP*
EMPRESTAR2	*LEND2*	PARAR2	*STOP2*
ENCONTRAR	*MEET*	PEDIR2	*ASK2*
ENFORCAR	*HANG*	PENDURAR	*HANG*
ENGOLIR	*SWALLOW*	PERDER	*LOSE*
ENTERRAR	*BURY*	PERGUNTAR	*ASK*
ENTRAR	*GO_IN*	PREJUDICAR	*HARM*
ESBOFETEAR	*SLAP_FACE*	PROCURAR2	*REACH_SOMEONE*
ESCAPAR	*ESCAPE*	PROSPERAR	*PROSPERATE*
ESCAPAR2	*ESCAPE2*	PROVAR	*PROVE*
ESPIRRAR	*SNEEZE*	PUXAR	*PULL*
ESTUPRAR	*RAPE*	RECUAR	*RETREAT*
FALAR2	*SPEAK4*	RESPONDER	*ANSWER*
FILIAR-SE	*JOIN_ORGANIZATION*	SEGUIR	*FOLLOW*
FINCAR	*THRUST_IN*	SENTAR-SE	*SIT*
FREAR	*BRAKE*	SERVIR2	*SERVE2*
GUARDAR	*STORE*	TRANSFERIR	*TRANFER*
TER_IDEIA	*HAVE_IDEA*	TRAUMATIZAR	*TRAUMATIZE*
IMPOR	*IMPOSE*	VER	*SEE*
IMPRIMIR	*PRINT*	VISITAR	*VISIT*
INCHAR	*SWELL*	VISITAR2	*VISIT2*
IR	*GO*	VOLTAR	*RETURN*
LAÇAR	*LASSO*	VOTAR	*VOTE*
TELEFONAR	*CALL_PHONE*		

Telic verbs with [direction] + handshape change

ABANDONAR1	*GIVE_UP1*	SUMIR	*VANISH*
ABENCOAR	*BLESS*	ESCOLHER	*CHOOSE*
ABOCANHAR	*BITE_OFF*	ESPIRRAR2	*SNEEZE2*
ABORTAR	*MISCARRY*	EXPLODIR	*EXPLODE*
ABSORVER	*ASSIMILATE*	EXPULSAR	*EXPEL*
ABSORVER2	*SUCK_UP*	INSULTAR	*INSULT*
ABSORVER3	*EXTRACT*	JOGAR	*THROW*
ABSORVER_MENTE	*ASSIMILATE*	LIBERAR	*SET_FREE*
ABUSAR	*ABUSE*	MULTAR	*FINE*
ACEITAR	*ACCEPT*	OFENDER	*OFFEND*
ADMISSÃO	*ADMITTANCE*	OUVIR	*HEAR*
AGARRAR1	*GRASP*	PEGAR	*TAKE_GRASP*
PEGAR	*CATCH*	PERCEBER2	*PERCEIVE2*
ATACAR	*ATTACK*	RESPIRAR	*BREATH*
BICAR	*PECK*	ROUBAR2	*STEAL2*
CHAMAR	*CALL*	SAIR	*LEAVE*
CHEIRAR	*SMELL*	SECAR	*DRY*
COLAR	*GLUE*	SORTEAR	*RAFFLE*
COMPLEMENTAR	*ADD*	SUMIR	*DISAPPEAR*
CONQUISTAR	*OBTAIN*	TOCAR	*TOUCH*
COPIAR	*COPY*	VACINAR	*VACCINATE*
CORTAR	*CUT*	VENCER	*WIN*
CRIAR	*CREATE*	VIAJAR	*TRAVEL*
CURAR	*HEAL*	VIAJAR2	*TRAVEL2*
CUSPIR	*SPIT*	VOMITAR	*VOMIT*
DESABAFAR	*RELIEVE_FROM*	VENDER	*SELL*

Telic verbs with [direction] + orientation change

ACABAR4	*FINISH4*	ENVIAR_E-MAIL	*SEND_E-MAIL*
ACOSTUMAR2	*GET_HABITUATE2*	EMPRESTAR	*LEND*
AFASTAR2	*SEPARATE2*	ESCONDER	*HIDE*
AFIXAR	*FIX*	JUNTAR_MORAR	*SHACK_UP*
COLOCAR	*PUT*	MORRER	*DIE*
DAR2	*GIVE2*	NASCER	*BE_BORN*
DEMITIR	*FIRE*	PRENDER	*ARREST*
DEPILAR	*DEPILATE*	RECEBER	*RECEIVE*
DESTRUIR	*DESTROY*	SALVAR	*SAVE*
DIVORCIAR	*DIVORCE*	SUBSTITUIR	*SUBSTITUTE*
EJACULAR	*EJACULATE*		

Telic verbs with [direction] + handshape change + orientation change

ABRIGAR	*ACCOMMODATE*	REJEITAR	*REJECT*

Telic verbs with handshape change only

ABAIXAR_ORELHAS	*EARS_DOWN*	ESQUECER	*FORGET*
ABOTOAR	*BUTTON*	FORMAR-SE	*GRADUATE*
ACORDAR1	*WAKE-UP1*	FOTOGRAFAR	*PHOTOGRAPH*
ADORMECER1	*FALL_ASLEEP1*	FOTOGRAFAR2	*PHOTOGRAPH2*
ADOTAR	*ADOPT*	INJETAR_SERINGA	*INJECT_SYRINGE*
APAGAR2	*TURN_OFF*	PEDIR	*ASK*
CALAR_BOCA	*SHUT_UP*	ROUBAR	*STEAL*
COPIAR2	*COPY2*	RESUMIR	*SUMMARIZE*
DORMIR1	*SLEEP1*	SUBORNAR	*BRIBE*
ENSURDECER	*DEAFEN*	SUBTRATIR	*SUBTRACT*

Telic verbs with orientation change only

ABAIXAR_RABO	*TAILS_DOWN*	DECIDIR	*DECIDE*
ABRIR_ALGO	*OPEN_SOMETHING*	ENGOLIR2	*SWALLOW2*
ACAREAR	*CONFRONT_FACE_TO_FACE*	ESFORÇAR	*MAKE_EFFORT*
ACONTECER2	*HAPPEN2*	GOZAR	*HAVE_ORGASM*
ACRESCENTAR_COLHER	*ADD_WITH_SPOON*	IR2	*GO2*
ANTECIPAR2	*ANTECIPATE2*	LEVAR2	*TAKE_AWAY*
APOSTAR1	*BET1*	MARTELAR	*HAMMER*
ASSINAR	*SIGN*	MUDAR_OPINIAO	*CHANGE_MIND*
BATER_PORTA	*KNOCK_DOOR*	PROMETER	*PROMISE*
BATIZAR1	*BAPTIZE1*	QUEBRAR	*BREAK*
CALÇAR	*SHOE*	SAIR2	*LEAVE2*
CANCELAR	*CANCEL*	TRADUZIR	*TRANSLATE*
CANCELAR2	*CANCEL2*	TRAIR	*BETRAY*
COMEÇAR2	*START2*	TRANCAR	*LOCK*
CONSEGUIR	*CONQUER/ACHIEVE*		

Telic verbs with handshape change + orientation change

ABANDONAR2	*GIVE_UP2*	AGARRAR2	*CATCH*
ACABAR_NAMORO	*BREAK_UP*	APAGAR_LUZ	*TURN_OFF_LIGHT*
ACENDER_LUZ	*TURN_ON_LIGHT*	DESABROCHAR	*BLOSSOM*
ADORMECER2	*FALL_ASLEEP2*	MATAR_ARMA	*KILL_GUN*

Telic verbs with setting change only

ADIAR	*POSTPONE*	MUDAR	*MOVE*
AGASALHAR	*DRESS_WARM*	TROCAR2	*CHANGE2*

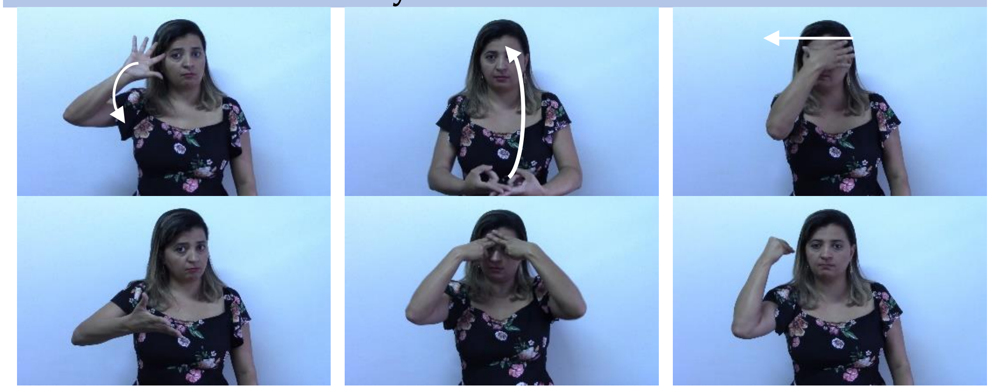
Telic verb with handshape change + setting change

SALVAR2	*REDEEM*

Appendix 6

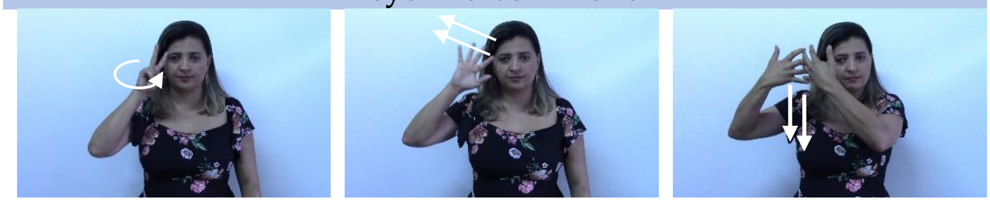
Stimuli for Experiments 1-3

Psych verbs - Telic



DECIDE TRAUMATIZE FORGET

Psych verbs - Atelic



REMEMBER DREAM PONDER

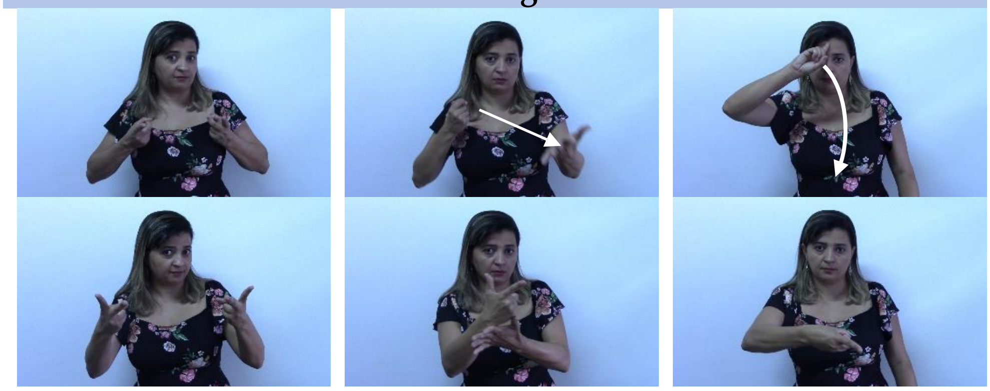
Physical events - Telic

ARRIVE | LEAVE | SUBSTITUTE

Physical events - Atelic

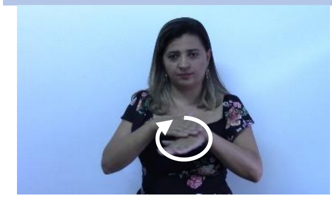
WORK | PLAY | STUDY

Social exchanges - Telic



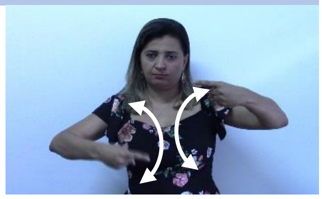
SELL | BUY | COMMAND

Social exchanges - Atelic



TALK

INTERACT



DISCUSS